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Framework Guidelines on 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

Environmental impact of buildings

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- In Europe **75-90%** of buildings standing today are expected to remain in use **in 2050**

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A holistic, systems approach

to building design,

delivery,

and operation

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- **Buildings as energy producers and not solely or primarily as *energy sinks***
- **Energy required by buildings can be supplied largely, perhaps exclusively, by *non-carbon-based energy***

High Performance Buildings

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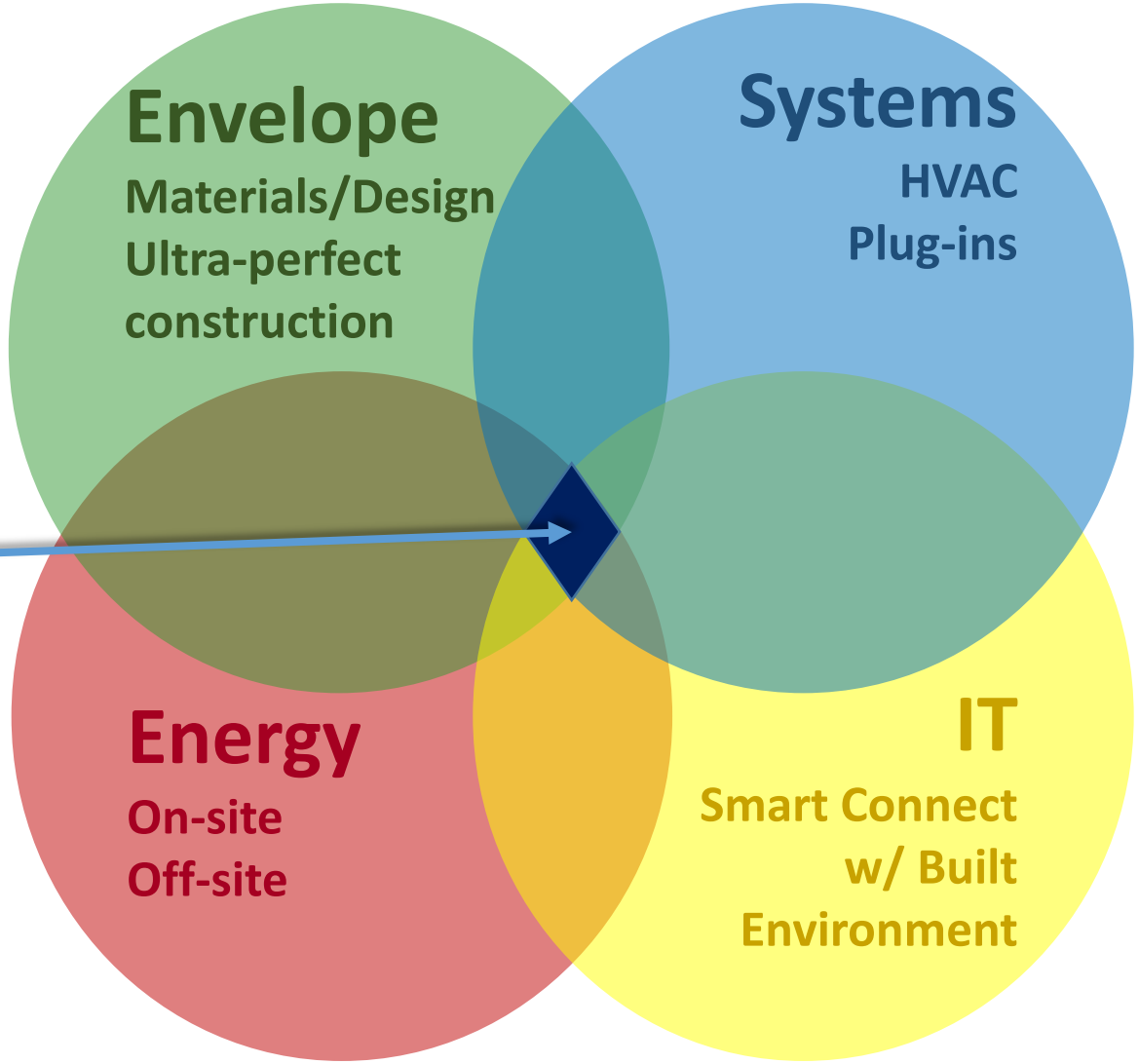

Sweet Spot

Guiding Principles:

- **Strategic approach**
- **Design and Construction – conception/ delivery**
- **Management – maintenance over life-cycle**
- **Implementation**

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

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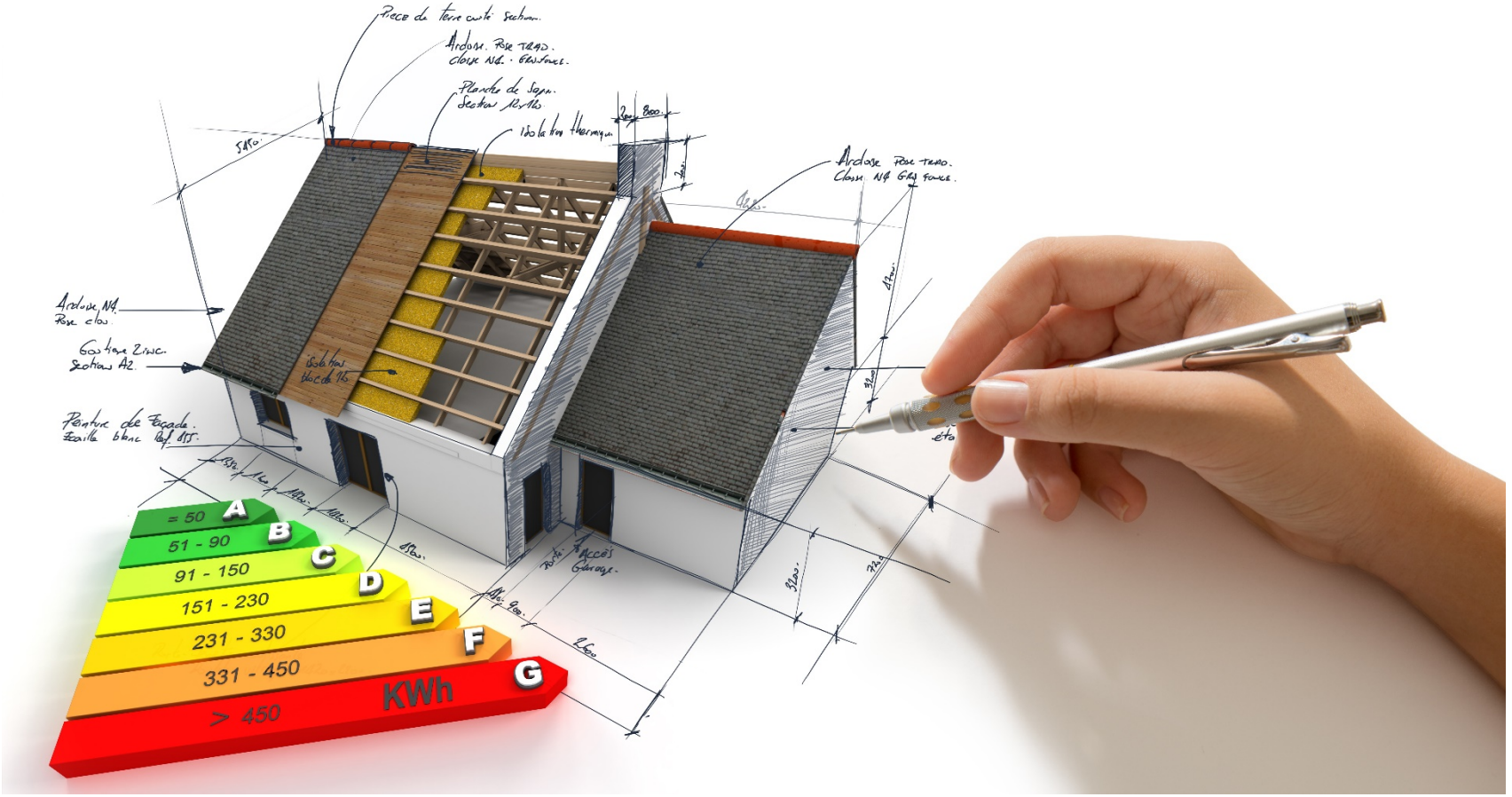

Targets

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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

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UNECE Framework Guidelines on Energy Efficiency Standards in Buildings can be found at:
https://www.unece.org/index.php?id=45864 and
https://www.unece.org/housing/committee78thsession.html
Direct links:
https://www.unece.org/fileadmin/DAM/energy/se/pdfs/geee/geee4_Oct2017/ECE_ENERGY_GE.6_2017_4_EEBuildingGuidelines_final.pdf (as endorsed by the Committee on Sustainable Energy) and
https://www.unece.org/fileadmin/DAM/hlm/documents/2017/ECE_HBP_2017_3.en.pdf (for endorsement by the Committee on Housing and Land Management)

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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

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Thank you!

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