Energy Flexible Buildings and SRI in EPBD

IEA EBC Annex 67

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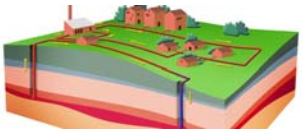
Common understanding that we need to replace fossil fuels with renewable energy







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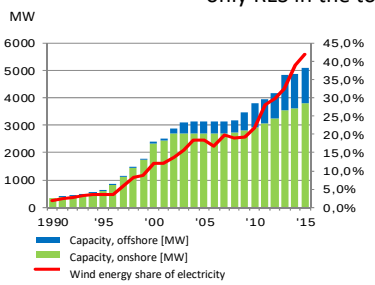
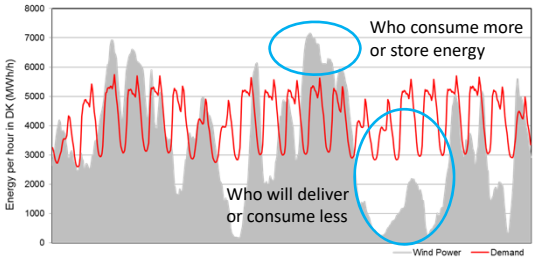
Example: Demnark
Goal: 50 % wind in power grid by 2020 and
only RES in the total energy system by 2050





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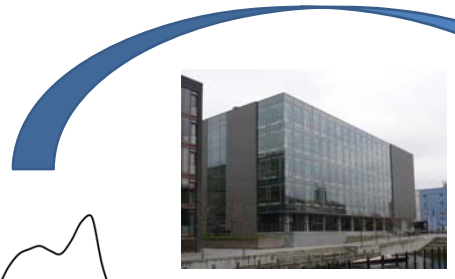
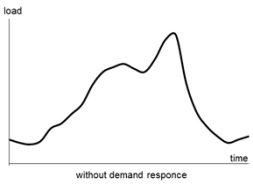
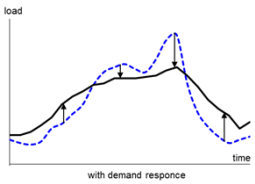
Most buildings have the ability to become energy flexible







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Commercial buildings

ventilation systems

cooling systems

supermarkets

pumps

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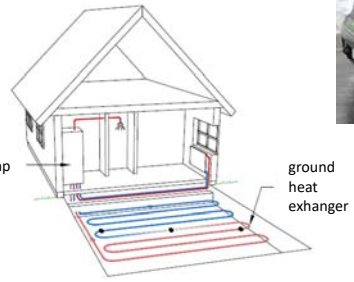
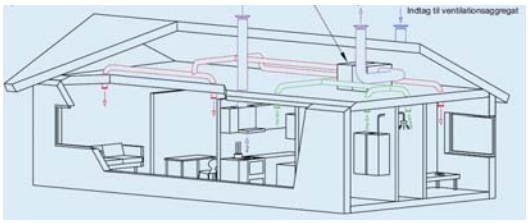
Electricity demand in households

heat pumps (aircondition)



EVs

ventilation systems



white goods

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Prosumers

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Definition of Energy Flexibility in buildings

The Energy Flexibility of a building is the ability to manage its demand and generation according to local climate conditions, user needs and grid requirements.

Energy Flexibility of buildings will thus allow for demand side management/load control and thereby demand response based on the requirements of the surrounding grids.

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What is the possible Energy Flexibility in buildings?

It depends

- type of building and energy service systems
- use of the building
- climate
- time of the day and the year
- occupants
- control possibilities
- state of storage (constructions, tank, battery, …)
- physical max vs. cost optimal energy flexibility
- surrounding grids
- energy tariffs
- …

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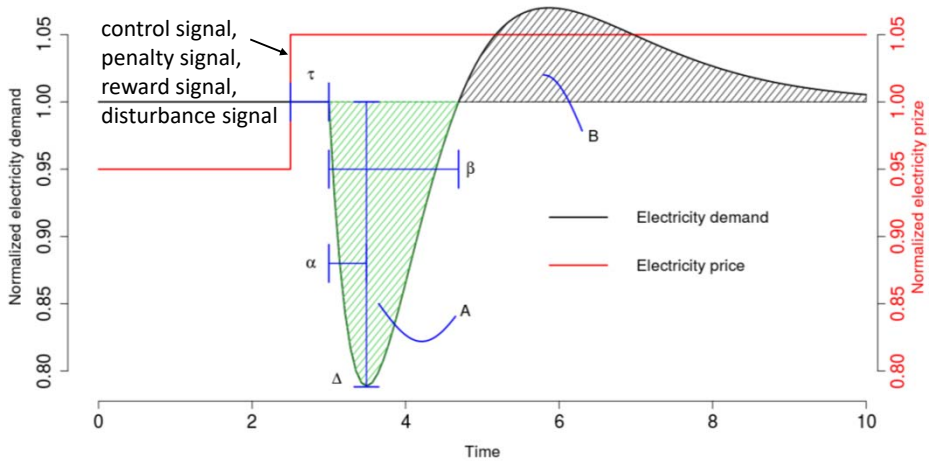
Characterization and labelling of Energy Flexibility in buildings



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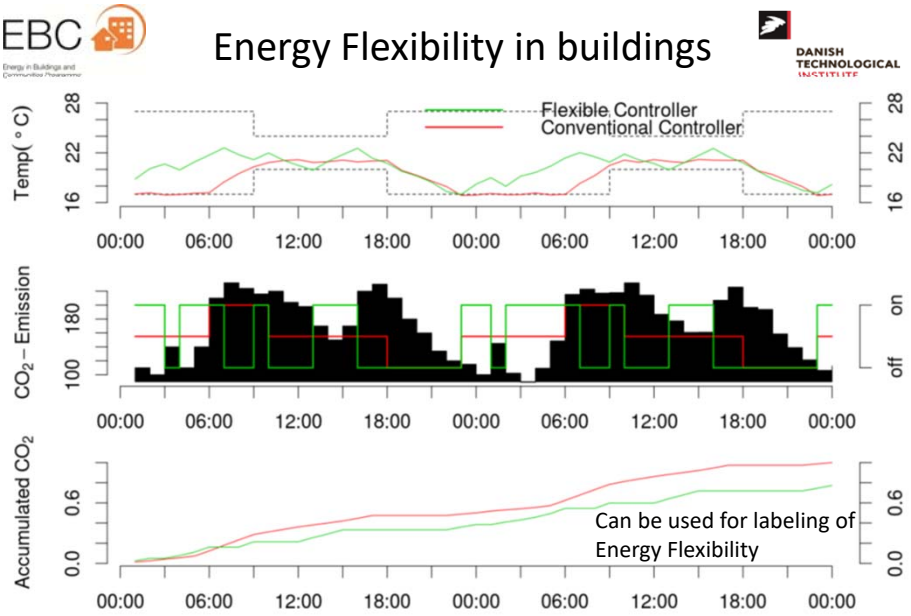
Energy Flexibility in buildings



Characterizing the Energy Flexibility of Buildings and Districts.
https://www.sciencedirect.com/science/article/pii/S030626191830730X

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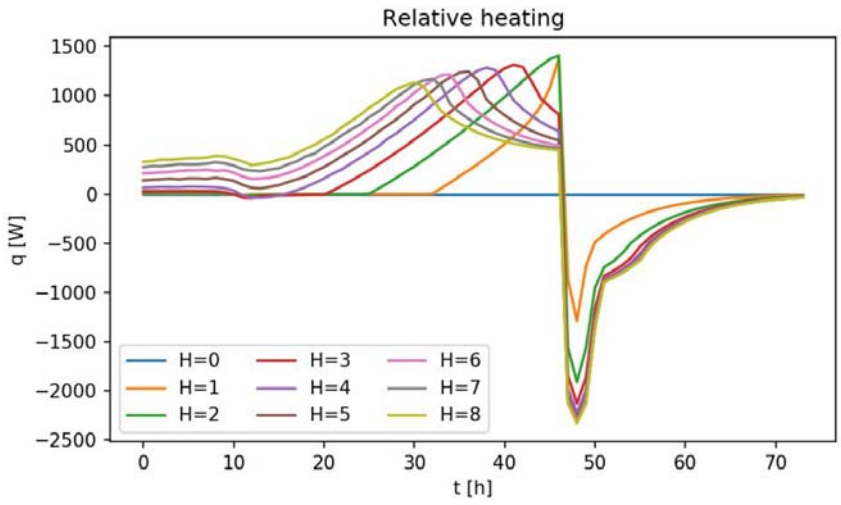
Pre-use of energy



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Output from Annex 67

- **Principles of Energy Flexible Buildings** summarizes the main findings of Annex 67 and targets all interested in what Energy Flexibility in buildings is, how it can be controlled, and which services it may provide.
- **Characterization of Energy Flexibility in Buildings** presents the terminology around Energy Flexibility, the existing indicators used to evaluate the flexibility potential and how to characterize and label Energy Flexibility.
- **Stakeholder perspectives on Energy Flexible buildings** displays the view point of different types of stakeholders towards Energy Flexible Buildings.
- **Control strategies and algorithms for obtaining Energy Flexibility in buildings** reviews and evaluates control strategies for Energy Flexibility in buildings.
- **Experimental facilities and methods for assessing Energy Flexibility in buildings** describes several test facilities including experiments related to Energy Flexibility and draws recommendations for future testing activities.
- **Examples of Energy Flexibility in buildings** summarizes different examples on how to obtain Energy Flexible Buildings.
- **Project Summary Report** brief summary of the outcome of Annex 67.

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Participating countries

- Austria
- Belgium
- Canada
- China
- Denmark
- Finland
- France
- Germany
- Ireland
- Italy
- Norway
- Portugal
- Spain
- Switzerland
- The Netherlands
- UK

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Website

annex67.org

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Smart Readiness Indicator

Smart Readiness Indicator in EBPD (Energy Performance in Buildings Directive)

- The introduction of a smartness indicator rating the readiness of the building to adapt its operation to the needs of the occupant and the grid, and to improve its performance
- The smartness indicator should be used to measure buildings' capacity to use ICT and electronic systems to optimise operation and interact with the grid

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SRI methodology

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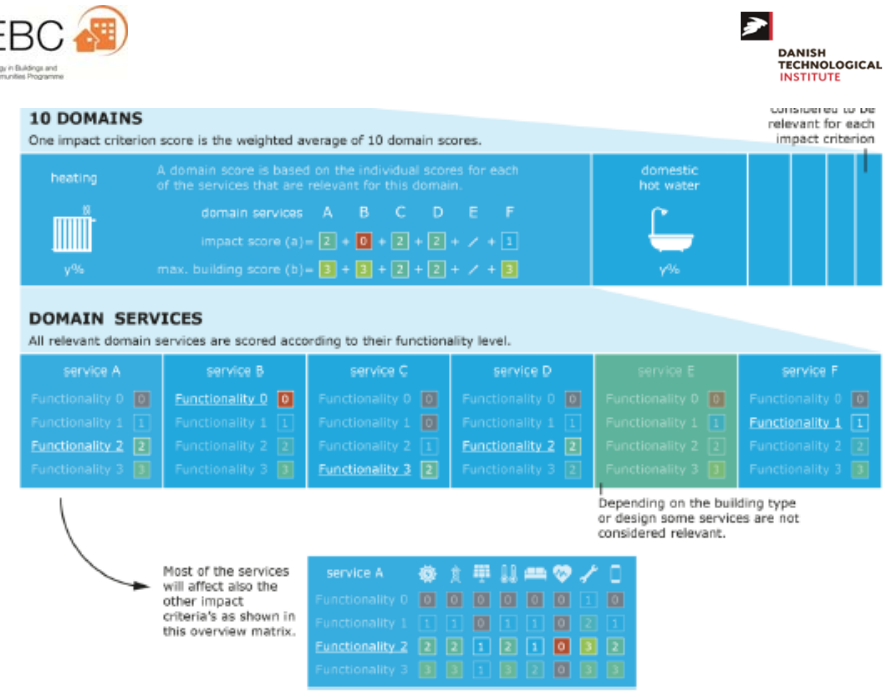

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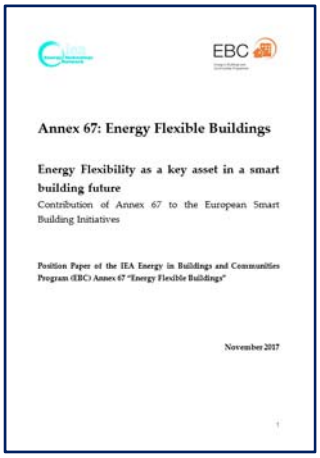
Remember the dynamic

There is a need for an approach that takes in to account the dynamic behavior of buildings rather than a static counting and rating of control devices. It is further important to minimize the CO_2 emission in the overall energy networks rather than optimize the energy efficiency of the single energy components in a building.


Annex 67: Energy Flexible Buildings

Energy Flexibility as a key asset in a smart building future

Contribution of Annex 67 to the European Smart Building Initiatives

Position Paper of the IEA Energy in Buildings and Communities Program (EBC) Annex 67 "Energy Flexible Buildings"

November 2017

http://www.annex67.org/media/1470/position-paper-energy-flexibility-as-a-key-asset-i-a-smart-building-future.pdf

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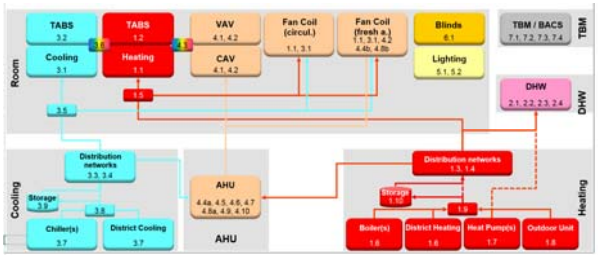
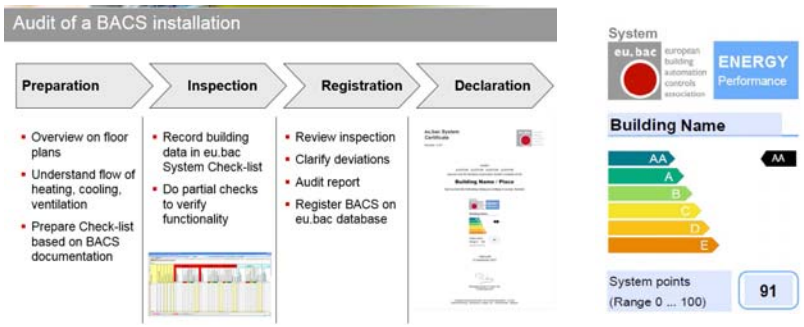
eu.bac audit





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Eu.bac audit in Green Tech House

3,600 m² office building with an enhanced Building Energy Manage System. The audit including reporting and following discussion with the building owner and users took roughly a week as it is recommended that two persons carry out the inspection in order to get everything right.
However, major insight into the control and the performance of the building was obtained.

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Thank you for your attention

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