

D2 - An open registry for the rating of IAQ management strategies

December 2025

Editors

Gabriel Rojas, Universität Innsbruck, Austria
Marc Abadie, LaSIE - La Rochelle Université, France

© Copyright INIVE 2025

All property rights, including copyright, are vested in INIVE, Operating Agent for EBC Annex 5, on behalf of the Contracting Parties of the International Energy Agency Implementing Agreement for a Programme of Research and Development on Energy in Buildings and Communities.

In particular, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of INIVE.

Published by INIVE, Sint-Pietersnieuwstraat 41, B-9000 Ghent, Belgium.

Disclaimer Notice: This publication has been compiled with reasonable skill and care. However, neither INIVE, nor the Contracting Parties of the International Energy Agency's Implementing Agreement for a Programme of Research and Development on Energy in Buildings and Communities, nor their agents make any representation as to the adequacy or accuracy of the information contained herein, or as to its suitability for any particular application, and accept no responsibility or liability arising out of the use of this publication. The information contained herein does not supersede the requirements given in any national codes, regulations or standards, and should not be regarded as a substitute for the need to obtain specific professional advice for any particular application. EBC is a Technology Collaboration Programme (TCP) of the IEA. Views, findings and publications of the EBC TCP do not necessarily represent the views or policies of the IEA Secretariat or of all its individual member countries.

ISBN 978-2-930471-77-8

Participating countries in the EBC: Australia, Austria, Belgium, Brazil, Canada, P.R. China, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Republic of Korea, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States of America.

www.iea-ebc.org

essu@iea-ebc.org

Preface

The International Energy Agency

The International Energy Agency (IEA) was established in 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme. A basic aim of the IEA is to foster international cooperation among the 30 IEA participating countries and to increase energy security through energy research, development and demonstration in the fields of technologies for energy efficiency and renewable energy sources.

The IEA Energy in Buildings and Communities Programme

The IEA co-ordinates international energy research and development (R&D) activities through a comprehensive portfolio of Technology Collaboration Programmes (TCPs). The mission of the IEA Energy in Buildings and Communities (IEA EBC) TCP is to support the acceleration of the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge, technologies and processes and other solutions through international collaborative research and open innovation. (Until 2013, the IEA EBC Programme was known as the IEA Energy Conservation in Buildings and Community Systems Programme, ECBCS.).

The high priority research themes in the EBC Strategic Plan 2019-2024 are based on research drivers, national programmes within the EBC participating countries, the Future Buildings Forum (FBF) Think Tank Workshop held in Singapore in October 2017 and a Strategy Planning Workshop held at the EBC Executive Committee Meeting in November 2017. The research themes represent a collective input of the Executive Committee members and Operating Agents to exploit technological and other opportunities to save energy in the buildings sector, and to remove technical obstacles to market penetration of new energy technologies, systems and processes. Future EBC collaborative research and innovation work should have its focus on these themes.

At the Strategy Planning Workshop in 2017, some 40 research themes were developed. From those 40 themes, 10 themes of special high priority have been extracted, taking into consideration a score that was given to each theme at the workshop. The 10 high priority themes can be separated in two types namely 'Objectives' and 'Means'. These two groups are distinguished for a better understanding of the different themes.

Objectives: The strategic objectives of the EBC TCP are as follows:

- reinforcing the technical and economic basis for refurbishment of existing buildings, including financing, engagement of stakeholders and promotion of co-benefits;
- improvement of planning, construction and management processes to reduce the performance gap between design stage assessments and real-world operation;
- the creation of 'low tech', robust and affordable technologies;
- the further development of energy efficient cooling in hot and humid, or dry climates, avoiding mechanical cooling if possible; the creation of 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: The strategic objectives of the EBC TCP will be achieved by the means listed below:

- the creation of tools for supporting design and construction through to operations and maintenance, including building energy standards and life cycle analysis (LCA);
- benefitting from 'living labs' to provide experience of and overcome barriers to adoption of energy efficiency measures;
- 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;
- the development of building information modelling (BIM) as a game changer, from design and construction through to operations and maintenance.

The themes in both groups can be the subject for new Annexes, but what distinguishes them is that the 'objectives' themes are final goals or solutions (or part of) for an energy efficient built environment, while the 'means' themes are instruments or enablers to reach such a goal. These themes are explained in more detail in the EBC Strategic Plan 2019-2024.

The Executive Committee

Overall control of the IEA EBC Programme is maintained by an Executive Committee, which not only monitors existing projects, but also identifies new strategic areas in which collaborative efforts may be beneficial. As the Programme is based on a contract with the IEA, the projects are legally established as Annexes to the IEA EBC Implementing Agreement. At the present time, the

following projects have been initiated by the IEA EBC Executive Committee, with completed projects identified by (*) and joint projects with the IEA Solar Heating and Cooling Technology Collaboration Programme by (☼):

- Annex 1: Load Energy Determination of Buildings (*)
- Annex 2: Ekistics and Advanced Community Energy Systems (*)
- Annex 3: Energy Conservation in Residential Buildings (*)
- Annex 4: Glasgow Commercial Building Monitoring (*)
- Annex 5: Air Infiltration and Ventilation Centre
- Annex 6: Energy Systems and Design of Communities (*)
- Annex 7: Local Government Energy Planning (*)
- Annex 8: Inhabitants Behaviour with Regard to Ventilation (*)
- Annex 9: Minimum Ventilation Rates (*)
- Annex 10: Building HVAC System Simulation (*)
- Annex 11: Energy Auditing (*)
- Annex 12: Windows and Fenestration (*)
- Annex 13: Energy Management in Hospitals (*)
- Annex 14: Condensation and Energy (*)
- Annex 15: Energy Efficiency in Schools (*)
- Annex 16: BEMS 1- User Interfaces and System Integration (*)
- Annex 17: BEMS 2- Evaluation and Emulation Techniques (*)
- Annex 18: Demand Controlled Ventilation Systems (*)
- Annex 19: Low Slope Roof Systems (*)
- Annex 20: Air Flow Patterns within Buildings (*)
- Annex 21: Thermal Modelling (*)
- Annex 22: Energy Efficient Communities (*)
- Annex 23: Multi Zone Air Flow Modelling (COMIS) (*)
- Annex 24: Heat, Air and Moisture Transfer in Envelopes (*)
- Annex 25: Real time HVAC Simulation (*)
- Annex 26: Energy Efficient Ventilation of Large Enclosures (*)
- Annex 27: Evaluation and Demonstration of Domestic Ventilation Systems (*)
- Annex 28: Low Energy Cooling Systems (*)
- Annex 29: ☼ Daylight in Buildings (*)
- Annex 30: Bringing Simulation to Application (*)
- Annex 31: Energy-Related Environmental Impact of Buildings (*)
- Annex 32: Integral Building Envelope Performance Assessment (*)
- Annex 33: Advanced Local Energy Planning (*)
- Annex 34: Computer-Aided Evaluation of HVAC System Performance (*)
- Annex 35: Design of Energy Efficient Hybrid Ventilation (HYBVENT) (*)
- Annex 36: Retrofitting of Educational Buildings (*)
- Annex 37: Low Exergy Systems for Heating and Cooling of Buildings (LowEx) (*)
- Annex 38: ☼ Solar Sustainable Housing (*)
- Annex 39: High Performance Insulation Systems (*)
- Annex 40: Building Commissioning to Improve Energy Performance (*)
- Annex 41: Whole Building Heat, Air and Moisture Response (MOIST-ENG) (*)
- Annex 42: The Simulation of Building-Integrated Fuel Cell and Other Cogeneration Systems (FC+COGEN-SIM) (*)
- Annex 43: ☼ Testing and Validation of Building Energy Simulation Tools (*)
- Annex 44: Integrating Environmentally Responsive Elements in Buildings (*)
- Annex 45: Energy Efficient Electric Lighting for Buildings (*)
- Annex 46: Holistic Assessment Tool-kit on Energy Efficient Retrofit Measures for Government Buildings (EnERGo) (*)
- Annex 47: Cost-Effective Commissioning for Existing and Low Energy Buildings (*)
- Annex 48: Heat Pumping and Reversible Air Conditioning (*)
- Annex 49: Low Exergy Systems for High Performance Buildings and Communities (*)
- Annex 50: Prefabricated Systems for Low Energy Renovation of Residential Buildings (*)
- Annex 51: Energy Efficient Communities (*)
- Annex 52: ☼ Towards Net Zero Energy Solar Buildings (*)

Annex 53: Total Energy Use in Buildings: Analysis and Evaluation Methods (*)

Annex 54: Integration of Micro-Generation and Related Energy Technologies in Buildings (*)

Annex 55: Reliability of Energy Efficient Building Retrofitting - Probability Assessment of Performance and Cost (RAP-RETRO) (*)

Annex 56: Cost Effective Energy and CO₂ Emissions Optimization in Building Renovation (*)

Annex 57: Evaluation of Embodied Energy and CO₂ Equivalent Emissions for Building Construction (*)

Annex 58: Reliable Building Energy Performance Characterisation Based on Full Scale Dynamic Measurements (*)

Annex 59: High Temperature Cooling and Low Temperature Heating in Buildings (*)

Annex 60: New Generation Computational Tools for Building and Community Energy Systems (*)

Annex 61: Business and Technical Concepts for Deep Energy Retrofit of Public Buildings (*)

Annex 62: Ventilative Cooling (*)

Annex 63: Implementation of Energy Strategies in Communities (*)

Annex 64: LowEx Communities - Optimised Performance of Energy Supply Systems with Exergy Principles (*)

Annex 65: Long-Term Performance of Super-Insulating Materials in Building Components and Systems (*)

Annex 66: Definition and Simulation of Occupant Behavior in Buildings (*)

Annex 67: Energy Flexible Buildings (*)

Annex 68: Indoor Air Quality Design and Control in Low Energy Residential Buildings (*)

Annex 69: Strategy and Practice of Adaptive Thermal Comfort in Low Energy Buildings (*)

Annex 70: Energy Epidemiology: Analysis of Real Building Energy Use at Scale (*)

Annex 71: Building Energy Performance Assessment Based on In-situ Measurements (*)

Annex 72: Assessing Life Cycle Related Environmental Impacts Caused by Buildings (*)

Annex 73: Towards Net Zero Energy Resilient Public Communities (*)

Annex 74: Competition and Living Lab Platform (*)

Annex 75: Cost-effective Building Renovation at District Level Combining Energy Efficiency and Renewables (*)

Annex 76: ☼ Deep Renovation of Historic Buildings Towards Lowest Possible Energy Demand and CO₂ Emissions (*)

Annex 77: ☼ Integrated Solutions for Daylight and Electric Lighting (*)

Annex 78: Supplementing Ventilation with Gas-phase Air Cleaning, Implementation and Energy Implications (*)

Annex 79: Occupant-Centric Building Design and Operation (*)

Annex 80: Resilient Cooling (*)

Annex 81: Data-Driven Smart Buildings (*)

Annex 82: Energy Flexible Buildings Towards Resilient Low Carbon Energy Systems (*)

Annex 83: Positive Energy Districts

Annex 84: Demand Management of Buildings in Thermal Networks (*)

Annex 85: Indirect Evaporative Cooling

Annex 86: Energy Efficient Indoor Air Quality Management in Residential Buildings (*)

Annex 87: Energy and Indoor Environmental Quality Performance of Personalised Environmental Control Systems

Annex 88: Evaluation and Demonstration of Actual Energy Efficiency of Heat Pump Systems in Buildings

Annex 89: Ways to Implement Net-zero Whole Life Carbon Buildings

Annex 90: EBC Annex 90 / SHC Task 70 Low Carbon, High Comfort Integrated Lighting

Annex 91: Open BIM for Energy Efficient Buildings

Annex 92: Smart Materials for Energy-Efficient Heating, Cooling and IAQ Control in Residential Buildings

Annex 93: Energy Resilience of the Buildings in Remote Cold Regions

Annex 94: Validation and Verification of In-situ Building Energy Performance Measurement Techniques

Annex 95: Human-centric Building Design and Operation for a Changing Climate

Annex 96: Grid Integrated Control of Buildings

Annex 97: Sustainable Cooling in Cities

Annex 98: Flexibilization and Optimization of Heat Pump Systems in Existing Buildings through Secondary-Side Digitalization

Annex 99: Air Cleaning for Sustainable and Resilient Buildings

Working Group – Energy Efficiency in Educational Buildings (*)

Working Group – Indicators of Energy Efficiency in Cold Climate Buildings (*)

Working Group – Annex 36 Extension: The Energy Concept Adviser (*)

Working Group – HVAC Energy Calculation Methodologies for Non-residential Buildings (*)

Working Group – Cities and Communities (*)

Working Group – Building Energy Codes

Table of content

1.	Introduction.....	5
2.	PANDORA: An internet-based open access database of pollutant emission rates of indoor sources ...	6
2.1.	Introduction.....	6
2.2.	PANDORA database	6
2.3.	Access.....	7
3.	A collection of typical pollutants' concentration in residential buildings	8
3.1.	Introduction.....	8
3.2.	IAQ database repository	8
3.3.	IAQ data analysis repositories	8
3.4.	Access.....	10
4.	Acknowledgements	11
5.	Authors	12

1. Introduction

This deliverable consists of a collection of repositories that were compiled within Subtask 2 of IEA-EBC Annex 86, namely an internet-based open access database of emission rates of indoor sources and a suite of tools to generate typical pollutant concentrations in residential buildings (typical exposure). These are important resources for designers, policy makers and other stakeholders who want to use modeling-based performance assessment in the design and rating of indoor air quality (IAQ) management strategies.

This document gives a short introduction of and links to the repositories. More information on the development and application of these resources can be found in Deliverable D.3.

2. PANDORA: An internet-based open access database of pollutant emission rates of indoor sources

Author: Marc Abadie

2.1. Introduction

Indoor air quality models require a wide range of input data, including envelope leakage information, weather, ventilation system characteristics, contaminant source emission rates, sink removal rates, occupant schedules, and air cleaner removal rates. Many of the required model inputs are available in the literature; however, these data have generally not been compiled in a readily accessible source. The aim of the current database, A compILation of iNDoOR Air pollutant emissions i.e. PANDORA, is to compile the available data regarding the emission rates (ER) of both gaseous and particulate pollutants in a systematic way to provide useful information for IAQ modelers. The implementation of data was undertaken in three distinct phases. The initial phase, coinciding with the establishment of the database in 2009, focused on the integration of all available data published prior to that year. The second phase involved the progressive incorporation of data up to 2014. More recently, as part of the Annex86 project, a comprehensive compilation of post-2014 references was conducted by Subtask 2 participants. Publications were systematically identified through Scopus, Web of Science, and Google Scholar using the keywords “indoor air quality,” “emission rates,” and “indoor pollutants.” No geographical restrictions were applied; however, non-peer-reviewed studies were excluded. During this final phase, full integration of all retrieved data was not feasible; consequently, a curated subset was selected to complement the existing typologies with the most recent and relevant information.

2.2. PANDORA database

Pollutant ER are classified according to the following categories: Construction and Decoration Materials, Furniture, Cleaning Products and Air Fresheners, Occupants and Occupant Activities, Heating and Cooking Appliances, Electrical Equipment and Whole room or building.

Within the framework of the IEA-EBC Annex 86 Subtask 2, PANDORA has been updated in terms of accessibility and available data with approximately 1,000 new entries added to the 9,000 already implemented (Figure 1). The earliest studies on pollutant emission rates date back to 1982, with a primary focus on emissions from construction and decoration materials (Figure 1, left). The year 2003 represents a turning point, marked by the publication of several key reports from American and European research projects addressing VOC emissions from building materials. Since 2013, studies have increasingly reported emission rates from cleaning products, air fresheners, and occupant-related activities. At present, approximately 65% of the ER included in the database pertain to construction and decoration materials, 16% to cleaning products, and 12% to occupants and their activities.

The database currently contains approximately 3,000 pollutants, each associated with at least one emission rate. As illustrated in Figure 1 (right), formaldehyde is the most frequently reported pollutant, with 336 ERs, followed by total volatile organic compounds (TVOC) with 311, particulate matter with 173, and benzene with 150. Additional pollutants include other VOCs such as toluene, ethylbenzene, and xylene; aldehydes such as acetaldehyde, benzaldehyde, and butyraldehyde; and a smaller number of semi-volatile organic compounds (SVOCs), including benzo(a)pyrene, pyrene, and diethyl phthalate.

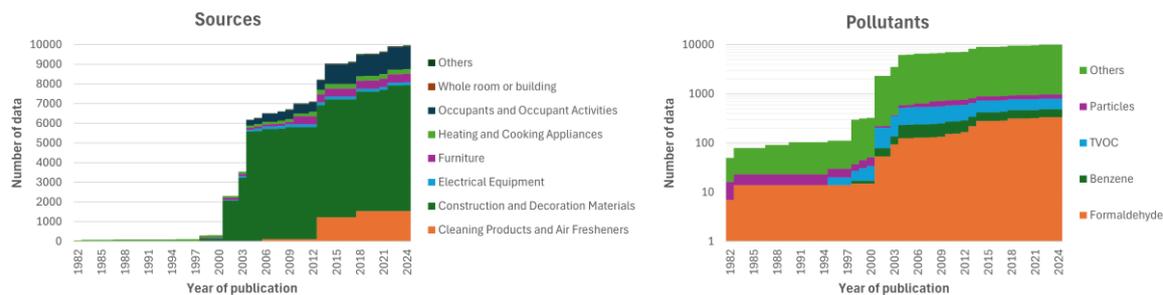


Figure 1: Number of ER implemented according to the category of indoor sources (left) and pollutants (right).

To provide more practical information for IAQ modelers, a dedicated companion website has been created to offer statistical analyses of certain data groups, enabling more informed decision-making for four selected pollutants (PM_{2.5}, formaldehyde, benzene and TVOC). PM_{2.5}, formaldehyde and benzene have been selected as they appear in all lists of pollutants of interest/target pollutants in indoor environment. Hence, IAQ modelers are always searching for inputs for their evaluation of exposure to those contaminants and this is also why there is a lot of data for those pollutants. Although TVOC is not a specific pollutant but rather an indicator of total VOC levels without direct health correlations, its relevance to indoor air quality (IAQ) remains debated. We chose to include TVOC in PANDORA due to the abundance of available data—comparable to formaldehyde—and its continued interest within the IAQ community, likely driven by the rise of low-cost sensors that measure overall pollutant load rather than individual compounds. As an example, Figure 2 presents the graphs resulting from the statistical analysis for Flooring, a sub-category of Construction and Decoration Materials, for formaldehyde. The left chart shows ER at 3 days, 28 days, and 365 days, while the right chart splits these results based on the year of data publication.

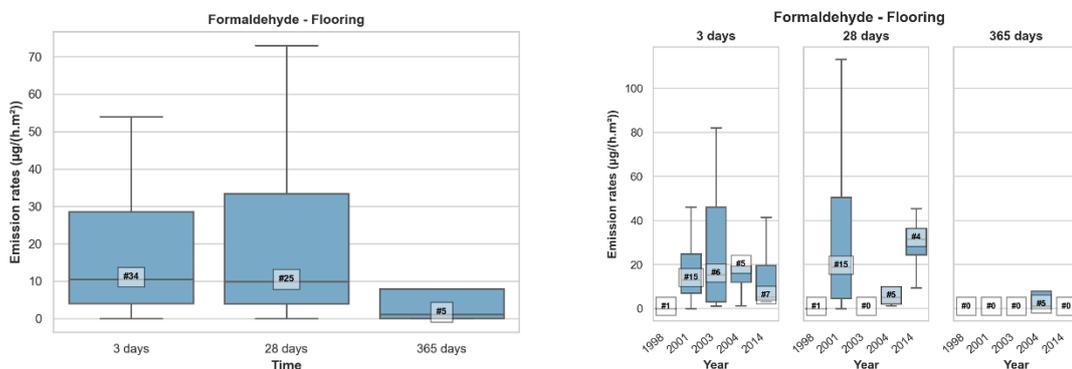


Figure 2: Statistics of emission rates of formaldehyde for flooring after 3, 28 and 365 days (left: all data; right: separated by the year of publication).

2.3. Access

PANDORA is a free internet-based database accessible on all devices, including phones, tablets, and desktops, through the dedicated website: <https://db-pandora.univ-lr.fr/>

The companion website presenting meta-analysis of the data for PM_{2.5}, formaldehyde, benzene and TVOC can be accessed through the "Data Analysis" page of the PANDORA database by clicking on the link labeled "PANDORA Statistical Analysis." or through the direct link: <https://gitlab.univ-lr.fr/mabadie/pandora/>

3. A collection of typical pollutants' concentration in residential buildings

Author: Marc Abadie

3.1. Introduction

Within Subtask 2 (ST2) of IEA EBC Annex 86 data from ongoing and past field measurements in residential homes was analyzed to support the estimation of typical pollutant exposure in residential buildings by providing a summary of measured pollutant concentrations. Instead of producing a static collection of “typical pollutants”, ST2 developed a workflow and provided a database/data repository that will output a summary of pollutant concentrations measured in residential homes from many different IAQ data sources. Such a summary is provided in the ST2 report. However, the workflow and the database are intended to become “living objects” that grow and develop further beyond this IEA project. The IAQ analysis can be re-run as more IAQ data becomes available and the algorithm can be extended with other functionalities, e.g. benchmarking individual studies against a representative bulk of other studies. It also provides a good foundation for further big data analysis procedures, e.g. for processing IAQ data gathered from IoT devices.

3.2. IAQ database repository

The original measurement data available to ST2 participants were analyzed to extract the distribution of pollutant concentrations applying a standardized data processing and analysis workflow implemented in a newly developed R package (see below). The output is a dataset in form of spreadsheet files (.xlsx), organized by country and study name. The sheet and table structure are such that this dataset can either serve directly as a rudimentary database or can easily be imported in dedicated databases. It includes measurement data from 21 IAQ studies from 11 countries, with 1173 residential homes and 3268 distinct measurement locations. The data contains 44 different IAQ parameters including: carbon dioxide (CO₂), relative humidity (RH), temperature (T), particulate matter (PM₁, PM_{2.5}, PM₁₀), formaldehyde (HCHO), volatile organic compounds (TVOC, VOC), nitrogen dioxide (NO₂), Radon and others (e.g., airflow, fungi, mites and diverse SVOCs). An exemplary extract of this database for PM_{2.5} is shown in Table 1. The full dataset including a collection of summary tables thereof can be found in the following repositories.

3.3. IAQ data analysis repositories

The analysis repositories include the programming scripts (mostly in R) that were developed to process and analyze IAQ measurement data provided by ST2 participants. Two git-repositories have been created to publish these scripts:

3.3.1. R package for processing individual IAQ measurement data

The R package annex provides a series of functions and methods to easily process measurement data in a standardized manner as defined in the IEA EBC Annex86 project. It also includes functions for writing (and validating) the final files that form the IAQ database repository hosted on [Zenodo](#).

3.3.2. Collection of scripts for IAQ analysis

This git-repository consists of a collection of scripts and functions to analyze data from the IAQ database repository. They include the scripts used to generate the summary tables and figures provided in the associated report and papers, e.g. see Table 1 **Error! Reference source not found.** and Figure 3.

It also collects pre- and postprocessing scripts (in R and Python) that were developed within ST2 to process the original (raw) timeseries data to produce the IAQ database repository on Zenodo.

Table 1: Summary statistics of measured PM_{2.5} concentration in bedrooms during nighttime hours (23-07), and in living rooms, kitchens and other living areas (e.g. home office) during daytime hours (07-23). The statistics (median, min, P5, P25,...) are calculated from the monthly mean concentration.

PM _{2.5} [$\mu\text{g}/\text{m}^3$]	Overall [†]	Window airing (not designed) [†]	Natural ventilation (designed) [†]	Hybrid/mixed mode ventilation [†]	Mechanical ventilation [†]
Bedroom (23-07)	13 (0, 2, 8, 25, 99, 288), N=471	14 (8, 8, 11, 17, 33, 33), N=34	11 (1, 3, 6, 20, 59, 121), N=206	15 (5, 7, 10, 18, 24, 28), N=24	15 (0, 2, 9, 33, 138, 288), N=207
Living room (07-23)	12 (0, 2, 7, 25, 189, 452), N=752	9 (2, 4, 6, 15, 36, 65), N=73	16 (0, 4, 8, 27, 119, 236), N=223	10 (0, 2, 4, 15, 106, 202), N=96	15 (0, 2, 6, 28, 241, 452), N=360
Kitchen (07-23)	18 (1, 6, 12, 30, 279, 530), N=397	16 (9, 9, 13, 18, 22, 22), N=12	17 (1, 4, 10, 24, 92, 257), N=225	16 (11, 12, 15, 19, 27, 27), N=25	26 (5, 8, 15, 68, 376, 530), N=135
Undefined living area / home-office (07-23)	3 (2, 2, 2, 6, 24, 24), N=13	NA (Inf, NA, NA, NA, NA, -Inf), N=0	6 (3, 3, 3, 13, 24, 24), N=5	3 (2, 2, 2, 8, 14, 14), N=4	2 (2, 2, 2, 3, 3, 3), N=4

[†]Median (Min, 5% Centile, Q1, Q3, 95% Centile, Max), N= Number of non-missing data points

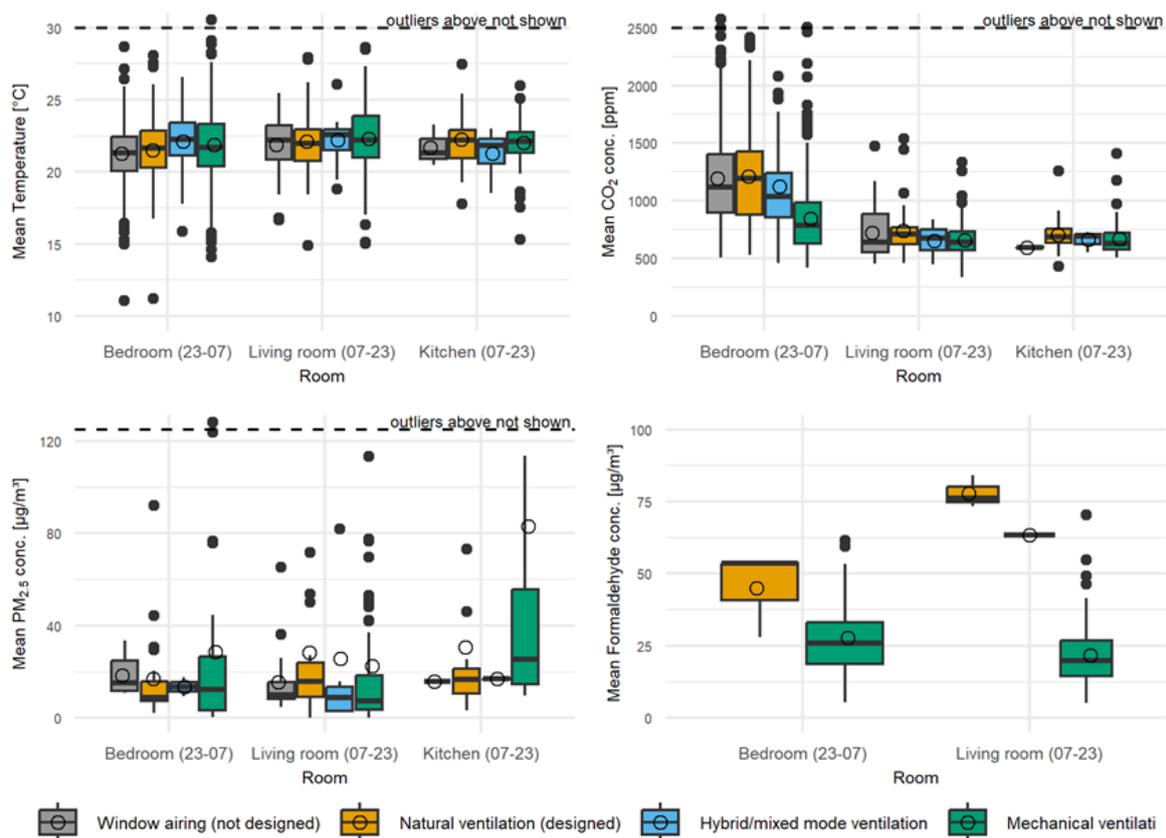


Figure 3: Exemplary results stemming from D2.3 IAQ data repositories. Boxplots of monthly mean temperature, CO₂, PM_{2.5}, HCHO concentration in bedrooms during nighttime hours (23-07), and in living rooms and kitchens during daytime hours (07-23).

3.4. Access

The IAQ database repository is accessible on Zenodo: <https://doi.org/10.5281/zenodo.14917724>

The R package repository for the measurement data is accessible on GitHub: <https://github.com/IEA-EBC-Annex86/annex>

The ST2 analysis scripts are also accessible on GitHub: <https://github.com/IEA-EBC-Annex86/ST2analysis>

4. Acknowledgements

The authors would like to acknowledge that the Austrian contributions were carried out and funded as part of the IEA research cooperation on behalf of the Austrian Federal Ministry for Innovation, Mobility and Infrastructure (Grant number FO999898199).

5. Authors

Authors in alphabetical order:

Andreas Frei, Universität Innsbruck, Austria
Aurora Monge Barrio, Universidad de Navarra, Spain
Bart Cremers, Zehnder, The Netherlands
Charles-Florian Picard, Tipee, France
Constanza Molina, Pontificia Universidad Católica de Chile, Chile
Dusan Licina, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Eol Geffre, LaSIE - La Rochelle Université, France
Francesco Babich, Eurac Research, Italy
Gabriel Bekö, Danmarks Tekniske Universitet, Denmark
Gabriel Rojas, Universität Innsbruck, Austria
Gráinne McGill, University of Strathclyde, United Kingdom
Hala Hassan, University of Galway, Ireland
James McGrath, Maynooth University, Ireland
Kevin Verniers, Renson, Belgium
Lena Mayr, Universität Innsbruck, Austria
Linda Toledo, Eurac Research, Italy
Marc Abadie, LaSIE - La Rochelle Université, France
Marcel Loomans, Technische Universiteit Eindhoven, The Netherlands
Maria Justo Alonso, SINTEF, Norway
Marie Coggins, University of Galway, Ireland
Mohsen Pourkiaei, Maynooth University, Ireland
Nuria Casquero-Modrego, Lawrence Berkeley National Laboratory, USA
Peter Tappler, Österreichisches Institut für Bauen und Ökologie, Austria
Reto Stauffer, Universität Innsbruck, Austria
Sasan Sadrizadeh, Kungliga Tekniska högskolan, Sweden
Sascha Hammes, Universität Innsbruck, Austria
Timm Freundorfer, Universität Innsbruck, Austria

www.iea-ebc.org