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Energy Efficiency Standards in Buildings

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Environmental impact of buildings

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In the developed world, buildings are responsible for:

- consuming over **70%** of the **electrical power generated**
- consuming **40%** of **primary energy**
- **40%** of **CO_2 emissions** from combustion

Environmental impact of buildings

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- Developing countries will need to accommodate **2.4 billion** new urban residents by 2050

Joint Task Force on Energy Efficiency Standards in Buildings

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- Committee on Sustainable Energy and the Committee on Housing and Land Management
- Sustainable Development Goals – SDG7 (and others)
- Sustainable Energy for All Initiative
- Geneva UN Charter on Sustainable Housing

Joint Task Force on Energy Efficiency Standards in Buildings: Planned Activities

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a) Mapping energy efficiency standards in buildings and preparing gap analyses
b) Evaluating options for the development, adoption or promotion of energy efficiency standards in buildings
c) Preparing guidance materials
d) Promoting partnerships with other international organizations
e) Establishing a network of experts on ee in buildings
f) Developing and organizing training programmes

Framework guidelines for EE standards in buildings

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A holistic, systems approach

to building design,

delivery,

and operation

Framework guidelines for EE standards in buildings

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Energy required by buildings can be supplied largely, perhaps exclusively, by *non-carbon-based energy*

High Performance Buildings

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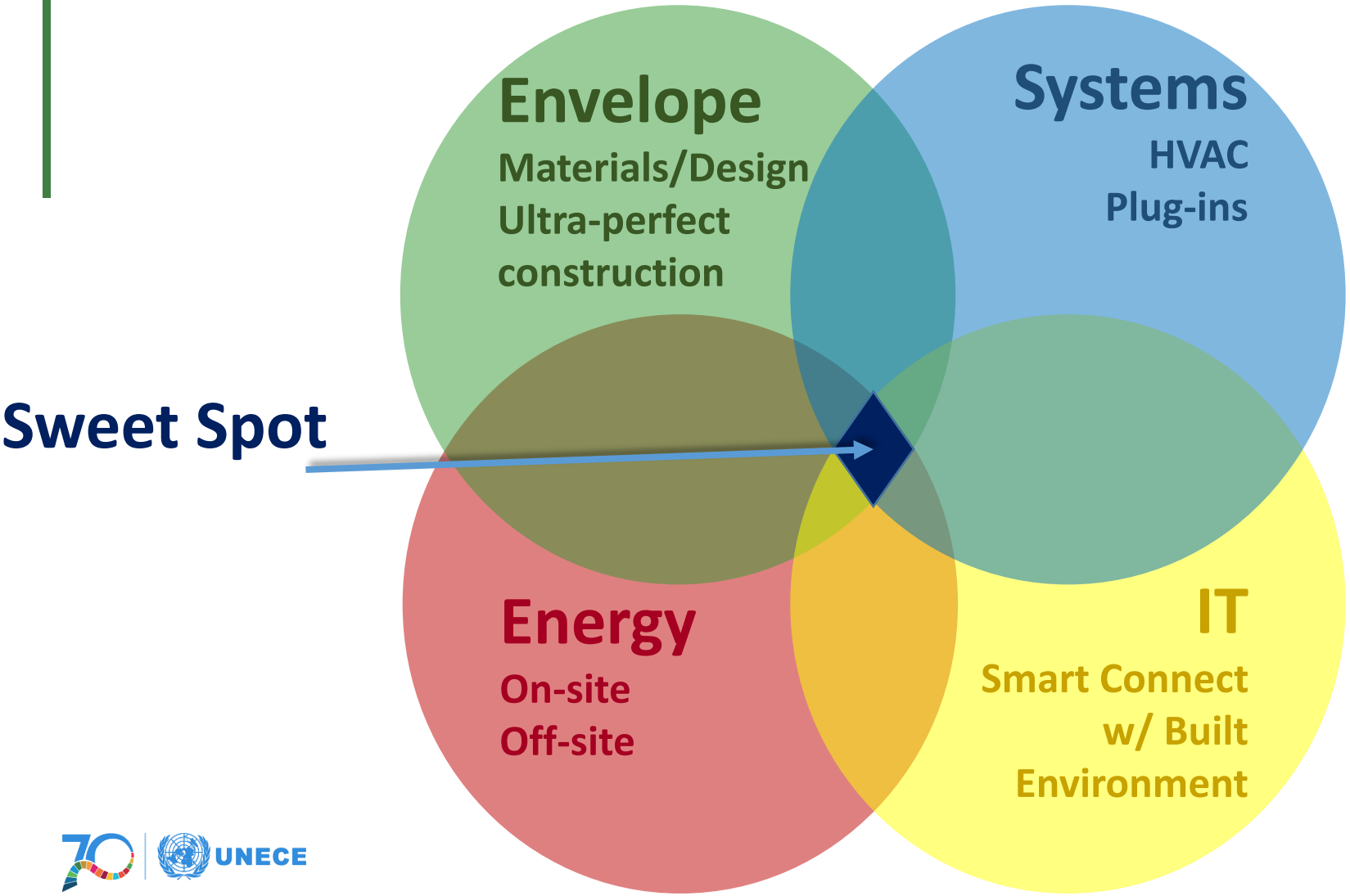

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Strategic – Buildings must be:

- **Science-based**: design, construction, and management
- **Financed** through policies recognizing the value of better buildings
- **Service-oriented**: meet the sustainability demands of the populations served
- **Integrated** with their built environment life-cycle to connect buildings as energy generators and consumers
- **Cost effective** to mobilize private investment and entrepreneurs
- **Performance-monitored** with feedback loops to operations and design tools
- **Performance-based**: evaluated by system outcomes, not component prescriptions

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Design and Construction – Conception/delivery of buildings must be:

- **Holistic and integrated:** recognize buildings and their environment are part of a system.
- **Affordable**: high performance buildings costing the same as or less than in 2016
- **Validated:** based on energy models that reliably predict actual building performance
- **Sustainable:** made using sustainable materials, equipment, construction, management and retirement practices
- **Code-driven:** with local adaptation of global building standards
- **Skills based:** develop work-forces to provide technology/skills needed for design, construction and operation

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Management – Building must be maintained over their life-cycle:

- **Commissioning:** With commissioning and re-commissioning of active systems
- **Performance-based:** With on-going benchmarking, monitoring & reporting of performance data
- **Certification:** Maintain certification or labelling to ensure energy performance is incorporated in to asset value
- **Managed**: professionally managed large or complex buildings with ethos of sustainability & social responsibility
- **Data-linked**: with advanced building information management capacity, where public infrastructure permits
- **Evaluated:** On going performance evaluation and improvement
- **City-scaled:** information analysis and outcomes
- **Life cycle-based:** with long term analysis

Performance Javelin Throw

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Passive
New build, space conditioning
➔
15 kWh/m2/a

Passive
Retrofit space conditioning
➔
25 kWh/m2/a

High Perform
Retrofit, space condition + HVAC and hot water
➔
45 kWh/m2/a

High Perform
Retrofit, space condition, HVAC, hot water, and plug-ins
➔
90 kWh/m2/a

Performance Javelin Throw

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UNECE's Framework Guidelines on Energy Efficiency Standards in Buildings can be found on our website at:

https://www.unece.org/index.php?id=45864

Framework guidelines for EE standards in buildings

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Implementation

- Dissemination
- Education
- Research
- Consultation
- Participation

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Practical steps

- Global research consortium
- Research and demonstration projects
- International Centers of Excellence

Near-term Programme for Framework Guidelines

Research Programme

Penn State Programme

Research Programme Agenda

Demonstration Projects (Maine, PHI, PITT, Ukraine)

Additional ICE MOU & Seminars (NYC; YVR; BRU; TSE)

Wexford Ice MOU & TOR

ICE

Oct Nov Dec Jan Feb Mar Apr

Resourcing Strategy and Outreach

Resourcing

Executive Committee

NYC/GVA/DC Joint Task Force

UN Events

Oversight; Outreach; Management

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Thank you!

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