

EPCs in Europe – How much to harmonise?

Prof David Jenkins, Mahsa Sayfikar
Heriot-Watt University

Next Generation Energy Performance Certificates Conference
Brussels, 23rd May 2024



EPCs across Europe

- EPBD does not enforce all EPCs to be identical
- Before we push for harmonisation:
 - What do we mean by harmonisation?
 - Where do we already have it?
 - Why do we want it?
 - How could this be implemented?
- And to what degree is this an achievable goal for countries with different
 - Building stock
 - Climates
 - Technologies and related markets
 - Cultural relationship with energy and buildings

Harmonisation – what is it?

- EPC ratings (and metrics) that look/feel similar?
- All official metrics and indicators?
- The entire EPC journey?
 - Inputs, calculation, outputs
 - Assessments and assessors (e.g. training)
- Policy implementation
- All of the above? (I hope not)

How different are we?

- crossCert have considered differences in EPC frameworks by:
 - Aesthetics of the EPC documentation
 - Calculation approach
 - Definitions, terminology, and inputs/outputs used
 - Communication of energy-efficiency improvements
 - EPC assessor practices and training/skills
 - Use of verification/validation frameworks

EPCs are....different

Bewertung des Gebäudes
Die Gesamtbewertung des Gebäudes erfolgt aufgrund des jährlichen Heizenergiebedarfs. Nutzfläche - zurzeit beträgt dieser 157 kWh/m²a

Gesamtbewertung
Heizenergiebedarf
Ist-Zustand: 157 kWh/m²a

Gebäudehülle
Heizwärmebedarf
Ist-Zustand: 136 kWh/m²a

Anlagentechnik
Anlagenaufwandszahl
Ist-Zustand: 1,36

Umweltwirkung
CO₂-Emission
Ist-Zustand: 40 kg/m²a

Redni broj	Dio zgrade na koji se mjera odnosi
1.	Sustav rasvjete
2.	Vanjska ovojnica
3.	Vanjska ovojnica
4.	Vanjska ovojnica
5.	Vanjska ovojnica
6.	Sustav grijanja



ΣΥΣΤΑΣΕΙΣ
1. Θερμομόνωση, A/C και ηλια

2. ---

3. ---

Σύσταση

1.

2.

3.

Οι συστάσεις μέρους σας - Η επιλογή της

Recommendation

COOLING accounts for
The overall energy performance
The overall CO₂ performance
The average energy efficiency
The average CO₂ efficiency

Add optimum start/stop
Code:
Applicable to:

ZALECENIA DOTYCZĄCE

1) PRZEGRÓD BUDYNKU
Nie dotyczy

2) SYSTEMÓW TECHNICZNYCH
Nie dotyczy

3) INNYCH UWAG DOTYCZĄCYCH OPLACALNOŚCI EKONOMICZNEJ
Brak uwag

CONVERSION TO DISTRICT HEATING AND REPLACING RADIATORS

- Find a craftsman or other relevant professional who can help you with planning and carrying out your energy improvement.
- At Sparenergi.dk you can get inspiration for energy improvement about "Switch to district heating"
- Read more about the specific energy improvement at www.sparenergi.dk/skift-til-fjernvarme
Obtain one or more offers for the energy improvement, select the solution that suits you best, and start your energy improvement.

Избран пакет за изпълнение в сград
Клас на енергопотребление след извършване на избран пакет от ЕСМ

Разход на потребна енергия след изпълнение на ЕСМ от избрания пакет		Разход след
Специфичен	Общ	Специфичен
kWh/m ²	kWh/год.	kWh

Element	Description	Energy Efficiency	Environmental
Walls	Cavity wall, as built, no insulation (assumed)	★★☆☆☆	★★☆☆☆
Roof	Pitched, 200 mm loft insulation	★★★★☆	★★★★☆
Floor	Suspended, no insulation (assumed)	—	—
Windows	Fully double glazed	★★★★☆	★★★★☆
Main heating	Boiler and radiators, mains gas	★★★★☆	★★★★☆
Main heating controls	Programmer, TRVs and bypass	★★★☆☆	★★★☆☆
Secondary heating	Room heaters, mains gas	—	—
Hot water	From main system	★★★★☆	★★★★☆
Lighting	Low energy lighting in 55% of fixed outlets	★★★★☆	★★★★☆

Recommended measures	Indicative cost	Typical saving per year	Rating after Improvement	
			Energy	Environment
1 Cavity wall insulation	£500 - £1,500	£261	E 47	E 39
2 Floor insulation (suspended floor)	£800 - £1,200	£55	E 49	E 41
3 Low energy lighting for all fixed outlets	£25	£22	E 49	E 41
4 Upgrade heating controls	£350 - £450	£55	E 51	E 43
5 Solar water heating	£4,000 - £6,000	£35	E 52	E 44
6 Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£247	D 62	E 51

Measures to increase the use of renewable energy sources

- Installation of a solar energy receiver system for hot water production
- Installation of photovoltaic cells
- Biomass heating
- Transition to geothermal energy

Organizational measures

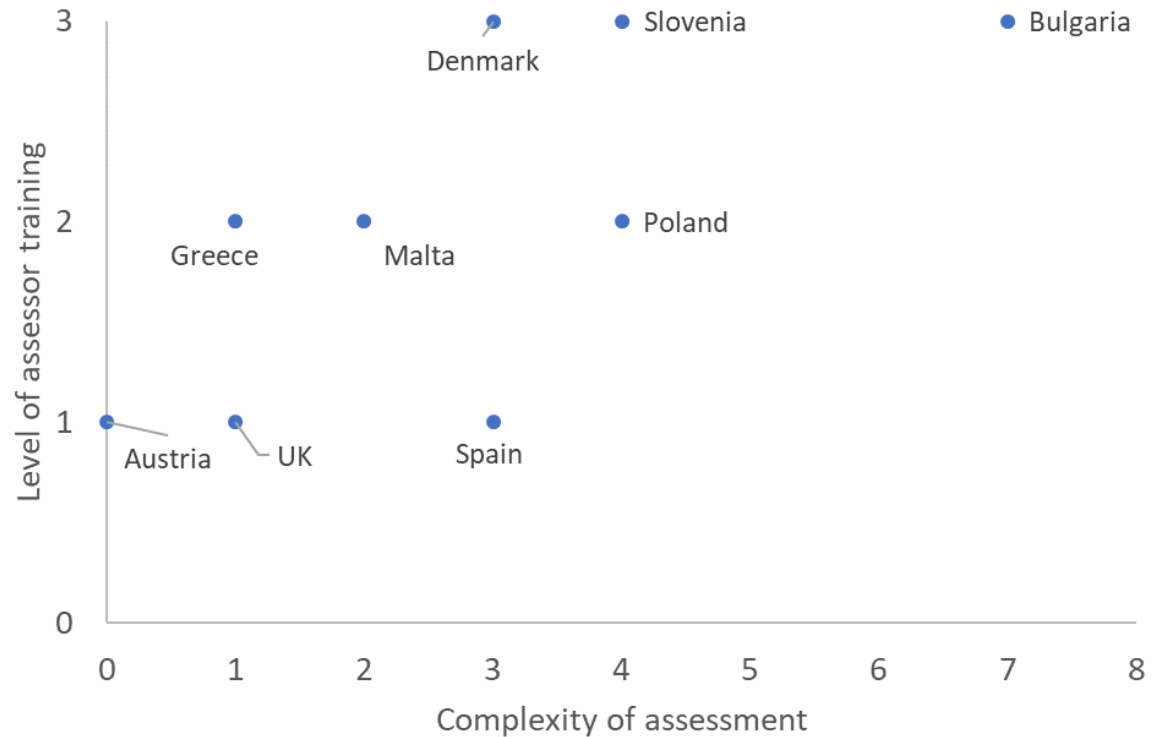
- Turn off the lights when the rooms are unoccupied
- Analysis of the tariff system
- Energy audit of the building

Tailoring vs Standardising

	Highly tailored									Highly standardised
Calculation methodology	Bulgaria	Poland	Slovenia	Croatia	Denmark	Spain	Greece	Malta	Austria	UK
Recommendations approach	Poland	Austria	Malta	Slovenia	Spain	Bulgaria	Croatia	Denmark	Greece	UK
Assessor background education	High requirement							Low requirement		
	Bulgaria	Croatia	Slovenia	Poland	Greece	Malta	Denmark	Spain	Austria	UK

Assessors are not the same...

- Assessors with different training/skill levels cannot perform the same assessments
 - They are also unlikely to accommodate new EPC metrics in the same way



Verification frameworks



■ Quality control mechanisms:

- Verification rules in the EPC software (out-of-range values, missing parameters, consistency, ...)
- Automatic verification rules embedded in online EPC registers
- Independent checks by official government bodies or third-party organisations
- A connection between the complexity/standardisation of the calculation methodology and quality control?

Verification frameworks



	Standardisation rating (1-highly tailored, 5-highly Standardised)	Software validation rules	Database automatic controls	Organisations in charge of independent checks
Austria	5	<ul style="list-style-type: none"> A list of errors and explanations about them. <ul style="list-style-type: none"> No warnings about out-of-range values 	In some regions in Austria, the EPC database is used for independent quality checks	Performed by relevant energy agencies
Bulgaria	1	Some of the input fields have limits, but the allowed range is wide	Not automatically checked; however, the certificates are checked by the relevant authority before being lodged on the database	SEDA
Croatia	4	<ul style="list-style-type: none"> There are some checks on inputs and results. No warnings about out-of-range values 	There are no quality controls on the EPC database	The Ministry of Physical Planning, Construction and State Assets
Denmark	4	Input parameter validation measures	The EPC database is equipped with automatic data validation. It is automatically compared with other building data.	The Danish Energy Agency
Greece	4	Input parameter validation measures	Automatic validity check of EPC data is performed on the national EPC registry platform.	The Ministry of Energy
Malta	5	Input parameter validation measures	The data is thoroughly checked and cleaned before being lodged	The Malta Competition and Consumer Affairs Authority (designated by the Building and Construction Authority (BCA))
Poland	2	No validation measures	The EPC registry automatically checks for missing data; however, there are no automatic checks for the validity of EPC data.	An independent body
Slovenia	3	Input parameter validation measures	The electronic EPC registry runs an automatic check on the EPC certificates	the Inspectorate of the Republic of Slovenia on behalf of the Ministry of the Environment and Spatial Planning
Spain	4	<ul style="list-style-type: none"> Limited validation measures (mostly focused on missing inputs for the technical systems) are implemented, No warnings about out-of-range values. 	Some automatic checks including various identifiers, date of issue, the length of time between the site visit and EPC issue date, useful area, energy rating typology and negative final energy values	Varies regionally, the relevant institution (Autonomía) In each region
UK	5	Highlights out-of-range values	In-built validation rules applied: use of accredited software, missing fields, out-of-range values, parameter formats, consistency, and controlling the trends of data	<ul style="list-style-type: none"> Accreditation Schemes The Department for Levelling Up, Housing and Communities

Importance for next-gen EPCs

- Process for applying next-gen EPC metrics and innovations will be different for different countries
- Some new metrics may not even be suitable for a given EPC approach
 - This must consider both the assessment and assessor
- Need to guard against EPCs being asked to do things that they were not ever intended to do
 - And, again, this changes by country
- Should we focus harmonisation on how we use and verify EPCs rather than the EPCs themselves?
 - i.e. checking the EPC process is meeting intended goals of EPBD

Or do we just harmonise our ambitions for EPCs

- What can we compare against? Need clear categories

Criteria for an energy assessment

Forms of assessment – but could be current and future EPC methods

	Steady-state EPC models	Dynamic simulation	Empirical characterisation
C1 Alignment with reality	Low	Medium	High
C2 Flexible demand rating	Low	Medium	High
C3 Accommodates new technology	Medium	High	Medium
C4 Suitability for punitive action	Low	Medium	High
C5 Extrapolating and standardising	High	Medium	Low
C6 Quality of input information	Low	Medium	High

Summary

- There is a need to accept (some of) our differences where they are required
- EPCs can give the illusion of harmonisation
 - Differences are hidden but must be understood when applying top-down changes to EPCs
 - But we can „cluster“ EPC approaches when we categorise differences
- Harmonisation is not an end goal in itself
 - It may even reduce effectiveness for an individual country
 - But it may allow more effective implementation of key parts of EPBD and sharing of best-practice
- This is not just a next-gen EPC issue
 - But ignoring current variations in EPC frameworks will restrict effectiveness of new uses of EPCs

Thank you

Prof David Jenkins D.P.Jenkins@hw.ac.uk

www.crossCert.eu

