



Overview of Activities by IEA TCP on Energy in Buildings and Communities

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Chair

Technical Day in Brussels (June 11, 2019)

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EBC TCP Member Countries:

Australia, Austria, Belgium, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States of America (24 as of June 2019)



At the 81th ExCo Meeting in London June 2017, Photo by Randy Martin

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- In 1977, the EBC TCP was founded in International Energy Agency.
- 64 completed projects (Annexes)
- 16 ongoing projects (Annexes) + 4 working groups
- ExCo members, project leaders (Operating Agents), IEA Secretariat, ESSU, project proposers and observers meet in June and November every year.
- In every ExCo meeting, on the previous day, Technical Day is arranged for information exchange with national policy makers and experts.

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High-priority themes for EBC TCP

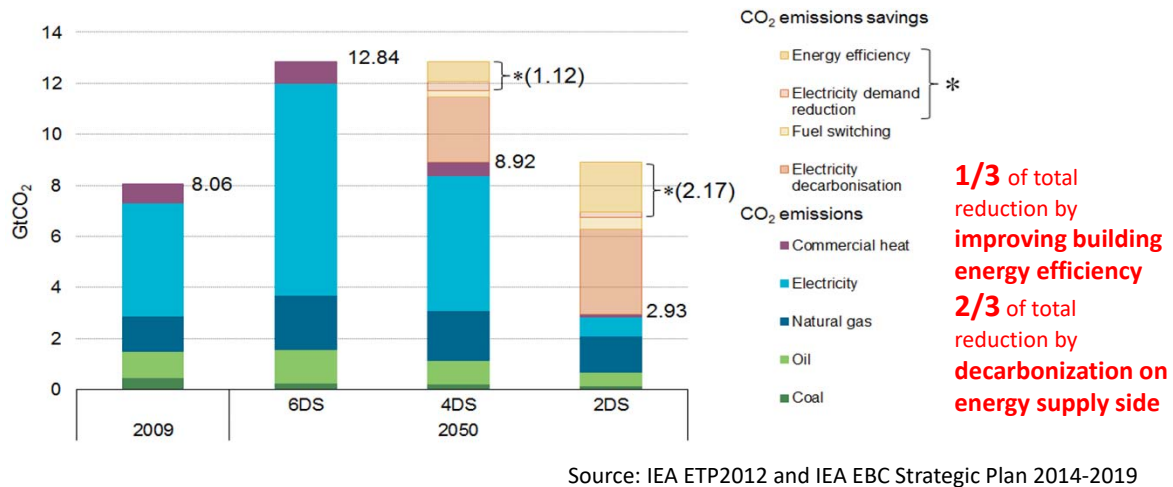
1. Integrated planning and building design
2. Building energy systems
3. Building envelope
4. Community scale methods
5. Real building energy use

Source: EBC Strategic Plan 2014-2019

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In order to limit global temp. rise in 2050 to 2°C, 77% reduction in total CO₂ emissions in the building sector by 2050 would be required.



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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

1. Integrated Planning and Building Design

- IAQ Design and control **low energy residential** building (Carsten Rode/DN, Annex 68, 2014-2020)
Topic: Estimation of pollutant emission from building materials
- Assessing **life cycle related environmental impacts** caused by buildings (Rolf Frischknecht/CH, Annex 72, 2016-2021)
Topic: Embodied energy and CO₂ emission
- Integrating solutions for **daylighting and electric lighting** (Jan de Boer/DE, SHC Task 61/Annex 77, 2018-2021)
Topic: Design methods of energy efficient electric lighting and its control

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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

2. Building energy systems

- Supplementing ventilation with **gas-phase air cleaning**, implementation and implications
(Bjarne Olesen & Pawel Wargocki/DN, Annex 78, 2018-2023)
Topic: Removal of detrimental gases and possibility to reduce ventilation
- **Resilient cooling** for residential and small commercial buildings
(Peter Holzer/AT, Annex 80, 2018-2023)
Topic: Mechanical cooling with validated efficiency for energy and cost

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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

3. Building envelope

- Long-term performance of **super-insulating materials** in building components and systems
(Daniel Quenard/FR, Annex 65, 2013-2019)
Topic: Test protocol proposal and application of vacuum insulation, etc.
- Deep **renovation of historic buildings** towards lowest possible energy demand and CO₂ emissions
(Alexandra Troi/IT, SHC Task 59/Annex 76, 2017-2021)
Topic: Historic buildings used as living space and with reduced energy use

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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

4. Community scale methods

- **Energy flexible** buildings
(Søren Østergaard Jensen/DN, Annex 67, 2014-2019)
Topic: Shifting energy demand in buildings and stabilizing energy grids
- Towards **net zero energy resilient public communities**
(Alexander Zhivov/USA, Annex 73, 2017-2022)
Topic: Net zero energy master planning process with resilient energy supply
- Cost-effective building **renovation at district level combining energy efficiency and renewables**
(Manuela Almeida/PT, Annex 75, 2017-2021)
Topic: Cost-effective strategies at district level to reduce CO₂ and energy

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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

5. Real building energy use

- Strategy and practice of **adaptive thermal comfort** in low energy buildings
(Yingxin Zhu/CN & Richard de Dear/AU, Annex 69, 2015-2019)
Topic: Energy implication of adapting themselves outside strict comfort zone
- Building energy epidemiology: **analysis of real building energy use** at scale
(Ian Hamilton/UK, Annex 70, 2015-2020)
Topic: Utilization of real building energy use data and its method
- Building energy performance assessment based on **in-situ measurements**
(Staf Roels/BE, Annex 71, 2016-2021)
Topic: Filling performance gaps between as-built and theoretical design targets
- **Competition and living lab** platform (Karsten Voss/DE & Sergio Vega/ES, Annex 74, 2017-2021)
Topic: Platform mapping and linking the competitions and living lab experiences
- **Occupant-centric** building design and operation
(Andreas Wagner/DE & Liam O'Brien/CA, Annex 79, 2018-2023)
Topic: Guidelines and standards for behavior models in design and operation

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Ongoing Activities (Annex)

Note: Key words in Annexes' titles are in red.

As information center & incubator

- Air infiltration and ventilation center
(Peter Wouters/BE, Annex 5, 1979-2021)

Topic: Publication on air leakage reduction and ventilation systems

In total, 16 Annexes are ongoing.

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On-going Activities (Working groups)

- HVAC energy calculation methodologies for non-residential buildings
(Takao Sawachi/JP, 2016-2019)

Topic: Analysis of HVAC energy calculation methods for national policies

- Cities and communities
(Helmut Strasser/AT, 2018-2020)

Topic: Cities' non-technical needs beyond technical energy solutions
Targeting urban decision makers, IEA officials and IEA TCPs

- Building energy code
(David Nemtsov/US, 2018-)

Topic: Share building energy code best practices including new solutions

- International building material database
(Peter Lyons/AU, 2018-)

Topic: A global network of regional data aggregators on building materials.
Starting from the database of glazing and shading materials, the database would be extended through discussions in the working group.

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New Annex proposal under development

- Smart data-driven solutions for high performance buildings

Proposer: Stephen White/AU

➤Objective (to be finalized):

To harness **digital technology** revolution to reduce energy use in buildings, through Software as a Service innovation and affordable building automation. **Empowered by access to reliable real-world data**, digital solutions can rapidly scale and commoditise knowledge, with great potential for overcoming skills barriers and automating building performance optimisation.

➤Background of proposal

Mission Innovation #7, “Affordable Heating and Cooling”

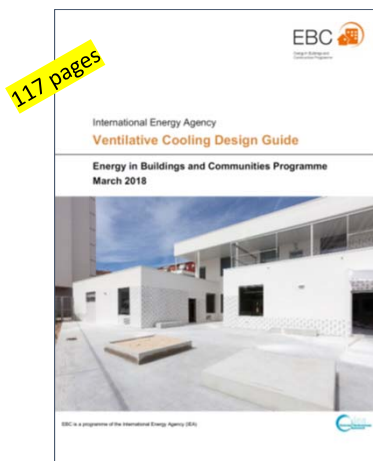
➤Proposal is to be made in this week after the workshop held in April:

4-5 April, 2019 in Delft

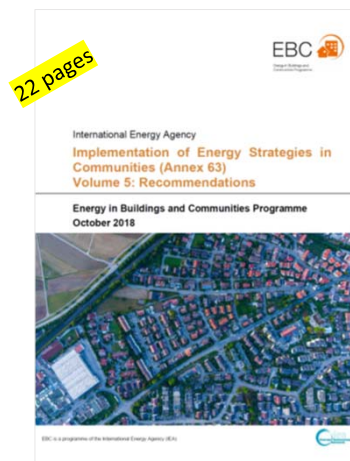
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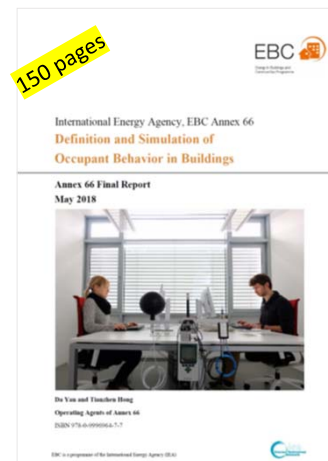
- Recently completed annexes and examples of their deliverables



Design guide for natural ventilation (Annex 62)



Recommendations for policy makers, researchers and planners (Annex 63)



Final report (Annex 66)

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Highlight of co-operation outside the TCP

- Having started standardization on design of natural ventilation following results from **Annex 62** in ISO TC205 and CEN TC156
- Seminars on occupant behavior in ASHRAE conference and other international conference by **Annex 66**
- **Annex 5** organizes one international AIVC conference and one symposium every year, and publishes VIP (Ventilation Information Paper)
- **Working Group on Cities and Communities** is a collaboration among experts from different TCPs
- EBC ExCo has had joint meeting with SHC TCP in Nov. 2017 and June 2018, and is searching for the next chance.

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Challenges for EBC TCP

- ExCo members and OAs to share recognitions on existing technological problems and research needs
- To produce deliverables with practical, concrete and quantitative information and with ability to evaluate actual energy performance
- To contribute to improving effectiveness of policies including building energy codes and standards
- To promote the deliverables by utilizing ICT
- Closer communication with other TCPs and IEA office in order to enhance above-mentioned tasks for EBC TCP

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Please visit our website and check
deliverables from Annexes

<http://iea-ebc.org/>

Thank you for your kind attention!

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