EPC scheme in Portugal

30/07/2024

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Content

- Context in Portugal
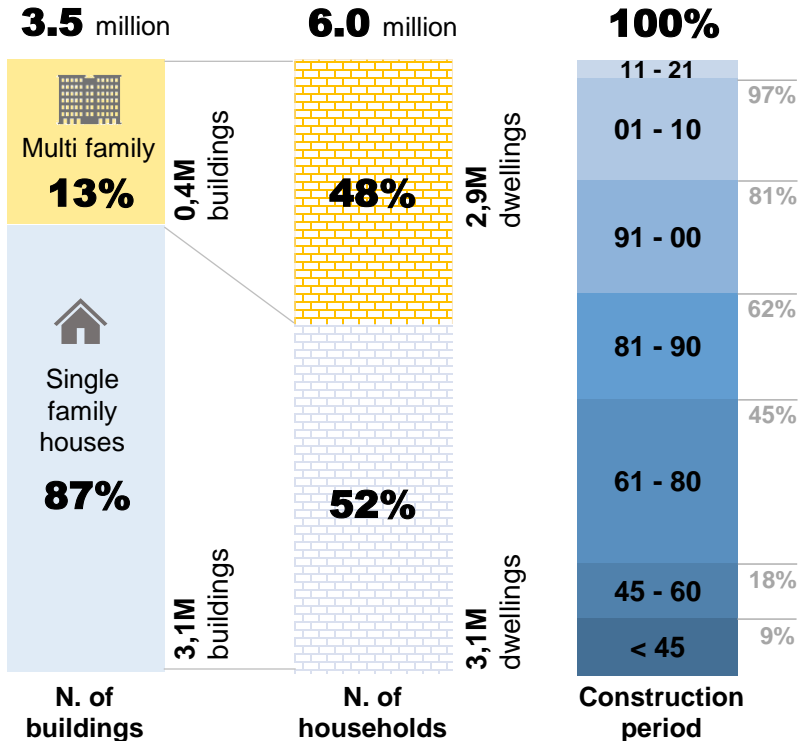
- Experiences in the EU using EPC DB

- Expected changes with the EPBD 2024 in Portugal

- Challenges

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Portuguese buidings stock from the "construction" perspective
Construction and energy performance data

Construction data

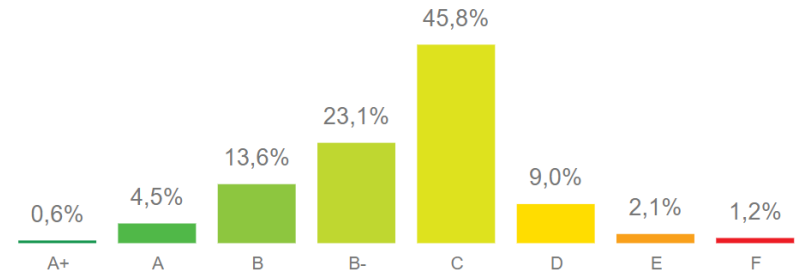**3.5** million | **6.0** million | **100%**

N. of buildings

- Multi family **13%** — 0,4M buildings
- Single family houses **87%** — 3,1M buildings

N. of households

- **48%** — 2,9M dwellings
- **52%** — 3,1M dwellings

Construction period

Period	
11 - 21	97%
01 - 10	81%
91 - 00	62%
81 - 90	45%
61 - 80	18%
45 - 60	9%
< 45	

Energy performance

Residential buildings

A+	A	B	B-	C	D	E	F
4,8%	13,4%	9,3%	7,2%	21,0%	22,1%	14,0%	8,2%

Non-residential buildings

A+	A	B	B-	C	D	E	F
0,6%	4,5%	13,6%	23,1%	45,8%	9,0%	2,1%	1,2%
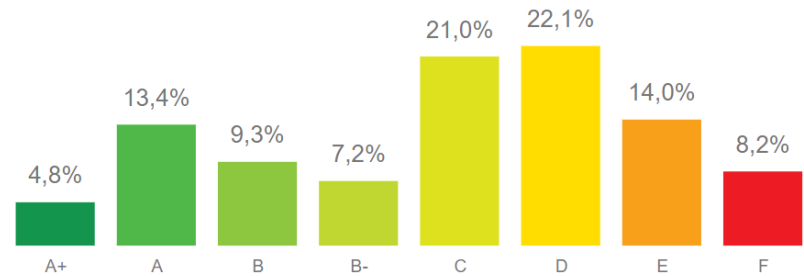
Energy Performance Certificates (EPC) scheme deployment in Portugal
Evolution of legislation

Directive 2002/91/CE EPBD

Directive 2010/31/UE EPBD

Directive 2018/844/UE EPBD

3,8M

1,8M

0,4M

0,2M

Until 1990	1990-2005	2006-2013	2014-2020	After 2020
☐ No requirements regarding thermal or building performance	☐ 1st legislation ☐ Thermal requirements ☐ Avoid pathologies	☐ 1st EPBD transposition ☐ EPC generation 1 ☐ 630.000 EPCs ☐ 80.000 EPCs/year ☐ 220 EPCs/day	☐ 2nd EPBD transposition ☐ EPC generation 2 ☐ 1.350.000 EPCs ☐ 190.000 EPCs/year ☐ 530 EPCs/day	☐ 3rd EPBD transposition ☐ EPC generation 3.0 ☐ 400.000 EPCs ☐ 200.000 EPCs/year ☐ 550 EPCs/day

EPC scheme in Portugal
Numbers since 2007

~2.500.000
ENERGY PERFORMANCE
CERTIFICATES (EPC)

40% of the building stock

9 in 10 residential

23.000
Public buildings

15.500
Big non-residential

Around **2.200** Qualified Experts

5.000.000
Improvement measures identified

INVESTMENT
€ 12.000 millions

SAVINGS
up to **€ 1.500** millions

Database with...

600 MILLION ENTRIES

Up to **300** variables per building

Geographic information
25 variables

Ventilation
17 variables

Building information
42 variables

Technical systems
54 variables

Building characterization
16 variables
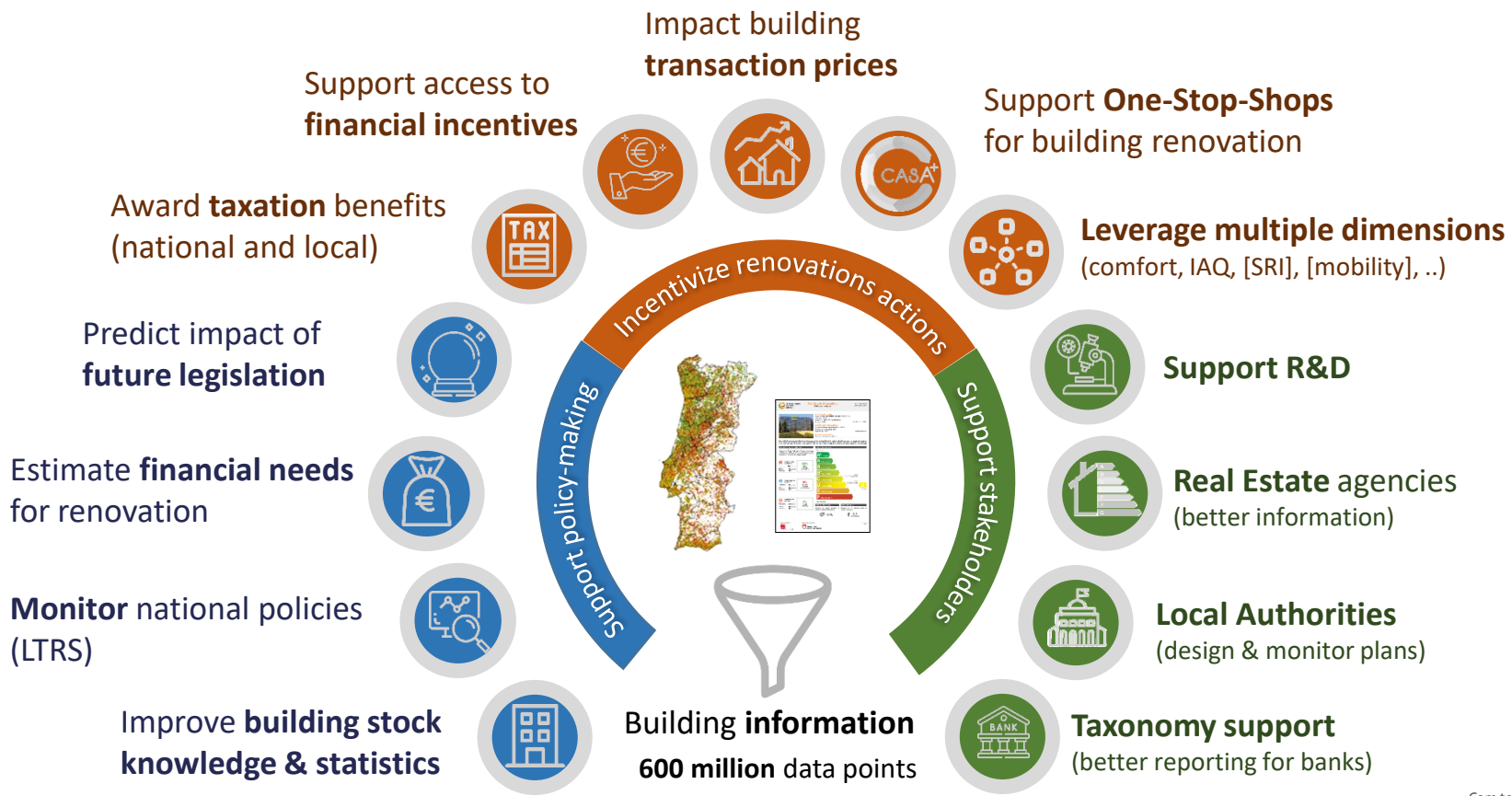
Energy balance
53 variables

Envelope
78 variables

Improvement measures
28 variables

EPC scheme in Portugal
Energy Performance Certificates contribution

Impact building **transaction prices**

Support access to **financial incentives**

Support **One-Stop-Shops** for building renovation

Award **taxation** benefits (national and local)

Leverage multiple dimensions (comfort, IAQ, [SRI], [mobility], ..)

Predict impact of **future legislation**

Support R&D

Estimate **financial needs** for renovation

Real Estate agencies (better information)

Monitor national policies (LTRS)

Local Authorities (design & monitor plans)

Improve **building stock knowledge & statistics**

Building **information** **600 million** data points

Taxonomy support (better reporting for banks)

Incentivize renovations actions

Support policy-making

Support stakeholders
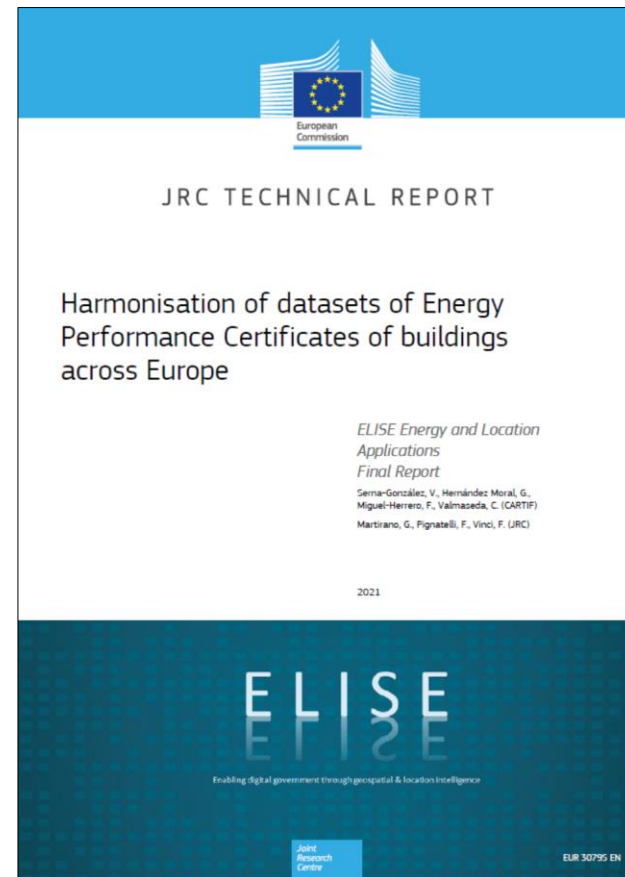
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Experiences in the EU using EPC DB

Harmonisation of datasets of energy performance certificates of buildings across Europe

ELISE energy and location applications : final report

https://op.europa.eu/en/publication-detail/-/publication/4b124f17-fb18-11eb-b520-01aa75ed71a1/language-en
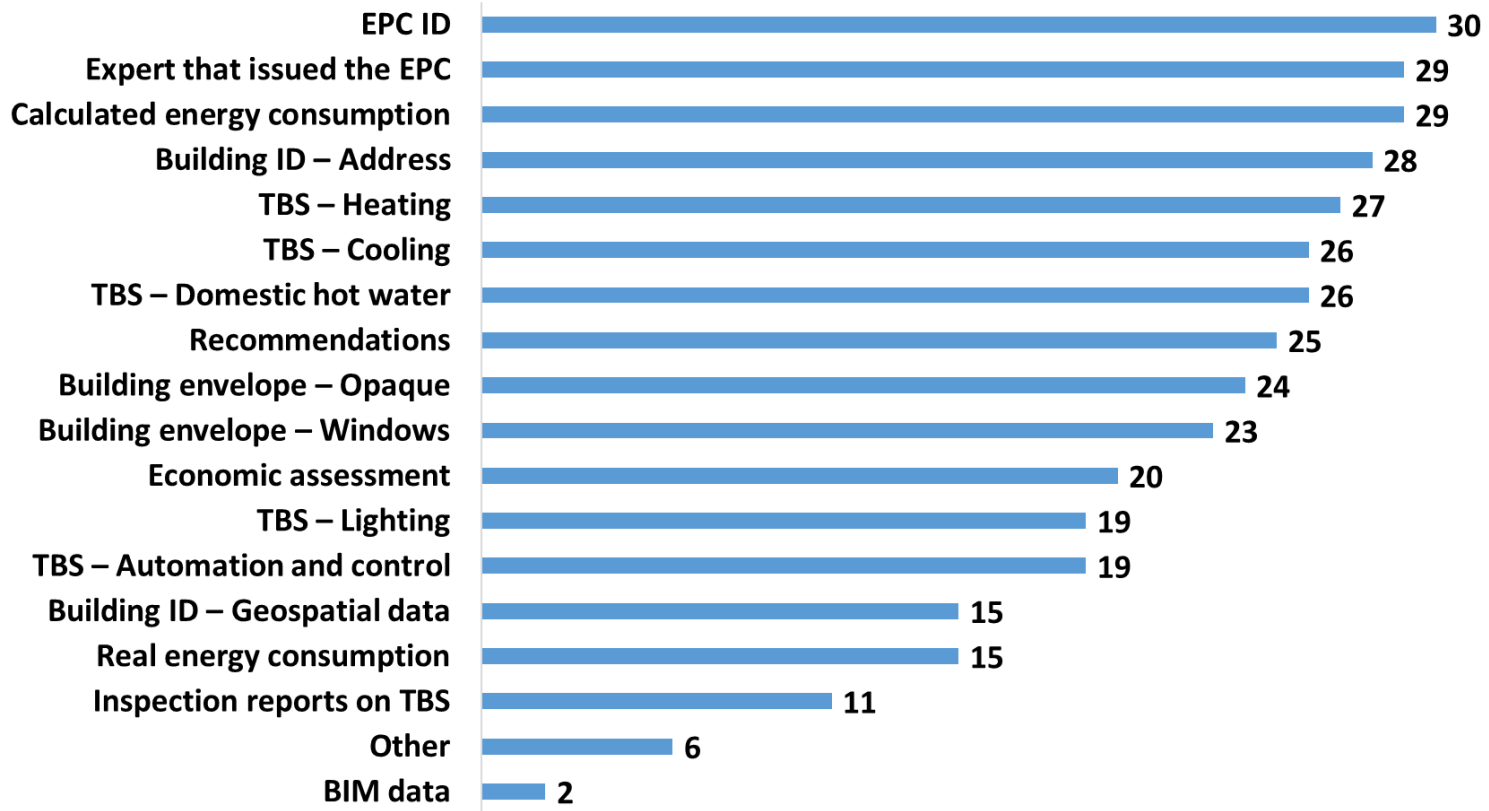
- ✓ **Different EPC schemes** making their comparison challenging.

- ✓ This report shows in the first place how a **European-wide harmonised EPC scheme would be very beneficial** to compare EPC datasets across countries and regions.

- ✓ Secondly, it showcases how **Regional Energy Agencies can actively support energy efficiency policies**.

- ✓ The study proposes a **European data model named EPC4EU**, reusing a methodology developed in 2017 to harmonise EPC in Italy and testing it with real EPC datasets from Castilla y León (Spain).

- ✓ **The methodology can be reused** to generate new versions of the EPC4EU data model **to harmonise EPC datasets from any Member State**.

- ✓ Furthermore, the study documents a **series of difficulties encountered during the harmonisation process and the solutions adopted** to overcome them.

- ✓ Finally, the study also **includes suggestions to use the resulting harmonised data in the QGIS software.**

European Commission

JRC TECHNICAL REPORT

Harmonisation of datasets of Energy Performance Certificates of buildings across Europe

ELISE Energy and Location Applications
Final Report
Serna-González, V., Hernández Moral, G., Miguel-Herrero, F., Valmaseda, C. (CARTIF)
Martirano, G., Pignatelli, F., Vinci, F. (JRC)

2021

ELISE

Enabling digital government through geospatial & location intelligence

Joint Research Centre

EUR 30795 EN

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Information from the CA-EPBD
Type of data is collected in the databases for EPC

Type of data	Count
EPC ID	30
Expert that issued the EPC	29
Calculated energy consumption	29
Building ID – Address	28
TBS – Heating	27
TBS – Cooling	26
TBS – Domestic hot water	26
Recommendations	25
Building envelope – Opaque	24
Building envelope – Windows	23
Economic assessment	20
TBS – Lighting	19
TBS – Automation and control	19
Building ID – Geospatial data	15
Real energy consumption	15
Inspection reports on TBS	11
Other	6
BIM data	2

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Information from the CA-EPBD
Number of variables and size of EPC DB

Country/ Region	Average # of variables per EPC		EPC DB size	Size per EPC
	Residential	Non-residential	(in GB)	(in kB)
Austria	500	600	5	52
Belgium - BR	200	-	130	592
Belgium - FL	750	750	950	550
Belgium - WL	400	-	1300	2363
Bulgaria	221	221	14	1881
Denmark	240	240	2000	3322
Estonia	-	-	430	14903
Finland	80	80	64	580
Greece	95	190	2	1,8
Ireland	70	-	935	1134
Italy	100	100	81	77
Lithuania	123	123	0,2	0,9
Luxembourg	165	-	-	-
Malta	100	100	-	-
Netherlands	150	150	1,6	0,3
Portugal	250	300	3500	2191
Rep. of Cyprus	31	31	0,65	13
Romania	30	30	600	629
Slovakia	168	210	2,21	18
Slovenia	70	80	99	1483
Spain	150	180	-	-
Sweden	200	200	196	294

Average number of variables per EPC

- **Residential ~ 195 variables**
- **Non-Residential ~211 variables**
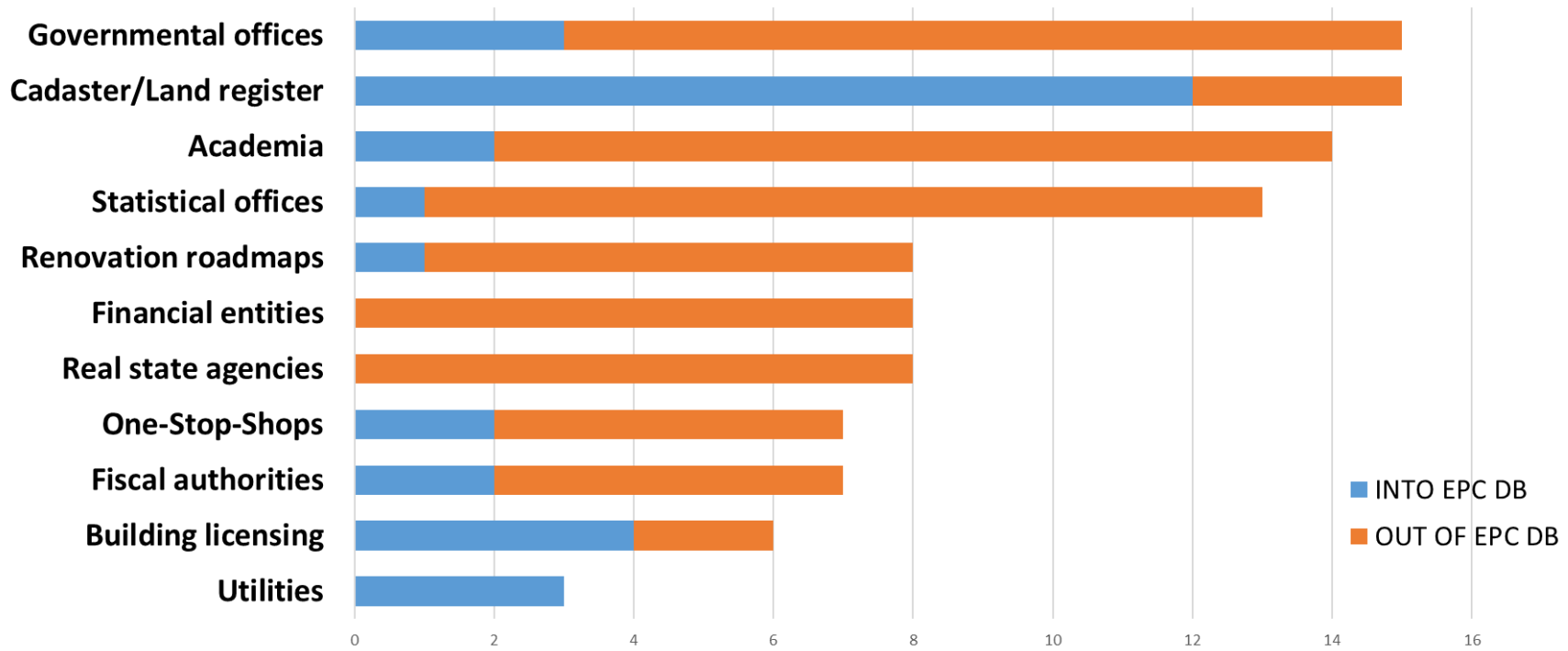
EPC Databases size

- **Average of 543 GB** (from 0,3 GB to 3.5 TB)

Size of each EPC issued

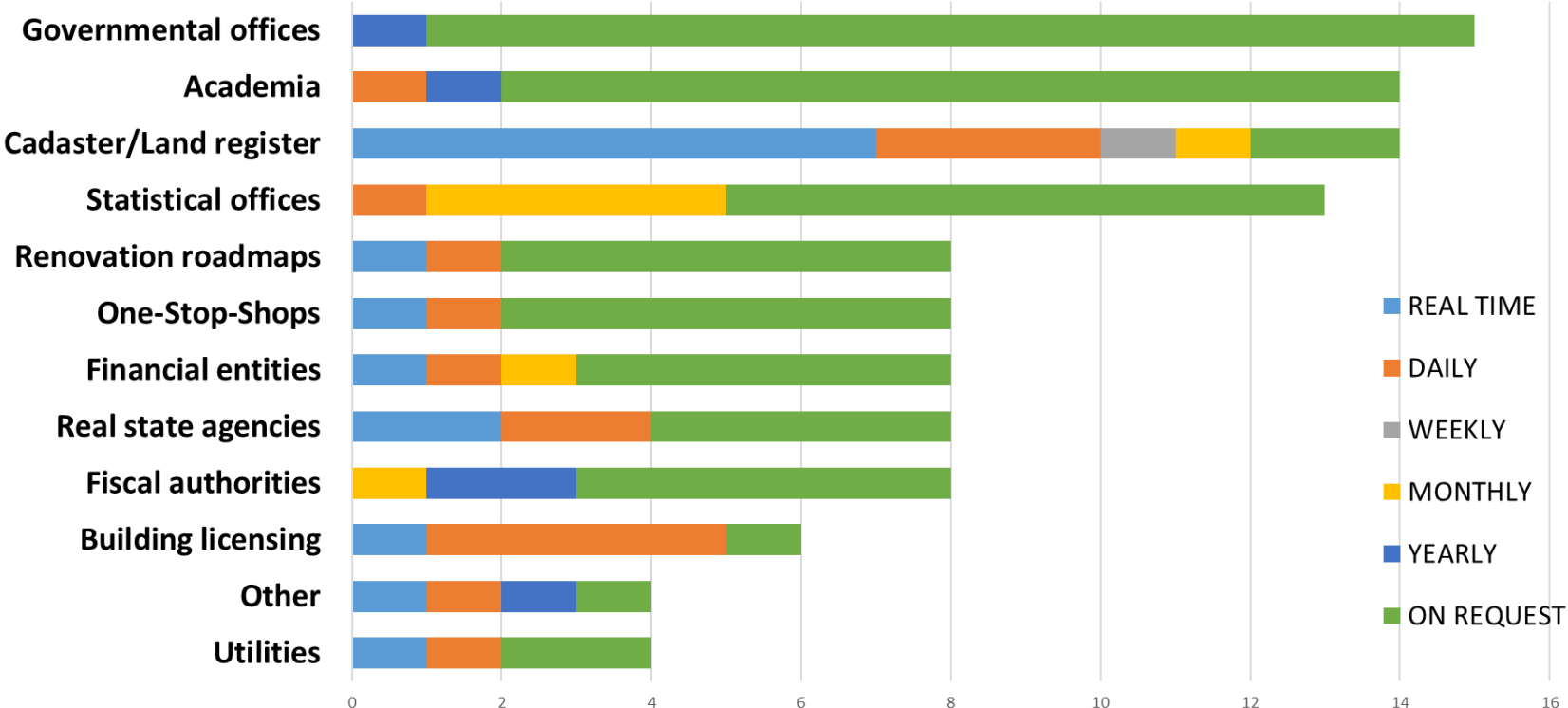- **Average of 1,5MB** (from 0,3 kB to 14MB)

Information from the CA-EPBD

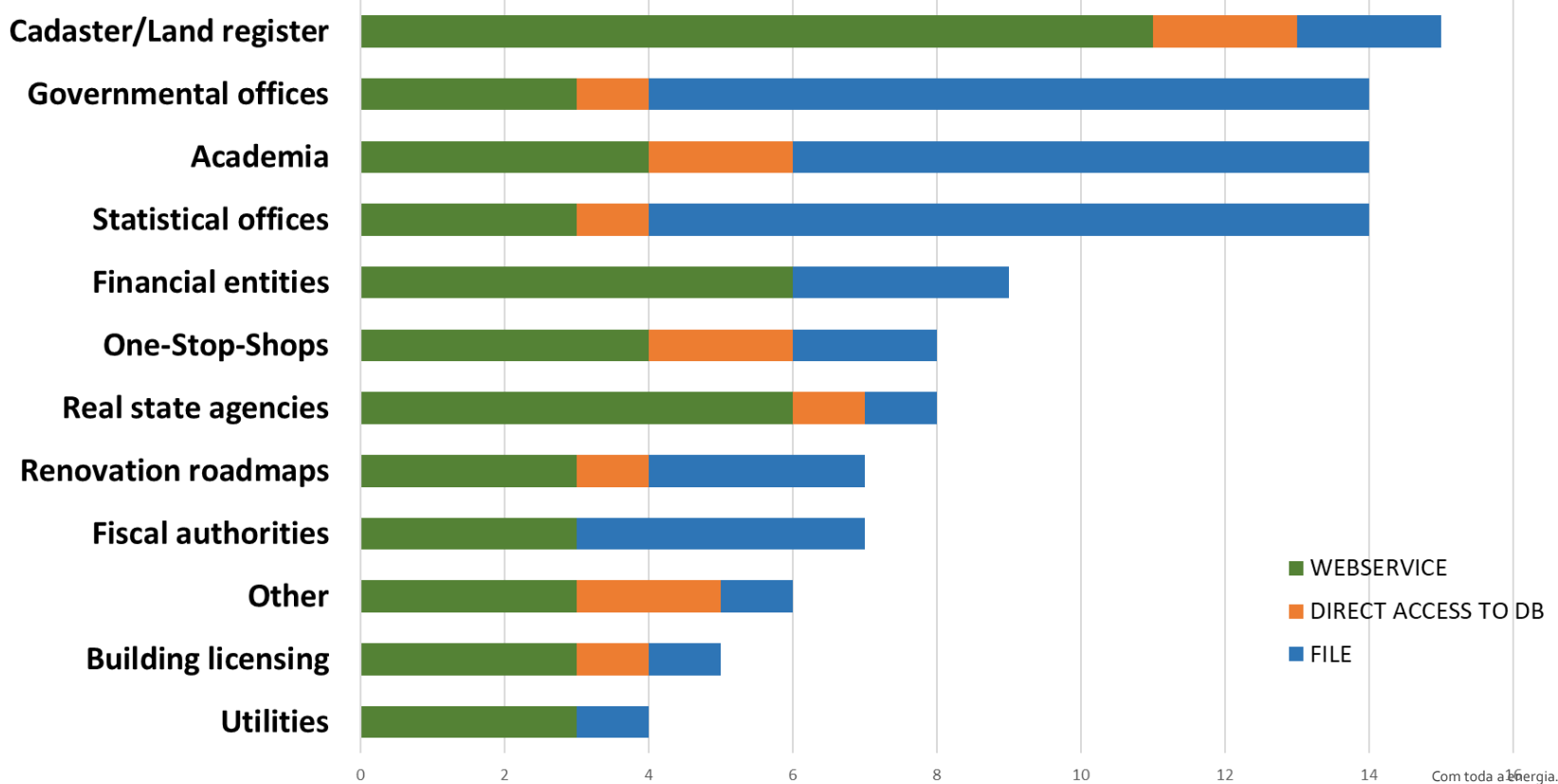## Interoperability - Type of DB/Service connected and main flow of data
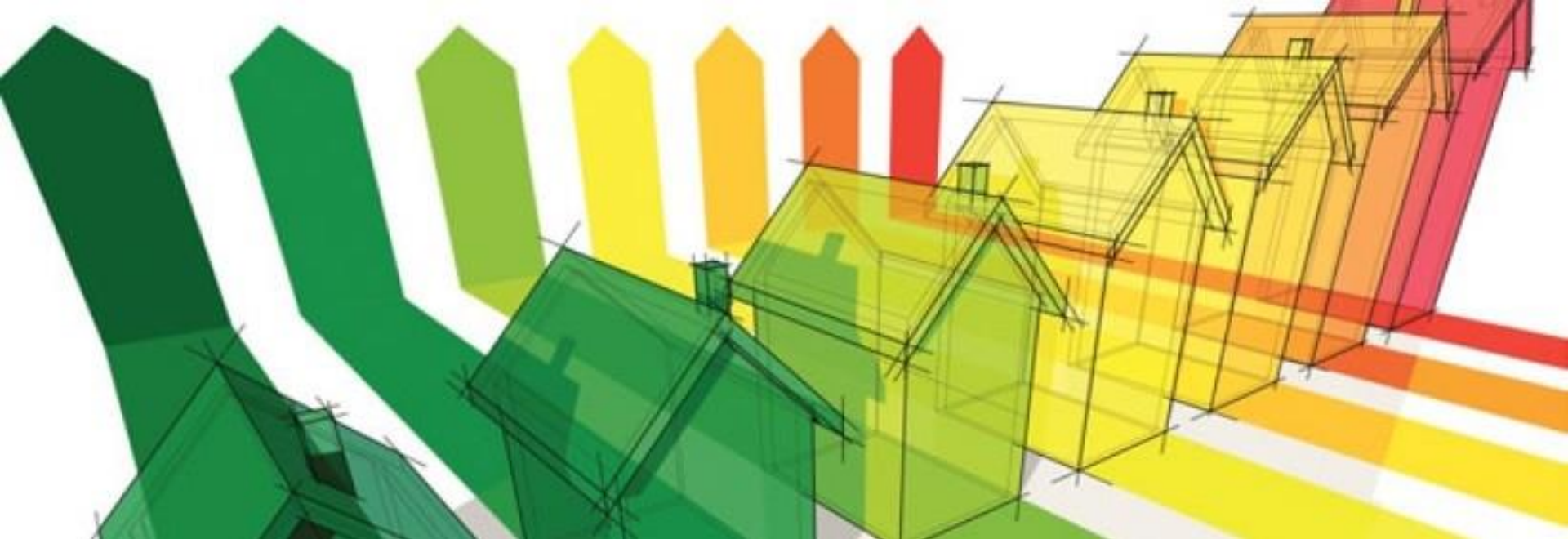
Information from the CA-EPBD
Interoperability – Frequency data is shared

Information from the CA-EPBD

## Interoperability – How data is shared

Chart legend: WEBSERVICE, DIRECT ACCESS TO DB, FILE

Categories (top to bottom): Cadaster/Land register, Governmental offices, Academia, Statistical offices, Financial entities, One-Stop-Shops, Real state agencies, Renovation roadmaps, Fiscal authorities, Other, Building licensing, Utilities

X-axis: 0, 2, 4, 6, 8, 10, 12, 14

Expected changes with the EPBD 2024 in PT
- EPC (and beyond) **databases**
- EPC calculation methodologies

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EPC DB structure in Portugal
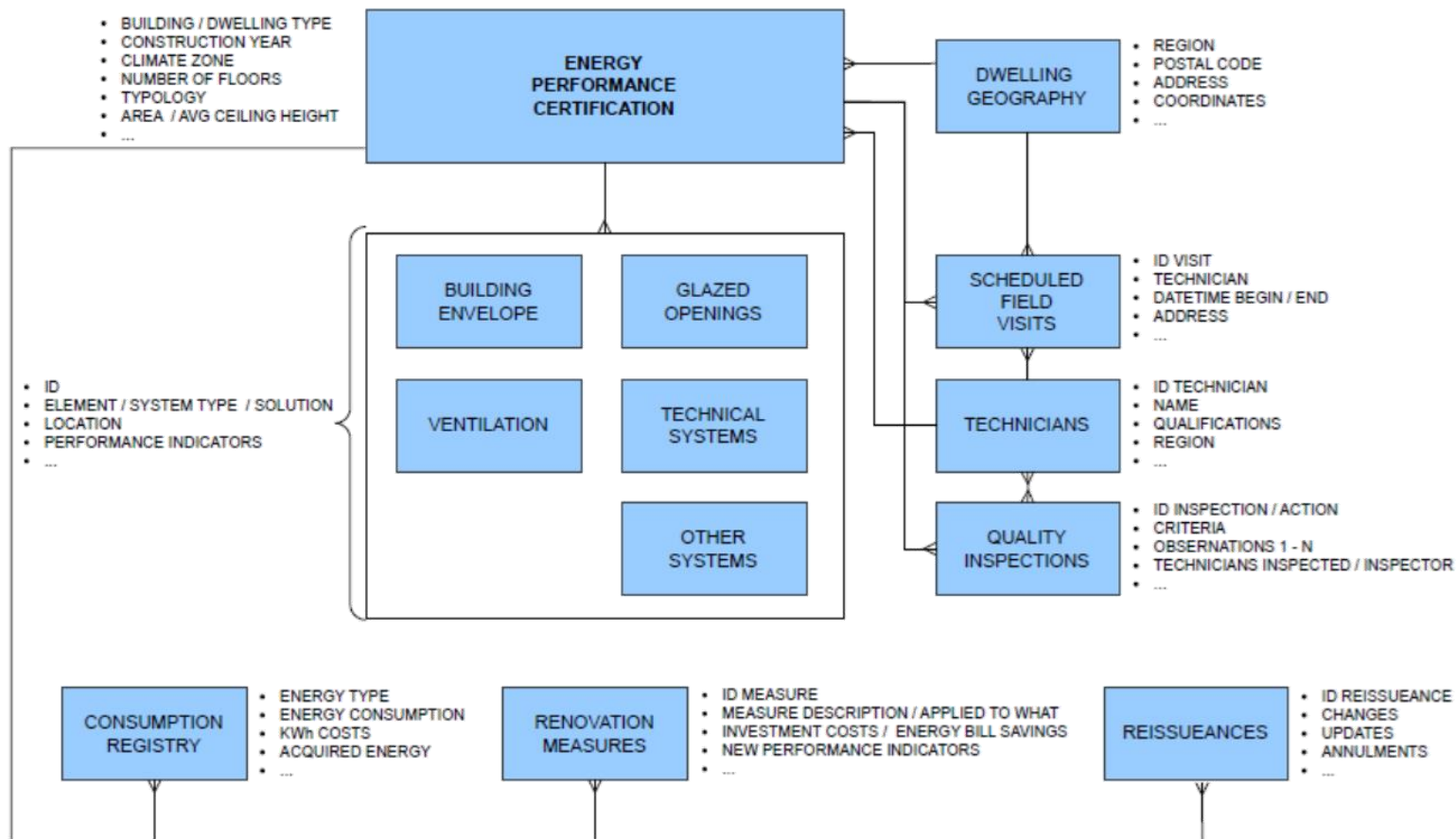
EPC DB – Link data to buildings

Each EPC can have up to 11 single identifiers

EPC DB – Link buildings and cadastre

Buildings identification

1) Identificação Edifício

METER ID

IDENTIFY BUILDING

Introduza o Código do Ponto de Entrega (CPE) para posicionar o edifício no mapa, diretamente no mapa.

Código do Ponto de Entrega (CPE): [   ] ⊕ ⊗

ADDRESS

Coordenadas Geográficas:

Latitude:

38.71182135258016

○ N ○ S [38] ° [42] ' [42.557] "

Longitude:

-9.138239622006948

○ E ○ W [9] ° [8] ' [17.663] "

GEO COORDINATES

Cadastre

2) Dados INE

INSPIRE ID

Inspire ID
PT_INE_III2_W87426S10570420110

Código do Edifício (Edif_Cod)
1747095

Inspire ID
PT_INE_III2_W87426S10570420110

Morada do Edifício
R AUGUSTA 219

Lugar
-

Código Postal e Localidade
1100-051 LISBOA

O ponto não apresenta corretamente o edifício no mapa: ☐
A informação obtida do edifício não está correta: ☐

DADOS CENSOS 2011

Época de Construção 1919 - 1945

Nº Pisos 2

Tipo Utilização Edifício 50-90% residencial

Necessidades de Reparação

🏠 Cobert. 🏠 Revest. 🏠 Estrutura 🏠 Comuns

Necessidades Conservação Geral Média

CENSOS DATA

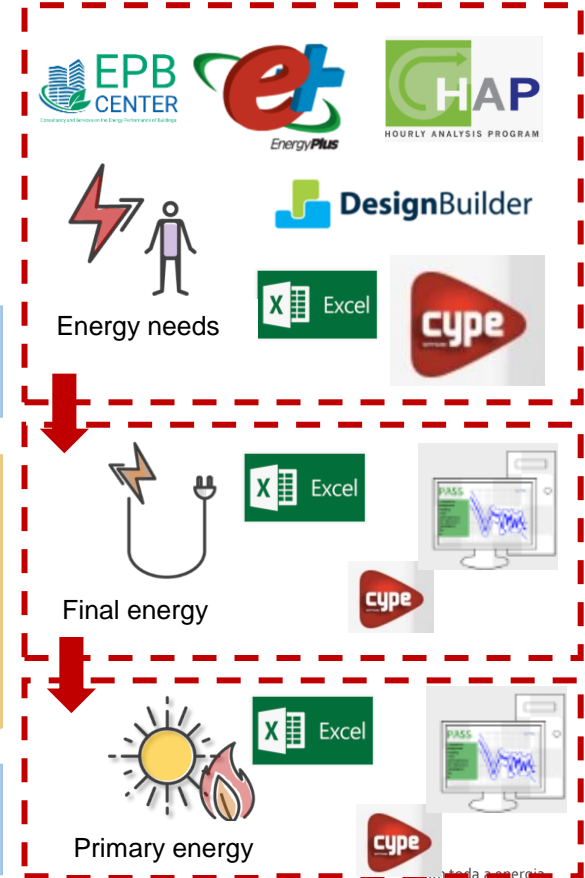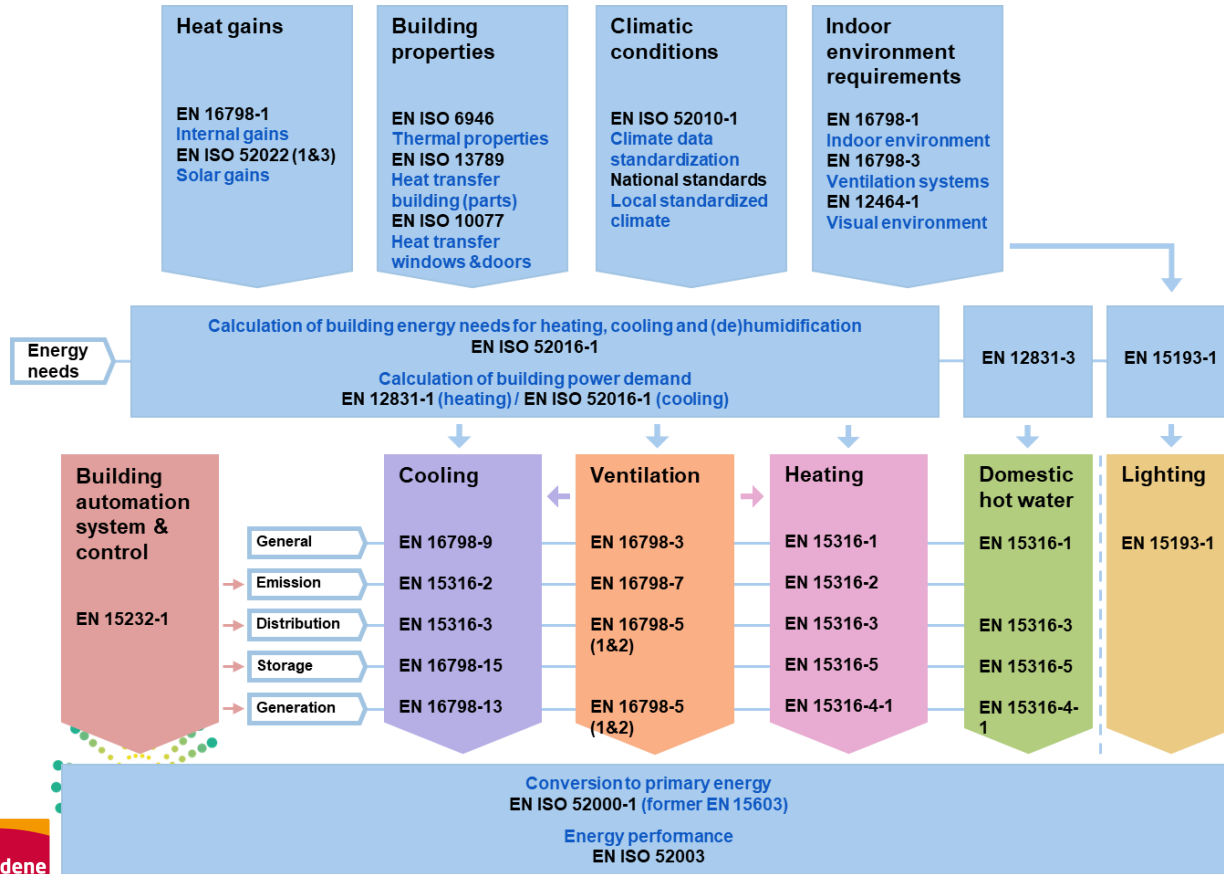**NÚMERO DE ALOJAMENTOS DO EDIFÍCIO: (5)**

Código Alojamento	Andar	Lado	
001	2	ESQ	◉
002	3	DTO	○
003	3	ESQ	○
004	4	DTO	○
005	4	ESQ	○

Alojamento não encontrado? ☐

DWELLINGS ID

Inspire ID
PT_INE_III2_W87426S10570420110

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EPBD 2024 | CEN standards

Heat gains

EN 16798-1
Internal gains
EN ISO 52022 (1&3)
Solar gains

Building properties

EN ISO 6946
Thermal properties
EN ISO 13789
Heat transfer building (parts)
EN ISO 10077
Heat transfer windows &doors

Climatic conditions

EN ISO 52010-1
Climate data standardization
National standards
Local standardized climate

Indoor environment requirements

EN 16798-1
Indoor environment
EN 16798-3
Ventilation systems
EN 12464-1
Visual environment

Energy needs

Calculation of building energy needs for heating, cooling and (de)humidification
EN ISO 52016-1

Calculation of building power demand
EN 12831-1 (heating) / EN ISO 52016-1 (cooling)

EN 12831-3

EN 15193-1

Building automation system & control

EN 15232-1

General
Emission
Distribution
Storage
Generation

Cooling

EN 16798-9
EN 15316-2
EN 15316-3
EN 16798-15
EN 16798-13

Ventilation

EN 16798-3
EN 16798-7
EN 16798-5 (1&2)
EN 16798-5 (1&2)

Heating

EN 15316-1
EN 15316-2
EN 15316-3
EN 15316-5
EN 15316-4-1

Domestic hot water

EN 15316-1
EN 15316-3
EN 15316-5
EN 15316-4-1

Lighting

EN 15193-1

Conversion to primary energy
EN ISO 52000-1 (former EN 15603)

Energy performance
EN ISO 52003

Energy needs

Final energy

Primary energy

CA-EPBD | EP calculation approaches in MS

Athens meeting, 17 May 2022
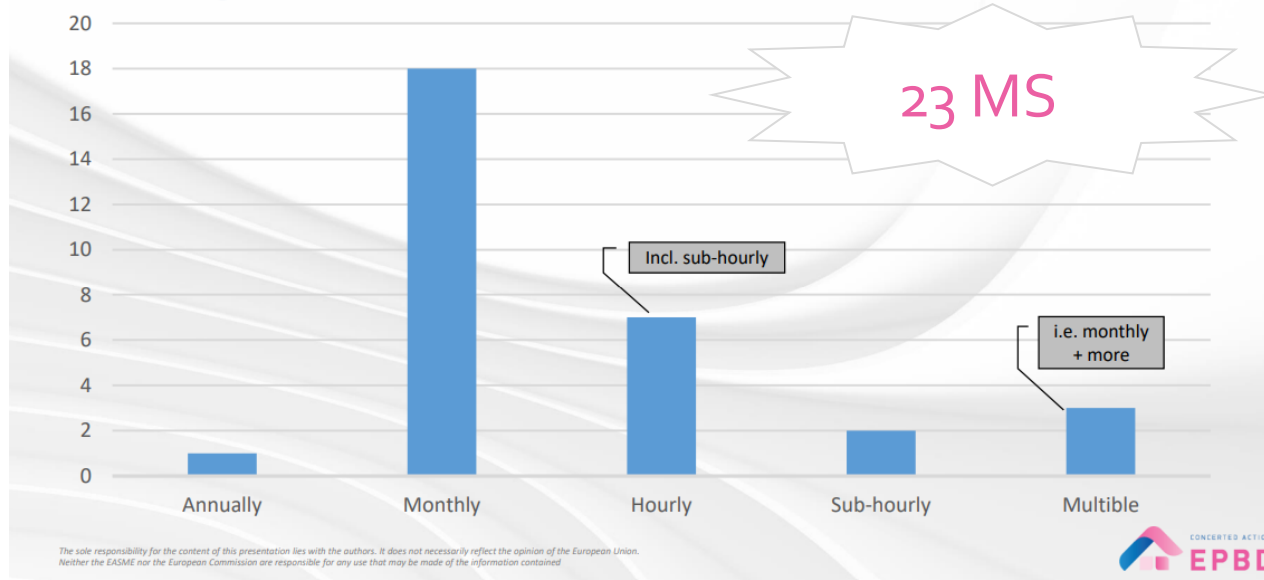
EPBD 2024 | EP calculation in PT - Residential

HAB

Energia Útil

- EN ISO 13790 ❌ **Revoked**
- Seasonal calculation method
- Fixed internal gains
- Fixed 24 hours user profiles
- Equal distribution of consumption per 24 hours
- EPB = Ratio (energy label not liked with a fixed indicator in kWh/(m^2.ano))

EPBD 2024 | Annex I

- Norma EN ISO 52016 (mensal, horário)
- **Monthly, hourly**, sub-hourly calculation method
- Reflect typical energy use
- EPB = Ratio or fixed kWh/(m^2.ano))
- Emissions = kgCO$_2$ eq/(m^2 .ano)

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EPBD 2024 | EP calculation in PT – Big Non-Residential

GES

Energia Útil

- ➢ ASHRAE 140 standard

- ➢ Hourly calculation method

- ➢ Internal gains calculated

- ➢ Real use profiles by typology

- ➢ Distribution of hourly consumption depending on profile

- ➢ EPB = Ratio (energy label not liked with a fixed indicator in kWh/(m^2.ano))

EPBD 2024 | Annex I

- ➢ Norma EN ISO 52016 (mensal, horário)

- ➢ Monthly**, hourly**, sub-hourly calculation method

- ➢ Reflect typical energy use

- ➢ EPB = Ratio or fixed kWh/(m^2.ano))

- ➢ Emissions = $kgCO_2$ eq/(m^2 .ano)

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Current challenges

> **EPC database** – Set-up a new portal, web interface and buildings database to integrate all EPBD data

> **Calculation methodology** – Update current EPB calculation methodology and store all the EPC data into the new portal
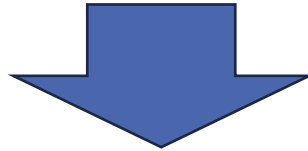
How to integrate and make best use of deliverables coming from the EPC cluster projects to facilitate current challenges?

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Thank you