Towards better quality and compliance of EPCs and building works

The EU project QUALICHeCK

QUALICHeCK Roadshow event
Gothenburg – 29 November 2016
Structure of the presentation

- About energy conservation
- Quality and compliance in the building sector
- QUALICHeCK: goal, objectives, approach
- Summary of key findings and future challenges
- Conclusions
European Roadmap 2050

COM(2011)112

GHG emissions, 100% = 1990

- Power Sector
- Residential & Tertiary
- Industry
- Transport
- Non CO₂ Agriculture
- Non CO₂ Other Sectors

Current policy
ALL NEW BUILDINGS!!

IF SKY IS THE LIMIT, THEN GO THERE.

NZEB (nearly zero)

Cost optimal requirements

ZEB? (zero)

PEB?? (positive)
CLIMATE CHANGE

Ambitious, but pragmatic and realistic!
The present EPBD

• Directive 2010/31/EU on the energy performance of buildings (EPBD) gives ambitious goals for the building sector to reduce energy use as well as greenhouse gas emissions.

• It requires Member States (MS) to engage in the generalisation of Nearly Zero-Energy Buildings (NZEB), both for new and existing buildings.

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Article 9
Nearly zero-energy buildings

1. Member States shall ensure that:

(a) by 31 December 2020, all new buildings are nearly zero-energy buildings; and

(b) after 31 December 2018, new buildings owned and operated by public authorities are nearly zero-energy buildings.

+ measures for existing stock
The present EPBD

• Energy Performance Certificates (EPCs) are probably the most visible instrument of the EPBD

• One specific objective of EPCs is to make it possible for owners or tenants of the building or building unit:
  • to compare and assess its energy performance
  • to estimate real energy use
  • to justify proper building operation and maintenance
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EPBD Article 18 – Independent control system

1. Member States shall ensure that independent control systems for energy performance certificates and reports on the inspection of heating and air-conditioning systems are established in accordance with Annex II.

2. The Member States may delegate the responsibilities for implementing the independent control systems. Where the Member States decide to do so, they shall ensure that the independent control systems are implemented in compliance with Annex II.

3. Member States shall require the energy performance certificates and the inspection reports referred to in paragraph 1 to be made available to the competent authorities or bodies on request.
Quality of EPCs – Current status

- In 14 Member States ~24 million EPCs
- Indicative costs between 30 and 200 €/EPC
- Public and financial institutions are starting to put value in it: higher price for better EPCs

What is the status on compliance mechanisms?

- In some MS extensive checks: automated checks, desk based checks, targeted + random checks, site visits, fines and administrative procedures.
- In some MS some checks: automated checks, random checks, no infringement procedures.
- In some MS little or unclear information
Does your country have a view on compliance rates of new buildings with EP requirements?

- Yes: 52%
- No: 26%
- Planned/taking place: 22%
EPBD Article 27 - Penalties

- Member States shall lay down the rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented.

- The penalties provided for must be effective, proportionate and dissuasive.

- Member States shall communicate those provisions to the Commission by 9 January 2013 at the latest and shall notify it without delay of any subsequent amendment affecting them.
Why worry?
Non-quality is expensive!

Cost for non-quality in the building sector
~ 10% * of sector turn-over in France
Probably very significant energy savings potential

* Figure taken from the French Quality Construction Agency,
Quality of the works

Compliant product selection and method implementation

Expected performance (U-value, g-value, VOC emission, strength, colour, etc.)

Non-compliant product selection or method implementation

Actual performance

Competition distortion
Market distrust
... Increased energy use

Unclear specifications
Lack of competence
Critical economic conditions
Lack of control
Energy Performance Certificates

EPC procedures

Compliant input data

Non-compliant input data

EPC software

Compliant label C

Actual label A

Competition distortion
Market distrust
... Increased energy use

Unclear procedures
Design modifications
Mistakes
Frauds
Difficult access to input data
Energy certificates with respect to ventilation ...

**EPC calculation**
- Efficiency of heat exchanger
- Fan characteristics
- Ductwork airtightness
- Demand controlled ventilation
- ...
- ...  **Observation:**
  In many countries no or nearly no control regarding compliance of EPC

**Implementation of the works**
- Air flow rates
- Acoustics
- ...
- ...
- **Observation:**
  In many countries no or nearly no control regarding implementation
Poor design and execution

• Energy performances critical
• IAQ problematic
• Acoustics
• Maintenance
Structure of the presentation

- About energy conservation
- Quality and compliance in the building sector
- QUALICheck: goal, objectives, approach
- Summary of key findings and future challenges
- Conclusions
QUALICHeCK goal

• Goal
  • Raise awareness and trigger initiatives to improve the compliance of:
    • Energy Performance Certificates
    • Quality of building works
  => To improve the actual energy performance of buildings by pushing people “to do what they declare”

• Objectives
  • Confirm the concern for non-compliant EPCs and quality of building works
  • Show the benefits of existing approaches
  • Give key steps to set up compliance frameworks
QUALICheck project (2014-2017)

Status of compliance and quality on the ground

Easy access of compliant EPC input data

Towards better quality of the works

Towards better compliance and effective penalties

Solutions
4 focus areas in QUALICHeCK

- Transmission characteristics
- Ventilation and airtightness
- Sustainable summer comfort techniques
- Renewables in multi-energy systems
National consortium
Structure of the presentation

1. About energy conservation
2. Quality and compliance in the building sector
3. QUALICHeCK: goal, objectives, approach
4. Summary of key findings and future challenges
5. Conclusions
3 main chapters in the booklet

1. What is the status on the ground?
2. How are some of the issues addressed as of today?
3. Structuring an approach to effective compliance
### What is the status on the ground?

**Key message**
Field data confirm the concern for energy performance assessment compliance or quality of buildings works

**Supported by**
10 field studies performed in 9 countries on samples of 25+ buildings
Literature review of quality of building works

**Background material**
Reports of field studies
“Status on the ground” report
Existing approaches report on quality of the works
Fact sheets
What is the status on the ground?

Key message
Field data confirm the concern for energy performance assessment compliance or quality of buildings works

- Examples of results regarding EP assessment compliance:
  - AT: 20% of the EPC input data not updated between design and completion => errors on SHD assessment in the range of 5-28%
  - EE: 68% of the buildings did not comply with summer comfort criteria
  - RO: recalculation of EPCs lead to a change in energy class in ≈ 40% of the buildings

See presentation by Jarek Kurnitski
What is the status on the ground?

Key message
Field data confirm the concern for energy performance assessment compliance or quality of buildings works

• Examples of results regarding quality of building works:
  • Over 50% of non-compliant ventilation provisions in France or The Netherlands, and serious indoor climate problems in nearly two thirds of Estonian buildings.
  • Numerous common problems in renewables in multi-energy systems in Austria, France, Germany and Sweden (e.g., 50% to 83% of unused pipe connections not insulated that degrade heat storage tank performance).

See presentation by Jarek Kurnitski
What is the status on the ground?

Key message

Field data confirm the concern for energy performance assessment compliance or quality of buildings works

Field study reports

To go further…
How are some of the issues addressed as of today?

Key message
Good news: there are existing approaches to contain these problems

Supported by
Literature review (30+ examples)

Background material
Reports of field studies
“Status on the ground” report
Existing approaches report on quality of the works
Fact sheets
How are some of the issues addressed as of today?

Key message
Good news: there are existing approaches to contain these problems

• Some examples:
  • Product characteristics databases, harmonised formats for product performance data
    • Ease access to input data => Less risk of incorrect values
  • Competent tester schemes for airtightness testers
    • Reduce the risk of using an incorrect airtightness value
  • Certification for existing cavity wall insulation
  • Certification of window installation
How are some of the issues addressed as of today

Key message

Good news: there are existing approaches to contain some of these problems

To go further...
Structuring an approach to effective compliance

- Compliance framework = a structured set of processes for maintaining accordance with established regulations, specifications or legislation
## Structuring an approach to effective compliance

<table>
<thead>
<tr>
<th>Key questions to address</th>
<th>Elements to consider to address key questions</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. What is the scope of the framework?</strong></td>
<td>Issues found in the field and needs identified in terms of training, competence development, and checks. The scope can concern, for instance: all EPC input data, a selection or a unique EPC input data (e.g., envelope airtightness), ventilation airflow rates, window installation, cavity wall insulation, renewable energy systems, etc.</td>
<td>§ IV.1</td>
</tr>
<tr>
<td><strong>2. At which level and on which basis should it be imposed?</strong></td>
<td>Various levels (project, sector, real estate development, bank or insurance company, local authority, government) and bases (regulation, subsidies, risk management, market differentiation, specific awareness) depending on the regulatory context, financial incentives, and private initiatives.</td>
<td>§ IV.2</td>
</tr>
<tr>
<td><strong>3. On which type of requirement should it be based, and which type of control should it foresee?</strong></td>
<td>Any combination of qualification, certification, declaration, contractual specifications or technical rules, consistently with the controls foreseen—focus on actual service provided (direct) or on the actual competence or responsibility of the EPC input provider or the workers (indirect).</td>
<td>§ IV.3</td>
</tr>
<tr>
<td><strong>4. What are the procedures to comply with?</strong></td>
<td>Written documents explaining technical and non-technical procedures to achieve and to show compliance, compatible with EU or national legislation.</td>
<td>§ IV.4, IV.7, IV.8</td>
</tr>
<tr>
<td><strong>5. What are the procedures for identifying and handling non-compliance?</strong></td>
<td>Written documents allowing checks and identifying liabilities, as well as proportionate and dissuasive penalties. In a concern for efficiency, they should minimise interference with court system.</td>
<td>§ IV.5, IV.7, IV.8</td>
</tr>
<tr>
<td><strong>6. How will it be implemented in practice?</strong></td>
<td>Political and stakeholders' support, appropriate financial and human resources, use of information technologies, learning periods and scheme evaluation.</td>
<td>§ IV.6, IV.7, IV.8</td>
</tr>
</tbody>
</table>
Structuring an approach to effective compliance

1. What is the scope of the framework?
   - It should focus on critical problems

   - TRAINING
     - Need for more and/or improved training?
       - Yes: New offers of training
         - Upgrading existing trainings...
       - No

   - COMPETENCE
     - Need for checking competence of persons?
       - Yes: Examinations
         - Certified persons...
       - No

   - COMPLETION
     - Need for checking proper completion?
       - Yes
         - Need for checking proper completion
       - No: High probability of compliant service
Structuring an approach to effective compliance

2. At which level should it be imposed?

<table>
<thead>
<tr>
<th>Level at which the compliance framework is imposed</th>
<th>Basis on which the framework is imposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>• Specific awareness of interested parties (building owner, architect, builder, industry sector, real estate developer, insurance company)</td>
</tr>
<tr>
<td>Sector</td>
<td>• Market differentiation</td>
</tr>
<tr>
<td>Real estate development</td>
<td>• Risk management</td>
</tr>
<tr>
<td>Bank or insurance company</td>
<td>• Risk management</td>
</tr>
<tr>
<td>Local authority</td>
<td>• Pre-condition for subsidies</td>
</tr>
<tr>
<td>Government</td>
<td>• Regulation</td>
</tr>
</tbody>
</table>

*Table 4: Levels at which and bases on which compliance frameworks may be imposed*
Structuring an approach to effective compliance

3. On which type of requirement should it be based? Which type of control should it foresee?

<table>
<thead>
<tr>
<th>Type of requirement</th>
<th>Main focus of the checks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual service (direct check)</td>
</tr>
<tr>
<td>Qualification or certification</td>
<td></td>
</tr>
<tr>
<td>Declaration of proper achievement of the service</td>
<td></td>
</tr>
<tr>
<td>Compliance with contractual specifications or technical rules</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Main focus of checks depending on types of requirements
Structuring an approach to effective compliance

• 4. What are the procedures to comply with?

• 5. What are the procedures for identifying and handling non-compliance?

• 6. How will it be implemented in practice?
Specific chapters

• Alleviating barriers to innovation
• Strengthening societal support

To go further...
To know more...

• A lot of information available on the QUALICHeCK website
QUALICHeCK source books and booklet:
“Towards compliant and easily accessible EPC input data”

How to get compliant and accessible data for the energy rating calculation of a building?
Overview of some existing approaches

François Durier (CETIAT, France)

With contributions and/or reviews from: Samuel Calloix (BBR, Belgium), Pranab Brind Crain (KCE/INVE, Belgium), Jan-Olof Dalenbäck (Chairman, Sweden), Hans Roos (Fraunhofer IPA, Germany), Susanne Geisler (ÖBB, Austria), Arnold Lamm (University of Gothenburg, Sweden), Per Johansson (Chairman, Sweden), Taejun Ko (University of the West Indies, Trinidad and Tobago), Ingo Kurniati (University of Technology, Indonesia), Jelle Lommen (University of Gent, Belgium), Manosmos Papagrigoriou (TEMAI, Greece), Alex Mihaljev (University of Technology, Braunschweig, Germany), Clemente Moscato (BBR, Belgium), Jose A. Mina (University of the West Indies, Trinidad and Tobago), Hans Peter (URBAN/NICERC, Romania), Paulus Wagenknecht (Chairman, Sweden), Peter Wauters (BBR, Belgium), Bruce Young (BBR, UK)

www.qualicheck-platform.eu

“Towards improved quality of the works”

Documented examples of existing situations regarding quality of works

Heike Erhorn-Kluttig, Hans Erhorn, Sarah Doster
(Fraunhofer Institute for Building Physics, Germany)

With contributions and/or reviews from: Samuel Calloix (BBR, Belgium), Pranab Brind Crain (KCE/INVE, Belgium), Jan-Olof Dalenbäck (Chairman, Sweden), Eric Ollivier (BBR, Belgium), Pranab Brind Crain (KCE/INVE, Belgium), Christophe Crippa (WUAG, Greece), Salvatore Calistri (OREB, Austria), Per Johansson (Chairman, Sweden), Theodor Kostas (KINEA, Greece), Manosmos Papagrigoriou (TEMAI, Greece), M. M. Aljah (IPST, Belo, Malaysia), Madalina Popescu (University of Romania, Romania), Hans Peter (URBAN/NICERC, Romania), Paulus Wagenknecht (Chairman, Sweden), Peter Wauters (BBR, Belgium)

www.qualicheck-platform.eu
Upcoming QUALICHeCK events

Posted on 2016/05/31 by Maria Dimitropoulou

The following QUALICHeCK events have now been confirmed. Participation is free for all, but prior registration is required. Please click on the links for further information and to register.

INTERNATIONAL WORKSHOP | Performance of thermal insulation in low energy buildings and advanced building renovation projects

Thursday 15 December 2016, Brussels, Belgium
Welcome Environmental concerns, in particular, have over the last decade led to a series of new initiatives in the European Union related to energy efficiency in buildings, with several directives comprising the main driver for action at the level of the Member States. In about 4 years from now, all new buildings will meet the nearly zero-energy (nZEB) target, and at the same time, building renovation represents a major challenge. Further may have to be taken on the longer term and in particular for the existing building stock to ensure a radical progress. All Member States are currently transposing the various directives, in particular the Energy Performance of Buildings Directive, the Renewable Energy Sources Directive and the Energy Efficiency Directive) into national legislation. Though transposing requirements are important, the claimed energy performance can be different from the theory. However, it is important that works related to energy efficiency and renovation are of good quality, in order to ensure that the expected energy performance is achieved and that the works will be sustainable over a long lifetime. In the opposite case, societal and political support might be lost.

Two concerns are in the centre of the QUALICHECK project, which started in March 2014 and which will run until February 2017. The key objectives are the following:

- To set up a series of actions which should result in more attention and real action for reliable information in the Energy Performance Certificates of new and existing buildings (i.e. “boundary conditions which force people to do what they declare”); and
- To set up a series of actions, which should result in more attention and real action for achieving better quality of the works, i.e. “boundary conditions which stimulate and allow the building sector to deliver good quality of the works.”

Dissemination of information is a key activity in QUALICHECK. This newsletter is one of such activities as this. In this issue, you find information on various QUALICHECK related events and outcomes.

Peter Walters
QUALICHECK Coordinator

Contents

Welcome
1st QUALICHECK Conference
1 Platform meeting
Initial project outcomes
Interaction with BUILD UP Skills
Testimonial from the European Association for ETHICS
Land workshop on quality and compliance in agreements
"Save the district"
QUALICHECK project partner organisations

1st QUALICHECK Conference
The 1st QUALICHECK Conference “Towards improved compliance and quality of the works for better performing buildings” was organised on 19th September 2014 at the Research Centre for Energy in Buildings in Estonia. The conference represented a major physical opportunity to expand dialogue and issue for energy efficiency in buildings, with several QUALICHECK project teams being one of the starting points for discussion. The Conference covered among others:

- Lessons learned from major EU initiatives regarding reliability of Energy Performance Certificate input data and quality of works.
- Experience from industry representatives regarding energy performance data and challenges in respect of energy efficiency in buildings.
- The QUALICHECK project and networking.
- Setting the framework: Funding energy efficiency projects.

The QUALICHECK project is also an example of European cooperation with the following partners:

- Research Centre for Energy in Buildings (Estonia)
- Technical University of Estonia (Estonia)
- University of Technology, Chemnitz (Germany)
- The University of Helsinki (Finland)
- Worcester Polytechnic Institute (USA)

"Save the district" project,
QUALICHECK project partner organisations

BauZ!?
QUALICHECK workshop as part of the BauZ! Conference 2015

By Susanne Grissler, ÖBB
The BauZ! Conference (www.bauz.at) is an annual event addressing the Austrian construction industry, authorities and administrations, representatives of the real estate sector as well as architects and engineers involved in building design. It was the objective of the workshop to introduce the QUALICHECK project, to present first results from the Austrian new data collection study carried out by P. Trötscher (Lukas Med), M. Wörndl (Wunstorf) and a group of students, "Ecoimprints". The event also aimed at discussing the importance of energy efficiency in buildings and about the different economic and financial aspects. The workshop was attended by 23 participants, resulting in the following conclusions:

(1) It is necessary to have two stages procedure, meaning that the design Energy Performance Certificate (EPC) needed for other countries than Austria to be updated after completion of the building, because design changes and reports of readings occur which need to be documented.

(2) Default values are important because the use of default values results in EPCs showing building efficiency in spaces, whereas some default values are unrealistic and need revision.

(3) In Austria, it is difficult to assess the impact of the EPC on the real estate market. The residential real estate market is rather competitive into the market of buildings and building units being sold and the prices being sold. The residential real estate market is regulated in the rental market, which makes it difficult to assess the impact of the EPC on the market.

The observation of the selling market shows that real estate agents present the...
FACT SHEET #24 | EPC database and control system for compliant EPC input data in Sweden

The Energy Performance Certificates (EPCs) database is a precondition for the implementation of an effective control system which is needed to ensure and enforce EPC compliance. This fact sheet describes the data entered in the Swedish EPC database, the automatic ...

Continue reading →

Posted on 2016/09/01 by Maria Dimitropoulou

Posted in Compliant and Easily Accessible EPC Input Data, Factsheets, Files | Tagged Renewables in multi-energy systems, Sweden, Transmission characteristics, Ventilation and airtightness

FACT SHEET #23 | Procedures for determining input data for the Energy Performance Certificate (EPC) of existing residential buildings in Belgium

The Energy Performance Certification system of existing residential buildings in Belgium includes clear procedures describing how the experts can determine the necessary input data. In general, these input data are directly observed in the building. For some data, this observation ...

Continue reading →

Posted on 2016/09/01 by Maria Dimitropoulou

Posted in Compliant and Easily Accessible EPC Input Data, Factsheets, Files | Tagged Belgium, Transmission characteristics

FACT SHEET #22 | Scheme of vocational qualifications in Cyprus

"I have the qualifications. I certify!"

Posted on 2016/09/01 by Maria Dimitropoulou
QUALICHeCK conferences Brussels

- Towards improved compliance and quality of the works for better performing buildings: 30 September 2014
- EPBD Review – Elements for better compliance and quality of works: 4 September 2015
- Better compliance and quality of the building works, in practice: 10 May 2016
- EPBD perspectives for compliant and smart buildings: 21 February 2017
International QUALICHeCK workshops

- Ventilation and airtightness: LUND - 16-17 March 2015
- Sustainable summer comfort techniques: ATHENS – 9-10 March 2016
- Renewables in multi-energy systems: LYON – 17 January 2017
Structure of the presentation

- About EPC compliance and good quality of the works
- What kind of activities in QUALICHeCK?
- Outcomes of QUALICHeCK
- Summary of key findings and future challenges
- Conclusions
Conclusions

• We have to be ambitious in terms of the requirements imposed for the energy performance of new and renovated buildings

• But it is also very important to create boundary conditions that:
  • Result in EPC compliance
  • Result in good quality of the works

• Based on field data and analysis of existing approaches, QUALICHeCK proposes an integral approach to develop compliance frameworks for:
  • Energy Performance Assessments
  • Quality of building works