QUALICheck suggestions related to compliance challenges for a smartness indicator

Peter Wouters
INIVE EEIG

Smartness indicator?
Definition in Winter Package:
A smartness indicator will reflect the ability of buildings to
i. adjust to the needs of the user and empower building occupants providing information on operational energy consumption complementing the energy performance information provided in the EPCs
ii. ensure efficient and comfortable building operation, signal when systems need maintenance or repair, and
iii. readiness of the building to participate in demand response, charge electric vehicles and host energy storage systems.

A study for determining detailed specifications regarding the smartness indicator has just started up
QUALICHeCK source book on EPC compliance

Aim:
To give guidance towards better EPC compliance

3 steps for effective compliance frameworks

- Procedures to obtain and prove compliant data
  - There should be clear procedures what must be done

- Formal procedures if non-compliance
  - There should be clear procedures how to decide on non-compliance and related actions

- Handling of non-compliance in practice
  - There should be an effective control and penalties if non-compliance
Source book on EPC compliance

Major parts of report:

- **Best practices**
  - Part 1: Issues related to procedures for determining EPC input data
  - Part 2: Legal framework related issues
  - Part 3: Compliance enforcement in practice related issues

- **About innovation**
  - Importance of societal support for compliance and enforcement
  - Economics of control and enforcement
  - Can BIM be a game changer?
  - Conclusions

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Change in relative EPBD impact on decision process

- Original EPBD (2003)
  - In most countries: EPBD was a point of attention but not of overwhelming importance

- EPBD recast (2010)
  - In the move to NZEB, EPBD requirements become very determining factor in design choices

- Proposal for revision of EPBD / winter package
  - ?

Market uptake of smartness indicator?

- Purely informative
  - Guidance – motivational

- A requirement – moderate level
  - Impact on decisions

- A requirement – severe level
  - Strong impact on decisions

QUALICHeCK experiences

IEE/13/610/SIO2.675574
01/03/2014-28/02/2014 28/04/2014
PART 1:
Procedures to obtain and prove compliant data

- 4.1. Clear technical procedures for determining SI input data

4.1. Clear technical procedures for determining SI input data

**EPC calculation**
- EPC Volume

**Smartness indicator**
- Dwelling – building – housing estate – city?
Smartness indicator: At dwelling level...
Smartness indicator: At building level...

Smartness indicator: At city level...
4.1. Clear technical procedures for determining SI input data

**EPC calculation**
- EPC Volume
- Primary energy consumption
  - More or less objective summation

**Smartness indicator**
- Dwelling – building – housing estate – city?
- A whole range of aspects
  - Not evident to make a simple summation

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**Figure 3 - Smart Ready Built Environment Indicators**

\[
SBEI = \frac{\left( \frac{(BHP + FEC)}{2} \times CMF \times ISC \right) \times \left( \frac{(SM + UP + FLX)}{2} \times COH \right) \times \left( \frac{(BE + RES + EV)}{2} \right) \times \left( \frac{(RES + PV)}{2} \right)}{12}
\]

\[
SBEI = \text{Smart Built Environment Indicator}
\]
### Table 1 – Smart building environment results
(Source: BPIE own analysis)

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4.1. Clear technical procedures for determining SI input data

**EPC calculation**
- EPC Volume
- Primary energy consumption
  - More or less objective summation
- To what extent is off-site renewables taken into account?
- Primary energy factors
- ...

**Smartness indicator**
- Dwelling – building – housing estate – city?
- A whole range of aspects
  - Not evident to make a simple summation
- ....
PART 1:
Procedures to obtain and prove compliant data

- 4.1. Clear technical procedures for determining SI input data
- ...
- 4.3. Easy access to compliant data
- ...
- 4.8. Robust technical handling of project independent innovative systems
- ...

How to characterise a thermostat?
Best practices PART 2: Legal framework for better enforcement and effective penalties

- 5.4. Philosophy on timeline for evolution of requirements
  ...
- 5.5. Point of time for proof of SI compliance
  ▪ How to deal with possible future external features (e.g. district heating)
  ...
- 5.6. Availability of legal procedures for penalising different types of non-compliance
  ...
- 5.11. Rewards instead of punishing?
  ▪ E.g. benefit in context of EPC calculations (?)
  ...
- 5.20. Not always possible to find a satisfactory solution - involve all stakeholders
  ▪ In case of severe SI requirements, this probably is even more sensitive than for EPC legal framework

3 steps for effective compliance frameworks

<table>
<thead>
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<th>PART 1: Procedures to obtain and prove compliant data</th>
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Best practices PART 3 - practical implementation of a framework for better enforcement and effective penalties

- 6.1. Political will to have effective compliance checking is crucial
- 6.5. Robust procedures in case of penalties
- 6.6. Support of stakeholders for effective compliance is crucial

Source book on EPC compliance

Major parts of report:
- Best practices
  - Part 1: Issues related to procedures for determining EPC input data
  - Part 2: Legal framework related issues
  - Part 3: Compliance enforcement in practice related issues
- About innovation
  - Importance of societal support for compliance and enforcement
  - Economics of control and enforcement
  - Can BIM be a game changer?
- Conclusions
Important to stimulate further developments and avoid to become a barrier for innovation
Source book on EPC compliance

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- About innovation
- Importance of societal support for compliance and enforcement
- Economics of control and enforcement
- Can BIM be a game changer?
- Conclusions
3D or 4D visual representation

Complex project designs are possible

Submodel security
Submodel energy performance
Submodel structural integrity
Submodel structural fire aspects
Submodel architectural design
Submodel interior design
Submodel electricity

Databases

Submodel structural acoustics
Submodel water appliances
Submodel air conditioning
Submodel light
Submodel interior design
Submodel security
Robust framework for input data (?)
- Transmission losses
- Thermal bridges
- Thermal mass
- Cool roof properties
- ...

Proactive guidance on quality...
- Heat losses
- Moisture, mould
- Structural aspects
- Acoustics
- ...

3D or 4D visual representation
Assembled BIM

Submodel security
Submodel energy performance ...

DATABASES
Submodel water appliances
Submodel air conditioning
Submodel light
Submodel electricity

Submodel structural integrity
Submodel structural fire aspects

Submodel structural fire aspects
Submodel structural acoustics

Submodel architectural design
Submodel interior design

Submodel smartness indicator...

DATA ANALYSIS TOOLS
"Clash" detection
Quantities & Price estimation
Primary Energy consumption
Overheating aspects
Daylight calculations
Acoustics
...
Systems and innovation...
Probably potential for (more) open innovation framework
Conclusions

- The need for a more or less robust approach for the SI to a large extent depend on the status of the SI (informative ... severe requirement)
- QUALICheck lessons learned with respect to EPC compliance challenges might be interesting when developing a smartness indicator
- BIM might be a potential strong tool for smart assessment of the smartness of a building and its environment