Steps to improve the reliability of EPC input data and quality of the works in the Belgian context

Program of the workshop

- Energy Performance of buildings regulations in Belgium - The key puzzle pieces for an effective regulation
  Xavier Loncour, BBRI

- Building airtightness: Towards improved and reliable declared performances
  Clarisse Mees, BBRI

- Ventilation: Steps towards frameworks for reliable EPC input data and improved quality/compliance
  Samuel Caillou, BBRI
Energy Performance of buildings regulations in Belgium
The key puzzle pieces for an effective regulation

Xavier Loncour

Increasing ambition levels but how to build an effective regulation?
Energy Performance Regulation
Implementation at the regional level

Belgium - a federal state
The Energy Performance Regulation = a regional competency

Energy Performance Regulation

Existing building

New building

The regulations are very similar in the 3 regions
Examples in this presentation mainly taken from the Flemish Region
Impact of legislation?
Results of Belgian SENVIV-study

Impact of legislation?
Results of Belgian SENVIV-study

Results for different periods...

Nearly no impact
Not evident that legislation is respected...
New approach developed including an effective compliance checking

New approach developed including an effective compliance checking

<table>
<thead>
<tr>
<th>Year</th>
<th>Thermal insulation Requirement</th>
<th>In practice</th>
<th>Energy performance Requirement</th>
<th>In practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-1997</td>
<td>No → K65 → K55</td>
<td>K68</td>
<td>No requirements</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>K45</td>
<td>K41</td>
<td>E100</td>
<td>E86</td>
</tr>
<tr>
<td>2007</td>
<td>K45</td>
<td>K39</td>
<td>E100</td>
<td>E80</td>
</tr>
<tr>
<td>2008</td>
<td>K45</td>
<td>K38</td>
<td>E100</td>
<td>E76</td>
</tr>
<tr>
<td>2009</td>
<td>K45</td>
<td>K36</td>
<td>E100</td>
<td>E72</td>
</tr>
<tr>
<td>2010</td>
<td>K40</td>
<td>K33</td>
<td>E80</td>
<td>E64</td>
</tr>
<tr>
<td>2011</td>
<td>K40</td>
<td>K35</td>
<td>E80</td>
<td>E65</td>
</tr>
<tr>
<td>2012</td>
<td>K40</td>
<td>K34</td>
<td>E70</td>
<td>E58</td>
</tr>
</tbody>
</table>

Which changes were made to succeed in doing an effective regulation?
Inspector (Civil servant, ...)

Key element # 1

Effective system of compliance checking!
Owners

Inspector (Civil servant, ...)

Rapporteur

Contractor(s)

Architect

Owners

Inspector (Civil servant, ...)

Architect

Contractor(s)
The installer has insulated the roof 15cm whereas 20cm was foreseen in the declaration at the moment of the building permit. There has to be a sanction...

The technical specifications mentions 20 cm, I made no error.

I have prescribed 20cm.

I agreed with the owner to only insulate 15 cm.

Which type of sanction? If fine, what level? Who should pay?

We have no idea how this is possible (but we are not competent).

We have no idea how this is possible (but we are not competent).

This declaration at the end of the works contains errors. I shall give a fine.

How can a civil servant decide on a “reasonable” fine? Without endless discussions?
Sanctions in Belgium - Fines

- The sanctions (fines) are imposed directly by the administration (not by a court)
- The amounts are defined by the law
  - e.g. transmission losses: 60 € per W/K
    - Window of 5 m²:
      - U declared = 2.5 W/m²K
      - U reality = 3.0 W/m²K
      - Fine = 5 m² * (3.0 - 2.5) * 60 = 150 €
  - e.g. ventilation airflows:
    - 4 € per missing m³/h
    - No ventilation in a bedroom – 36 m³/h → Fines = 144 €

Belgian software: The calculation of fines is included in the software.
Flemish Region 2013: Fine for about 10% of new Flemish buildings
Flemish approach

- Intensive stakeholders concertation (2002-2004)
- A consensus was reached that the inspectors should **not** have to investigate which parties are (partly) responsible
  - If declaration wrong → rapporteur pays the fine
  - Of course, rapporteur should be able to transfer to fine to the person who made the error
    - If rapporteur has collected relevant documents (invoices, technical prescriptions, visit,…), he should have a strong case to recover cost from those who made the fault

This declaration contains **errors**.
The **law** states that the **rapporteur** has to pay **1.278 €**
This declaration states that the building is not meeting the requirements.

1.278 €

Sanction to owners?

- Private owners are considered non-competent as builders

  How is it possible that they have to pay the fine?

- In the legislation:

  “… the architect must inform the owner if certain decisions might lead to non-conformity with the legal requirements”
I have clearly and formally informed you that you should have insulated 20cm. But you did not want to do this, you only asked the contractor to do 15cm.

This declaration states that the building is not meeting the requirements. The owners have to pay 1.278€.

1.278 €

Owners

Civil servant

Rapporteur

Contractor(s)

Architect

Key element # 2

Encourage the correct performance declaration!
Independent control system and database

Clear procedure (and control system) allowing effective control!
When to declare the performance?

- Building permit
- Start of works
- End of works
- X months after end of works

Architect
We have insulated the roof less but the floor more because it was cheaper to better insulate the floor...

Civil servant
The installer has insulated the roof 15cm whereas 20cm was foreseen in the declaration at the moment of the building permit. There has to be a sanction...

Not easy to check the composition of a concrete floor...

There are many advantages to base control on a reporting at the end of the works. Then no excuses if information is wrong, as all the information was in principle available.
When to declare the performance?
Change of approach in the Belgian context

Choose the appropriate moment to declare the performance!
This declaration contains errors. The law states that the rapporteur has to pay 1.278 €

I am willing to pay the fine, BUT you did not take the correct input data into account. I accept a fine of only 732 €

How to find reliable input data?

- Voluntary database supported by the energy agencies
- No discussion on these data by the energy agencies
- Each producer may decide to declare the performance of his products
- Specific procedures including a third party check
Insulation material

Construction products

Solar protection devices

Which Products?

Trickle ventilators

Fans and Ventilation groups

Key element # 5

Easy access to reliable input data!
What about other input data?

Building related performance

Data with an important impact on the Energy Performance

Measured building airtightness

Effective airflows

Specific quality framework developed

Overview of the key elements

- Effective system of compliance checking
- Encourage the correct performance declaration
- Clear procedures allowing effective control
- Choose the appropriate moment to declare the performance
- Easy access to reliable input data
What about the quality of the works?

With a compliance checking framework
Improvement of the quality of the works

From building openness to building airtightness

Improvement of the performances

<table>
<thead>
<tr>
<th>Requirement</th>
<th>v50 (m³/hm²)</th>
<th>n50  (h⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive house</td>
<td>v50 = 2.4 m³/hm²</td>
<td>n50 = 0.8 h⁻¹</td>
</tr>
<tr>
<td>Pilot projects (CALE)</td>
<td>v50 = 3.5 m³/hm²</td>
<td></td>
</tr>
<tr>
<td>Statistics new buildings</td>
<td>v50 = 12 m³/hm²</td>
<td></td>
</tr>
<tr>
<td>Default value EPR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SENVIVV study
50 dwellings 1992-1993
n50 = 10.1 h⁻¹
Conclusions

- Several key elements were identified to realize an effective regulation.
- Effective regulations have also a positive impact on the quality of the works.
  - no cheating → fair competition
- Implement and improve the national regulation is a continuous process.
- Each country has to take his national context into account.

Thank you

Xavier Loncour
BBRI
Belgian Building Research Institute
Avenue Pierre Holoffe, 21
1342 Limelette
Belgium
www.bbri.be