

Technological, social and systemic innovations to impact on energy demand change in buildings

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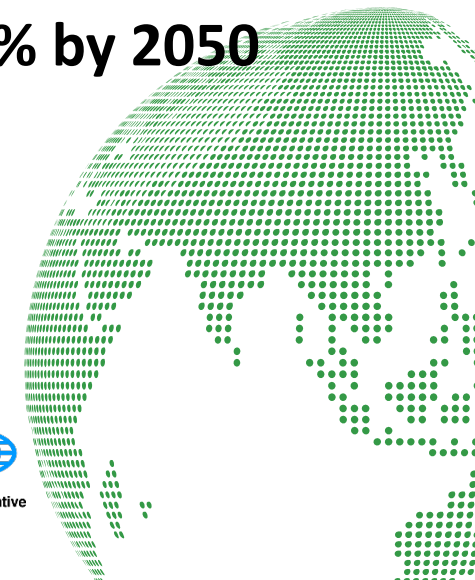
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Buildings are a key component of the built environment, supporting human activities and wellbeing, but driving significant energy and material demands

Buildings account for 21% of global GHG emissions in 2019: 57% indirect, 24% direct, 18% embodied emissions

Global mitigation potential of buildings 61% by 2050 compared to a baseline scenario

Ref: IPCC AR6 WGIII Chapter 9



A complex sector...

The building sector is fragmented, heterogenous, tightly linked to local contexts, and involving by multiple actors

Global North: mitigation potential strongly relying on the renovation of older and inefficient buildings

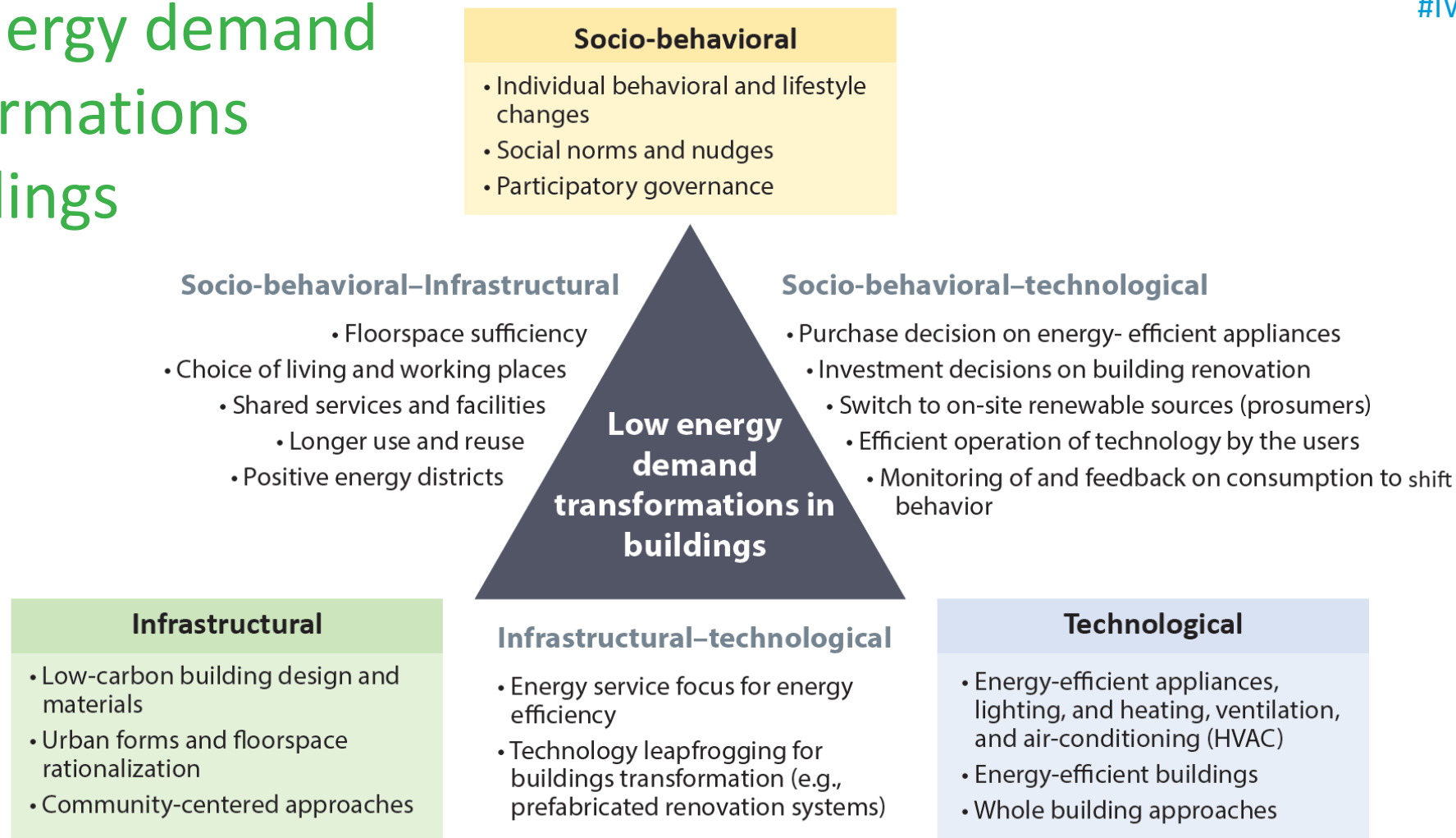
Global South: unprecedented stock expansion expected.

Providing low carbon buildings while improving decent living standards is key



Low-energy demand transformations in buildings

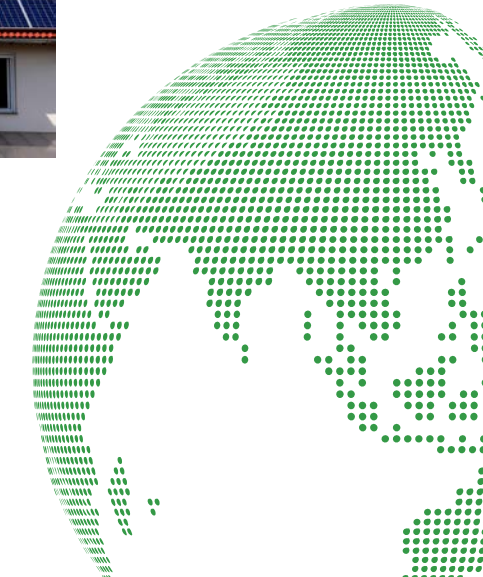
2 and 3 November 2023
Progress by Innovation
#IVECFForum23



Ref: Mastrucci, Niamir, Boza-Kiss, et al. *Modeling Low Energy Demand Futures for Buildings: Current State and Research Needs*. Annual Reviews of Environment and Resources (In press)

Technological transformation

- Energy-efficient buildings
- Energy-efficient appliances, heating and cooling systems
- Whole-buildings solutions and on-site renewable energy sources



Infrastructural transformation

- Low-carbon design and materials
- Urban forms and floorspace sufficiency
- Community-centered approaches



Socio-behavioural transformation

- Behavioural and lifestyle changes
- Social norms and nudges
- Participatory governance



Megatrends

Digitalization

Teleworking, smart meters, buildings information modelling (BIM), 3D printing

Sharing economy

Co-housing and co-working, sharing of appliances, community-based services

Circular economy

Reuse, re-purposing of buildings, lifetime extension, low-carbon and recycled materials

Decent living standards

Durable and affordable housing, sufficient space, access to clean and affordable technologies



Conclusions

- **Buildings play a key role in the decarbonization of cities** while supporting human activities and wellbeing
- **Technological, infrastructural and socio-economical transformations** and innovation are crucial in energy demand change in buildings
- Importance of **holistic strategies addressing the whole life-cycle** of buildings, and **systemic approaches** bridging across different sectors and dimensions



Thank you for your attention!

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