Energy Epidemiology: A New Best Practice Building Energy Model Report Guideline

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Shifting to a zero-carbon, efficient and resilient building stock
Buildings sector energy use continues to rise

Global direct CO₂ emission reductions by mitigation in building in the net zero energy scenario 2050

Notes: Activity = change in energy service demand related to rising population, increased floor area and income per capita. Behaviour = change in energy service demand from user decisions, e.g. changing heating temperatures. Avoided demand = change in energy service demand from technology developments, e.g. digitalisation.

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Why change our current research and practice?

Many countries have plans to **significantly reduce energy use** or **improve energy intensity** from the building stock.

Much of this reduction needs to come through more **energy efficient built environments**, which are responsible for almost 36% of global emissions.

Globally energy efficiency refurbishment is estimated to result in the **investments of trillions of dollars**.
Studying the building... as a group

As a population
Epidemiology…

Is data driven, emphasis is on empirical evidence, distribution of a condition, understanding of underlying / driving factors

Focuses on understanding what is affecting the spread and severity of a condition

Uses research findings to inform past/future practices and policy

What is ‘Epidemiology’ and why is it relevant to energy use in buildings?

Energy epidemiology

The systematic study of the distributions and patterns of energy use and their causes or influences in populations.

What is energy epidemiology?
How would the research landscape change, if decarbonizing the building stock was treated like a health risk?

Framework for interdisciplinary research

Large-scale population studies on the distributions of prevalence and incidence, and identifying and understanding the factors affecting theses distributions, using empirical data!

Have established data collection protocols, analysis, and archiving as a shared resource, and place detailed studies in context.

Protocols for feedback of findings (e.g. failure rates, adverse outcomes, unintended consequences) and systematic reviews of evidence

Emphasis on research translation and engagement with policymakers and industry as part on an ongoing progressive research programme.
How can we better understand building stock models?

Building stock energy models (BSMs) offer a tool to assess the energy demand and environmental impact of building stocks, and can demonstrate and evaluate pathways for reducing their energy demand and respective GHG emissions.

The problem:
The heterogeneity of BSMs, together with a lack of consistency in the description and reporting of the models often hinders the understanding of the model, impeding an accurate interpretation and/or comparison of the results.

The proposal:
Annex 70 have developed reporting guideline in order to improve reporting practices in the field of building stock energy modelling.

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<th>Subtopic</th>
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| Overview | Aim and scope  
Modelling approach  
System boundary  
Spatio-temporal resolution |
| Model Components | Building stock  
People Environment  
Energy  
Costs Dynamics  
Other aspects |
| Input and outputs | Data sources  
Data processing  
Key assumptions |

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| Quality assurance | Calibration  
Validation  
Limitations  
Uncertainty  
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| Additional information | Implementation Access  
Funding and contributors  
Areas of application  
Key references |
## Building Stock Model reporting guidelines

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<tr>
<th>Topic</th>
<th>Subtopic</th>
<th>Guiding questions</th>
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<tbody>
<tr>
<td>Overview</td>
<td>Aim and scope</td>
<td>What is the overall aim and scope of the model? What are the main use cases addressed?</td>
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<tr>
<td></td>
<td>Modelling approach</td>
<td>What is the general modelling approach and how is it structured? What are the main model parts and components included in the model and how do they relate to each other? What are the key steps in the modelling workflow?</td>
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<tr>
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<td>System boundary</td>
<td>What are the system boundaries (temporal, geographical, building types, energy services, economic sectors, etc.) of the model?</td>
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<tr>
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<td>Spatio-temporal resolution</td>
<td>What is the spatio-temporal resolution of the model?</td>
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### Data registry of building stocks
How can we better identify building stock data?

Registry for Building Stock and Energy Data provides a tool for identifying and knowing what data is available around the world among Annex 70 member countries.

The data registry contains information on over 1000 datasets and will be launched in 2022.

THANK YOU

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