EBC

Energy in Buildings and Communities Programme

International Energy Agency Energy in Buildings and Communities (EBC) Research Programme

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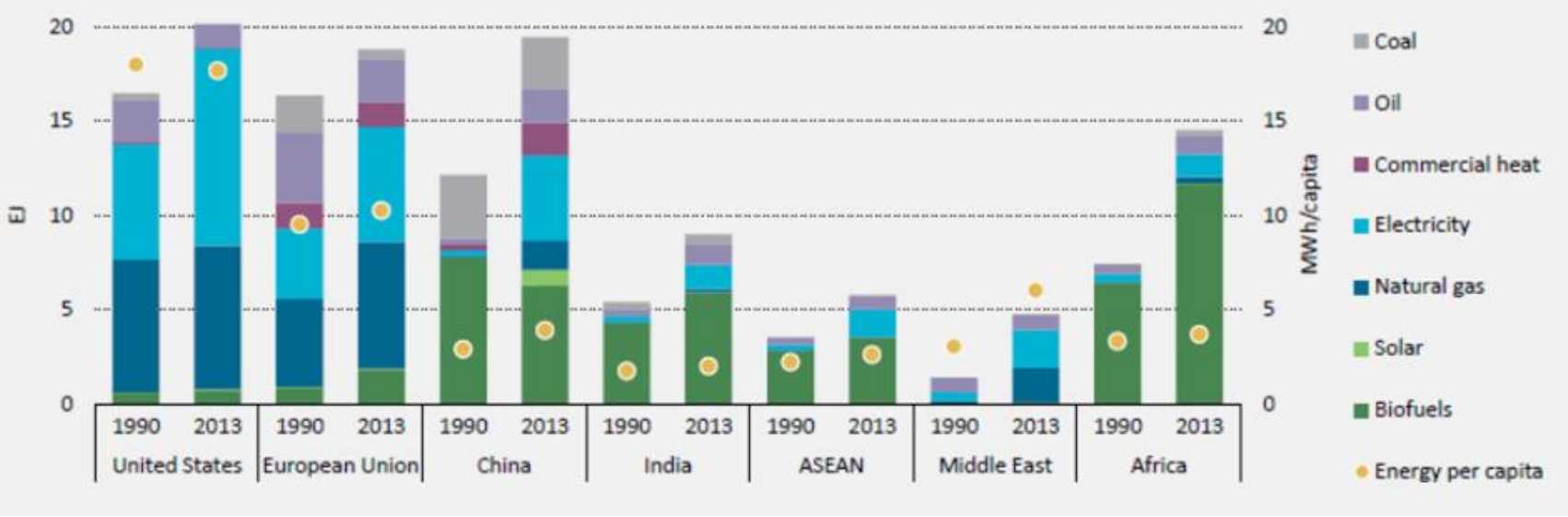
iea Energy Technology Network

IEA Technology Collaboration Programmes

The aim of the IEA EBC Technology Collaboration Programme is to carry out science based research in the field of energy in buildings and communities.

The outcomes of EBC's international collaborative research projects address determining factors for energy in that domain, e.g. technological aspects, environmental aspects, processes (planning, building and management), policy measures and behavioural aspects.

Energy growth still coupled with population growth



Building final energy use (exajoules, EJ) and intensity per person (MWh/capita) in selected regions

(IEA Energy Technologies Perspective 2016)

Key point *Few countries have decoupled building energy use from population growth. Energy efficiency is crucial to offsetting building energy growth while still providing comfort and improved quality of life.*

Challenges to achieve the IEA Two Degrees C Scenario (2DS)

Globally, building energy performance needs to improve from a reduction rate of 1.5% per year observed over the past decade to at least 2.5% per year required over the next decade beyond 2025.

- If aggressive energy efficiency policies in line with 2DS, urban building energy use would be reduced by 30% in 2050 compared with 6DS.
- Energy efficiency measures and fuel switching lead to a 50% reduction of direct CO2 emissions in urban buildings in 2050 compared with 6DS
- Low-energy new buildings, deep energy renovation of existing buildings, and low-carbon, energy-efficient heating and cooling technologies are crucial to achieving the 2DS
- ZEBs are challenging in urban areas and efficient district heating & cooling (DHC) in combination with heat pumps and renewables are critical.
- A strategic long-term vision is necessary to encourage the effective planning and implementation of building renovation measures with district heat network investments.

EBC Mission

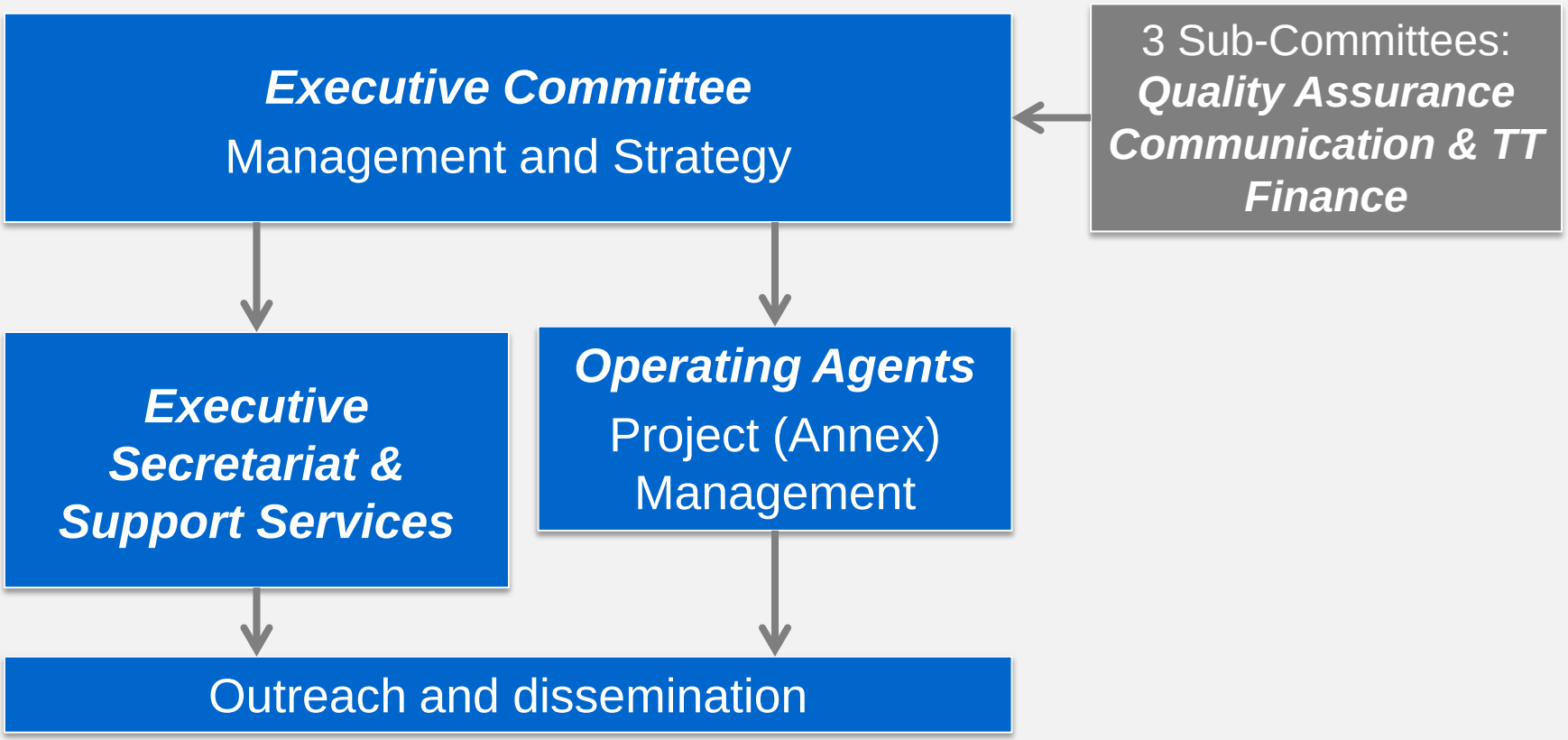
→ Energy efficiency is key

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.

23 Participating Countries

- Australia
- Austria
- Belgium
- Canada
- P.R. China
- Denmark
- Finland
- France
- Germany
- Ireland
- Italy
- Japan
- Republic of Korea
- Netherlands
- New Zealand
- Norway
- Portugal
- Singapore
- Spain
- Sweden
- Switzerland
- UK
- USA

Programme Governance



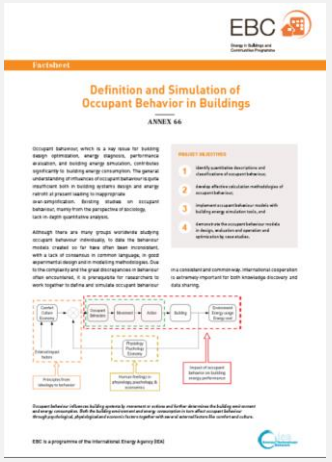
IEA-EBC Programme

– 81 Annexes and 5 Working Groups established

– 16 Annexes ongoing, 6 of which in preparation

– 600 experts involved from 23 Member Countries

– Official Annex reports, annual reports and newsletters (2/year) freely available



Strategic objectives

- Reinforce the technical and economic basis for refurbishment of existing buildings, including financing, engagement of stakeholders and promotion of co-benefits;
- Improve planning, construction and management processes to reduce the performance gap between design stage assessments and real world operation;
- Create robust and affordable building design and technology including 'low tech' approaches;
- Further develop energy efficient cooling in hot and humid, or dry climates, avoiding mechanical cooling if possible; and
- Create holistic solution sets for district level systems taking into account energy grids, overall performance, business models, engagement of stakeholders, and transport energy system implications.

Means of achieving objectives

- Creating tools for supporting design and construction through to operations and maintenance, including building energy standards and life cycle analysis (LCA);
- Developing innovative technology and systems for enhancing energy efficiency and the use of renewable energy in buildings and communities;
- Providing experience of, and overcome barriers to, adoption of energy efficiency measures through 'living labs';
- Improving smart control of building services technical installations, including occupant and operator interfaces;
- Addressing data issues in buildings, including non-intrusive and secure data collection; and
- Developing building information modelling (BIM), drones, artificial intelligence, 3D printing and robotics, from design and construction through to operations and maintenance.

Working Groups

Cities and Communities

HVAC Energy Calculation Methodologies for Non-residential Buildings

Building Energy Code Alliance

International Building Materials Database

Annexes in working phase #1

- No.77 EBC Annex 77 / SHC Task 61 Integrated Solutions for Daylight and Electric Lighting
- No.76 EBC Annex 76 / SHC Task 59 Deep Renovation of Historic Buildings Towards Lowest Possible Energy Demand and CO2 Emissions
- No.75 Cost-effective Building Renovation at District Level Combining Energy Efficiency & Renewables
- No.74 Competition and Living Lab Platform
- No.73 Towards Net Zero Energy Public Resilient Communities
- No.72 Assessing Life Cycle Related Environmental Impacts Caused by Buildings
- No.71 Building Energy Performance Assessment Based on In-situ Measurements

Annexes in working phase #2

- No.70 Building Energy Epidemiology: Analysis of Real Building Energy Use at Scale
- No.69 Strategy and Practice of Adaptive Thermal Comfort in Low Energy Buildings
- No.68 Design and Operational Strategies for High IAQ in Low Energy Buildings
- No.67 Energy Flexible Buildings
- No.65 Long Term Performance of Super-Insulating Materials in Building Components and Systems
- No.64 LowEx Communities - Optimised Performance of Energy Supply Systems with Exergy Principles
- No.63 Implementation of Energy Strategies in Communities
- No.05 Air Infiltration and Ventilation Centre

Annexes in preparation phase

- No.81 Smart Buildings - Real-World Data-Driven Software Applications for Energy Efficiency
- No.80 Resilient Cooling
- No.79 Occupant Behaviour-Centric Building Design and Operation
- No.78 Supplementing Ventilation with Gas-phase Air Cleaning, Implementation and Energy Implications
- No.77 EBC Annex 77 / SHC Task 61 Integrated Solutions for Daylight and Electric Lighting
- No.76 EBC Annex 76 / SHC Task 59 Deep Renovation of Historic Buildings Towards Lowest Possible Energy Demand and CO2 Emissions

Publications

ANNUAL REPORT

The Annual Report provides an overview of progress made by the EBC Programme, including summaries of new, ongoing and recently completed projects.

PDF (6.7 MB)

EBC NEWS

The latest news about EBC can be found in the twice-yearly newsletter EBC News.

Email alerts for new editions of EBC News Signup

The November 2018 edition features articles on:

- Building Energy Futures for New Zealand
- Implementation of Energy Strategies in Communities
- Definition and Simulation of Occupant Behaviour in Buildings
- On-site Assessment of Building Heat Loss Coefficients
- New EBC International Projects

PDF (2.1 MB)

Further Information

www.iea-ebc.org

Thank you