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ANNEX 5

ANNEX

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Approval of the content of the draft Commission Notice providing guidance on new or substantially modified provisions of the recast Energy Performance of Buildings Directive (EU) 2024/1275

Databases for the energy performance of buildings (Article 22)

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Commission Notice providing guidance on new or substantially modified provisions of the recast Energy Performance of Buildings Directive (EU) 2024/1275

Databases for the energy performance of buildings (Article 22)

1. GENERAL CONSIDERATIONS

National databases for the energy performance of buildings are crucial to ensure the availability and usability of reliable and robust building data acquired at regional and national level. The databases will contribute to the reduction of administrative burden across the policy making process by becoming in time a main source of data for assessing, monitoring and communicating the impact of buildings policies.

They may also be used to facilitate the deployment of building renovation support programmes providing information and facilitating expert support through one-stop-shops. Lastly, the energy performance databases improve knowledge of the building stock status and progress on modernisation and can pass on relevant information to other interconnected databases. As a result, the information stored in a national database can be used by public and private stakeholders such as national, regional and local authorities, research institutions, public bodies, banks, real estate companies, professionals, as well as the media and the general public.

Article 22 of the recast Energy Performance of Buildings Directive (the 'recast EPBD')[1] focuses on several key functionalities of databases on the energy performance of buildings (referred to below as 'databases'), including gathering and storage in machine-readable format, aggregation and anonymisation of required information. It also addresses the availability of information to the public or specific categories of user through appropriate digital interfaces, in compliance with data protection regulations as well as interoperability with other databases and administrative registers. Additionally, the Article includes requirements relating to the transfer of information to the EU Building Stock Observatory.

Furthermore, Article 22 is closely linked to Article 16 of the Directive on data exchange, as the databases can facilitate access to a building's systems data for building owners, tenants and managers. More details are available in the guidance on data exchange in Annex 6.

2. IMPLEMENTATION TIMELINE

The national energy performance of buildings databases to be set up under Article 22 of the Directive must be in place by the transposition deadline for the Directive, which is 29 May 2026.

The Commission will adopt the first implementing act to draw up common templates for the transfer of information to the EU Building Stock Observatory by 30 June 2025.

[1] Directive (EU) 2024/1275.

3. INFORMATION TO BE STORED IN THE DATABASES

Article 22(1) of the Directive requires Member States to set up a national database for the energy performance of buildings 'which allows data to be gathered on the energy performance of individual buildings and on the overall energy performance of the national building stock'.

Furthermore, Article 22(1) indicates that the databases 'shall allow data to be gathered from all relevant sources related to energy performance certificates, inspections, the renovation passport, the smart readiness indicator (SRI) and the calculated or metered energy consumption of the buildings covered'.

Additionally, Article 22(1) allows data on operational and embodied emissions and life-cycle global warming potential (GWP) to be gathered and stored in the database. It also allows for building typologies to be gathered.

3.1. Energy performance certificates (EPCs)

Article 20(8) requires all EPCs issued to be uploaded to the national database referred to in Article 22. It specifies that these uploads must include 'the full energy performance certificate, including all necessary data required for the calculation of the energy performance of the building'.

Annex V to the Directive lists the compulsory and optional information to be included in the EPCs. This Annex should also be transposed by 29 May 2026. EPCs must include the following data:

- energy performance class;
- calculated annual final and primary energy use and consumption;
- calculated energy needs;
- renewable energy production (and the main energy carrier and type of renewable energy source) and share of renewable energy produced on-site;
- operational greenhouse gas (GHG) emissions, and, if available, the value of life-cycle GWP
- an indication of whether the building can react to external signals;
- where applicable, whether the building's heat distribution system is capable of working at low or more efficient temperature levels;
- contact information for the relevant one-stop shops for renovation advice.

All compulsory elements of the EPC must be uploaded to the national databases. Furthermore, if the EPCs include optional elements listed in Annex V or other additional ones, these elements must also be uploaded to the national databases. Therefore, the concept of 'full EPC' means that the entire EPC, including all the information required under Article 19 and Annex V to the Directive, as well as potential additional country-specific indicators, must be uploaded to the database. This will facilitate access for building owners and other entitled users to a full EPC that can be downloaded as a single document, for example in PDF format, potentially for further use, in property advertisements.

Article 22(1) states that the operational GHG emissions and life-cycle GWP *may* be gathered and stored. In isolation, this might be understood as meaning these elements are optional, but according to Article 20(8) and Annex V to the Directive this data *must* be included in the EPC where available. Therefore, it must be uploaded to the database as part of the full EPC. Additionally, according to Article 7(2) of the Directive, it will be mandatory to calculate the

GWP and disclose it in the EPC from 1 January 2028 for all new buildings with a useful floor area larger than 1 000 m^2 and from 1 January 2030 for all new buildings. This interpretation is reinforced by Article 22(4), which stipulates that aggregated or anonymised data on energy performance, including energy consumption and, where available, the life-cycle GWP, must be publicly disclosed. The provision indicating that data on operational GHG emissions and life-cycle GWP *may* be stored in the database refers to data that is gathered outside the documents listed in the paragraph (EPCs, renovation passports, etc.), which may also be reported in the national database.

As provided by Article 20(8), 'all necessary data required for the calculation of the energy performance of the building' must be uploaded to the databases. The following information should be considered as the minimum 'necessary data' to be uploaded:

- Building or building unit category (or categories);
- Reference floor area of the certified building or building unit. Where the building includes very distinct uses (e.g. a mixed-use building with apartments on the upper floors and a commercial space on the ground floor), then the reference area uploaded should be broken down by type of use;
- Disaggregated energy needs by main type of use (space heating, space cooling, domestic hot water, lighting (where relevant) and other technical building systems (where relevant));
- Installed power of technical building systems (notably of space and water heating and space cooling systems);
- The performance (i.e. efficiency) of the technical building systems (notably of space and water heating and space cooling systems);
- Installed power of on-site renewable energy generators (e.g. installed power of rooftop photovoltaic panels, in kW);
- To the extent possible, the total area and thermal transmittance (U-values or, where relevant, thermal resistance R-values) of the main building components (e.g. windows, walls, roof, floor).

3.2. Inspections of heating, ventilation and air-conditioning systems

Article 24(3) requires that inspection reports on heating, ventilation and air-conditioning (HVAC) systems must be uploaded to the national energy performance database.

According to Article 23(1), regular inspections are required for systems with an effective rated output of over 70 kW. According to Article 23(3), systems with a rated output power higher than 290 kW must be inspected at least every three years, and systems with a lower rated output power at least every five years.

Therefore, the national databases must comprise information about inspections performed for at least two ranges of rated output power:

- between 70 kW and 290 kW;
- above 290 kW.

Article 23(2) introduces the possibility for Member States to establish separate inspection schemes for inspections of residential and non-residential systems. Therefore, and in order to maximise the usefulness of data, it is recommended that inspection results be stored in the database by type of building, e.g. residential and non-residential, and by type and energy

sources of heating and cooling systems that data can be filtered accordingly thus maximising their relevance for further policy monitoring and related research and analysis. This distinction will provide more detailed information for further assessments, and it is recommended even where there is a common inspection scheme for both building categories.

Furthermore, Article 24(1) provides that an inspection report must comprise the result of the inspection performed and its recommendations. These recommendations must, 'where relevant, include the results from the basic assessment of the feasibility to reduce on-site use of fossil fuels. Therefore, it is recommended that inspection results be stored in the database broken down by type of energy carrier and type of system, notably for heating equipment.

HVAC inspection reports could provide additional useful information to support the drawing up of national or local plans for the decarbonisation of heating and cooling in buildings.

3.3. Renovation passport

Article 22(1) provides that data from building renovation passports must be gathered in the national energy performance databases. Furthermore, Article 12(7) indicates that Member States must ensure that renovation passports can be uploaded to the national database.

Annex VIII to the Directive lays down the compulsory and optional numerical and non-numerical elements of the renovation passport.

Furthermore, Article 19(6) of the Directive allows the renovation passport to be issued jointly with the energy performance certificate under specific conditions. In such circumstances, the recommendations from the energy performance certificate pursuant to Article 19(6) are replaced by the renovation passport becoming a necessary complement of the EPC. In this case (and for the purposes of Article 22), it is recommended that the complete renovation passport be uploaded to the database. As a minimum, the renovation steps must be uploaded to the database, along with any additional information corresponding to the information required for the EPC recommendations under Article 19(7)-(10). At least those elements must be available to the building owners, managers and tenants together with the full EPC and in place of EPC recommendations.

As a consequence of the above provisions, the renovation passport must be uploaded to or be available through the databases for the energy performance of buildings.

3.4. Smart readiness indicator (SRI)

Article 22 clearly refers to the SRI as one of the 'relevant sources' from which data should be gathered. Member States are therefore encouraged, in setting up their national databases, to consider including data from SRI certificates where such data is available.

The SRI was officially tested in 15 EU countries in 2024[2]. The scheme has not yet been implemented in any Member State, meaning that SRI certificates issued under the EPBD are not yet available. However, if a Member State did decide to implement the SRI, certificates would start being issued and related data could be gathered in the national databases.

In addition, by 30 June 2027 the Commission must adopt a delegated act 'by requiring the application of the common Union scheme for rating the smart readiness of buildings, in accordance with Annex IV, to non-residential buildings with an effective rated output for heating systems, air-conditioning systems, systems for combined space heating and ventilation, or systems for combined air-conditioning and ventilation of over 290 kW'. Therefore, the SRI will become mandatory for a segment of the non-residential building

[2] More information at: SRI test phases (europa.eu).

stock. Consequently, SRI certificates will gradually be issued, and data included in them could be uploaded to the national databases.

Therefore, though in Article 15 there is no strict obligation to upload the SRI certificates, it is recommended that the SRI be implemented in such a way as to ensure that SRI certificate data can be uploaded to the national databases. Related arrangements could largely rely on replicating the ones that apply to EPCs, given the similarities (in terms of implementation) between the two schemes.

3.5. Calculated or metered energy consumption of buildings covered

Article 22(1) also provides that calculated or metered energy consumption of '*buildings covered'* must be stored in the database. "Buildings covered" can be understood as meaning buildings for which data must be uploaded to the national databases which is contained in one of the Directive's instruments listed in the second paragraph of Article 22(1), namely EPCs, renovation passports, inspection reports for heating, ventilation and cooling equipment inspections and SRIs. However, not all these instruments include information about energy consumption. Consequently, '*buildings covered'* in Article 22(1) should be interpreted, as a minimum, as buildings covered by the listed obligations to the extent that these obligations result in available data about calculated or metered energy consumption.

3.6. Information about building typologies and building stock

Article 22(1) mentions the possibility to gather the information in the database by building typologies. Though not compulsory, registering data by building typologies is strongly recommended as it has several benefits. Firstly, it makes it possible to add datasets referring to building typologies from sources other than those specifically mentioned in Article 22. These datasets may cover, for instance, final energy consumption and operational (on-site) GHG emissions from the residential and services sector. They may derive from statistical data collection or from building-related scenarios and projections. A database structured using main building typologies can significantly reduce the administrative burden of the policymaking process, by reducing the need for additional data collection or estimates by building type, facilitating the decision-making process on certain building types (e.g. for dedicated support programmes) and providing the basis for a more detailed and accurate assessment of the energy performance of the building stock. Equally, it will help Member States to monitor the development of the building stock over time and the impact of building policies, as well as helping to shape adjustments to policies to increase their effectiveness.

Related to that, Member States are encouraged to maximise the benefits and synergies between the database and the monitoring and implementation tools required under Article 9. As an example, organising the database by the same building typologies to be used for the implementation of minimum energy performance standards in non-residential buildings would make it easier to monitor the achievement of the energy performance threshold for the worst-performing buildings in a typology. A statistically relevant dataset will make it easier to assess the average performance of buildings of that type, or to identify what building typology may have the highest consumption. As another example, it will be useful to have more precise and detailed information about a specific building type, e.g. multi-family buildings or educational buildings, in order to tailor support policies and programmes to further improve their energy performance in the most suitable and cost-efficient way.

Building typologies may be organised following the categories of buildings listed in Annex I, point 6, and corresponding aggregates from NACE codes[3] (the latter mainly for non-residential buildings):

(a) single-family houses;

(b) apartment blocks (or multi-family buildings);

(c) offices;

(d) educational buildings;

(e) hospitals (or health and social work buildings);

(f) hotels and restaurants (accommodation and food services);

(g) sports facilities;

(h) wholesale and retail trade services buildings;

(i) other types of energy-consuming buildings.

According to Article 22(2), aggregated and anonymised data on the building stock must be made publicly available. This means that the database must comprise at least general information regarding total number of buildings, building units and related floor area of the overall building stock. It is recommended that the information be organised by building type, following the above general typologies, or by residential and non-residential buildings as a minimum.

Linking the national energy performance databases to the building-related statistics codification where possible will provide additional advantages through stronger harmonisation and the possibility to exploit the full potential of the available data. Therefore, it is further recommended to interrelate the energy performance of buildings database with relevant information collected through statistical offices (e.g. energy consumption, building stock data such as floor area of households, number of dwellings). This could be automatic and dynamic, i.e. updated statistics are immediately reflected in the energy performance database. It will offer additional features and enrich the data available for policy assessment and monitoring.

The above are useful in particular to fulfil the requirement of Article 22(4) to make publicly available the share of buildings in the national building stock covered by EPCs, and aggregated or anonymised data on energy performance, including the energy consumption, and, where available, the life-cycle GWP of the buildings covered. Once the details of the building stock are integrated into the energy performance database, this requirement can be fulfilled by taking the ratio between valid EPCs and total number of buildings or building units or total floor area of the building stock. If the energy performance database is already structured by building typologies, then it will be possible to make public the share of EPCs in each typology.

Furthermore, it is recommended that the information be stored in the database so it can be retrieved at appropriate levels of government. More about this is set out below on the requirement of Article 22(3) that Member States ‘ensure that local authorities have access to relevant data on the energy performance of buildings on their territory as required to facilitate drafting of heating and cooling plans and include operational geographic information systems and the related databases’.

[3] NACE Rev. 2 - NACE Rev. 2 - Statistical classification of economic activities - Products Manuals and Guidelines - Eurostat (europa.eu).

4. ARCHITECTURE, INTEROPERABILITY, DATA STORAGE FORMAT, ACCESS TO DATA

4.1. Data structure, communication and access to data

According to Article 22(2), data stored in the energy performance of buildings database must be machine-readable and accessible via an appropriate digital interface. Article 2(13) of the Directive (EU) 2019/1024[4] defines 'machine-readable format' as 'a file format structured so that software applications can easily identify, recognise and extract specific data, including individual statements of fact, and their internal structure'. Recital (35) of the above Directive further clarifies that 'documents encoded in a file format that limits automatic processing, because the data cannot, or cannot easily, be extracted from them, should not be considered to be in a machine-readable format'. Examples of machine-readable formats include comma-separated values (CSV), JavaScript Object Notation (JSON), and Extensible Markup Language (XML), Extensible Stylesheet Language Transformation (XSLT).

As indicated in Article 22(2), the data in the database must be accessible via an appropriate digital interface. This means that the national database must have appropriate communication modules for the wider public and targeted audiences such as buildings owners, tenants, building managers, investors, public research bodies and public administration. A well-developed and comprehensive database with a robust communication interface can also support one-stop shops to tailor advice based on concrete results and figures. It can also contribute to improved transparency about energy efficiency in building policies and facilitate access to building system data for building owners, managers and tenants as required by Article 16.

Article 22(5) provides that Member States must ensure that the information in the national database is transferred to the EU Building Stock Observatory (BSO) at least once a year. Member States may transfer the information more frequently. The national energy performance databases should therefore have a module that can be easily used and adapted for this transfer of information. The templates for transfer the information to the EU BSO will be laid down in an implementing act that the Commission must adopt by 30 June 2025 as provided in Article 22(6).

According to Article 22(2), aggregated and anonymised data of the building stock must be made publicly available. This means that the database must include general information regarding total number of buildings, building units and related floor area of the overall building stock. Additionally, as laid down in Article 22(4), Member States must make publicly available the share of buildings in the national building stock covered by EPCs, and aggregated or anonymised data on the buildings' energy performance, including energy consumption, and, where available, life-cycle GWP.

Importantly, publicly available data must be updated at least twice a year.

According to Article 22(2) of the Directive, the database must offer easy access to the full energy performance certificate free of charge 'for building owners, tenants and managers and to financial institutions as regards the buildings in their investment and lending portfolios, and, upon permission from the owner, also to independent experts'. This means that the EPCs should be available through the database not only in machine-readable format but also for download and print in full in the standard format, with all required information according to Articles 19, 20, 21 and Annex V of the Directive.

[4] Directive (EU) 2019/1024 on open data and the re-use of public sector information.

If the EPC and renovation passport are issued jointly then the renovation passport can also be made available in full, or only the elements required for the EPC. In any case, Member States may decide to allow access to renovation passports in the same way as for EPCs.

Inspection reports on HVAC systems (Article 24) must also be uploaded to the database. Therefore, it is recommended that building owners and potentially other categories of user mentioned in Article 22(2) be given access to the inspection reports for their heating, cooling and ventilation systems (HVAC). HVAC inspection reports must be stored in the database and making them available to building owners and relevant users will improve the usefulness of the database. Where direct access is provided through the database, this is considered equivalent to handing over the report. This means that an expert carrying out an inspection may simply provide access to the report (as uploaded to the database) to the owner or tenant of the building instead of sending a copy of the report.

Energy performance of buildings databases must allow information to be gathered on the building renovation passport and the smart readiness indicator. In practice, this means that it must be possible to upload the renovation passports and the SRI into the databases. Member States may enable direct access to the renovation passport and the SRI through the database for the relevant parties (e.g. building owner).

In general, it is recommended that all information from EPCs, SRIs, renovation passports and inspection reports be directly available through the database. This enables the database to be the main source of information on building performance, giving it more visibility and relevance. The database will then effectively act as a central point of access to the main information on the energy performance of buildings.

Article 22(3) provides that local authorities must have access to relevant data on the energy performance of buildings on their territory to facilitate the drafting of the heating and cooling plans. Furthermore, it requires that data must include operational geographic information systems (GIS) and access to other relevant databases must be given, all these in accordance with Regulation (EU) 2016/679[5]. In practice, Article 22(3) means that the database should be organised such that local authorities can retrieve data at the appropriate level of granularity, i.e. also at regional and local level, with GIS identification. It should be interconnected with appropriate administrative and other databases that local authorities may draw on to draft and implement their heating and cooling plans.

Additionally, the provision indicates that local authorities must be supported at national level. Such support may be financial or may relate to human or other resources or to the infrastructure needed to access and use the information in the database.

Pursuant to Article 22(4), Member States must make anonymised or aggregated information available, on request, to public and research institutions such as national statistical institutes, universities or research-related units of national and EU administrations.

For national statistical institutes, the situation is more specific. They have dedicated use and processing rights to benefit from such source linkage to the extent possible, in compliance with applicable personal data protection rules, as set out at EU level in Article 17a of Regulation (EC) No 223/2009 on European statistics[6]. This does not impact the additional

[5] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation, GDPR) Regulation - 2016/679 - EN - gdpr - EUR-Lex (europa.eu).

[6] Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and repealing Regulation (EC, Euratom) No 1101/2008 of the European Parliament and of the Council on the transmission of data subject to statistical confidentiality to the Statistical

dedicated national laws in place in most Member States. In practice these legal bases will complement access modalities under Article 22(4) as outlined above specifically for national statistical institutes. On one hand, national databases to be setup under Article 22 of this Directive will be an important addition to the national data source environments for official statistics. On the other hand, national statistical institutes have the potential to add substantial value, for instance by mapping the building information with the highest accuracy available onto the housing stock (dwellings, living quarters), thus enriching information from national databases for energy performance of buildings but also for many other statistical products such as official statistics on housing or energy.

It is recommended that this information be aggregated at an appropriate level of granularity in respect of data protection and privacy. A good example in setting the procedure to offer access to public and research institutions is the Eurostat approach in sharing micro-data from the European statistics[7].

4.2. Database architecture and interoperability with other databases

The first subparagraph of Article 22(1) requires Member States to set up one integrated national energy performance database or a collection of interconnected databases.

Where possible, a single-database approach is recommended.

However, there may be situations where this is difficult due to the way the country is organised administratively. A set of interconnected databases may be a more appropriate the solution. For instance, it is possible to interconnect a set of regional/federal databases to form a national database in Member States with federal organisation or where the implementation of building policies is delegated and there are notable regional differences that prevent a smooth integration into one national database.

Another possibility is to integrate databases specific to each instrument concerned and link them in an overarching database. However, this latter option may come with additional costs and additional administrative burden.

In cases where a set of databases is the chosen solution, the databases should nevertheless be integrated to the extent possible at national level in one single public interface. To facilitate this integration, a consistent, logical and coordinated format for data processing and storage is recommended. A well-developed and forward-looking structure will ensure smoother integration with other databases at national and international level, where this is necessary to enhance the data repository and assessment capabilities based on it.

The above will facilitate the fulfilment of the Article 22(7) requirement that the national energy performance database must be interoperable and integrated with other administrative databases containing information on buildings, such as the national land register and digital building logbooks.

Interoperability allows data to be exchanged, merged and aggregated with other national databases, resulting in new data points to be used for the purposes described above, especially to support policymaking.

Office of the European Communities, Council Regulation (EC) No 322/97 on Community Statistics, and Council Decision 89/382/EEC, Euratom establishing a Committee on the Statistical Programmes of the European Communities (Text with relevance for the EEA and for Switzerland) (OJ L 087 31.3.2009, p. 164).

[7] Eurostat provide access to micro-data from European statistics for scientific purposes. Based on prior registration as a research entity, micro-data can be shared with universities, research institutes or research departments in a public administration, banks, statistical institutes, etc. More information here: Overview - Microdata - Eurostat.

The use of unique identifiers (IDs) and geo-referencing in administrative databases can significantly facilitate the interoperability and future cross-exploitation of stored data. In order to maximise database capabilities, it is recommended that interoperability with other databases be considered since the beginning.

Other databases to be taken into account can be databases and repositories comprising additional building stock information, energy consumption profiles, real estate information (e.g. price evaluations), reliance on financial programmes, taxes and government incentives, urban licences or conservation status. Considering this additional information can provide further insight into the national building stock, the uptake of building renovation programmes, and the most efficient ways to support vulnerable and energy-poor consumers or to correct potential market failures.

To achieve a robust dataset with a higher degree of confidence, it is also recommended that the methodologies used for calculating and aggregating building data and other related information be harmonised where possible across the administrative databases, to make them compatible and avoid potential misalignments that may limit the data usage possibilities.

To the extent possible, the interconnected databases and registers could be made available through one portal, which would allow users to see data from all sources in one place.

A possible structure of the database can be seen in the figure below.

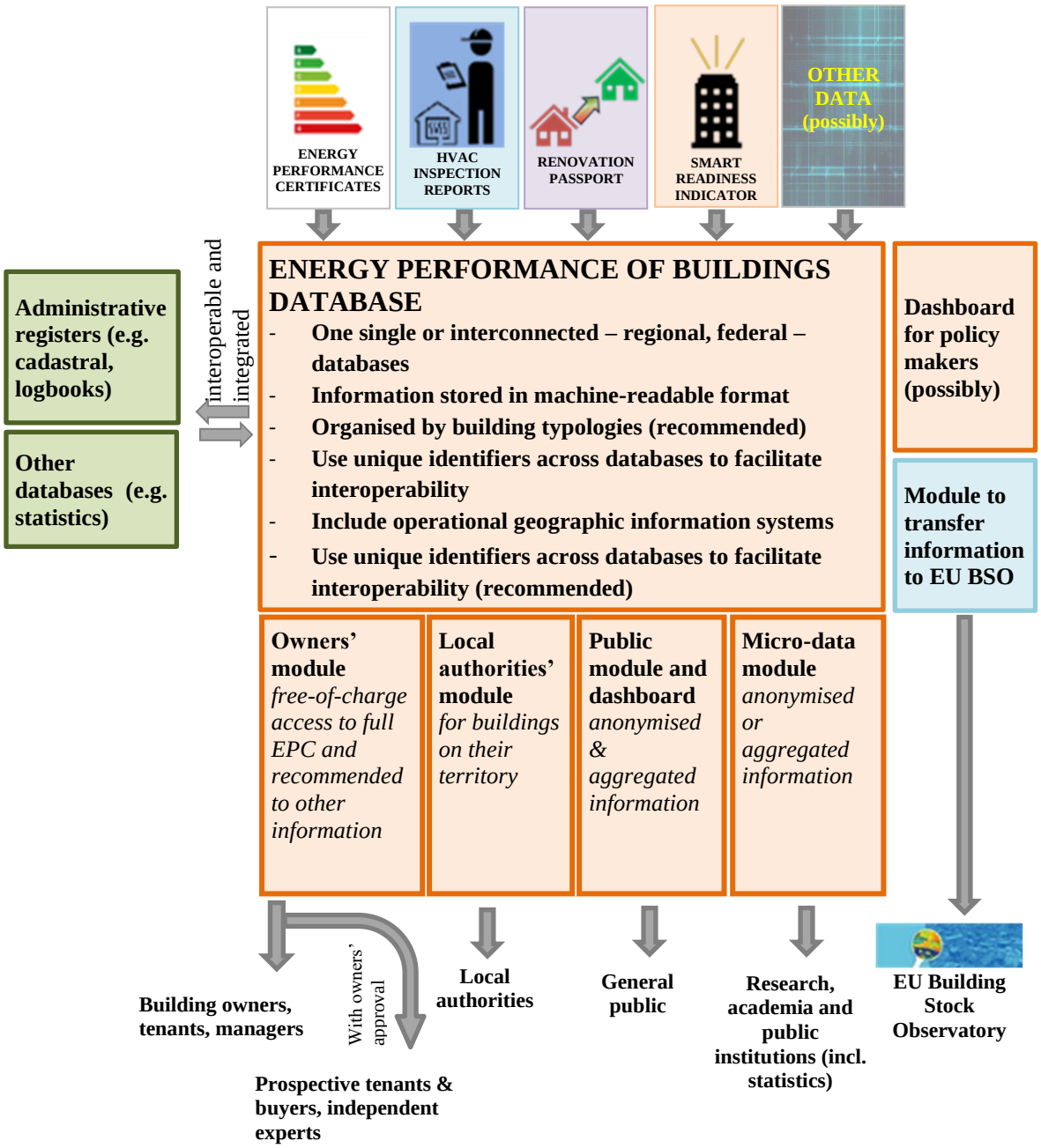

Figure 1: Possible architecture of an energy performance of building databases

5. DATA PROTECTION, ANONYMISATION AND SUFFICIENT AGGREGATION LEVELS

The level of access for the above-mentioned categories and database access protocols must be set in accordance with data protection legislation and in cooperation with national data protection authorities (DPAs).

In addition, Member States should be aware that the sharing of data from the national databases is covered by the Data Governance Act[8] (chapter II 'Reuse of certain categories of protected data held by public sector bodies'). Member States should ensure compliance with the relevant provisions and are encouraged to consult the national authorities responsible for enforcing the Data Governance Act in their country.

[8] Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724.

A clear privacy policy is recommended for access to information in the national database. If necessary, the policy currently in place can be reworked under the guidance of national DPAs. The policy should provide information and disclaimers about the personal data processing involved in implementing the database, as well as the contact details of the designated data protection office for further information or complaints.

From a personal data protection perspective, the integration of multiple registers gives rise to the following questions.

- Who should see the information stored within the database?
- What level of detail should be made available?

In that regard, the Directive provides that the database must make publicly available 'aggregated and anonymised' data, which does not fall under the scope of the GDPR. The aggregation can be done at appropriate levels (street, neighbourhood, district, etc.).

However, when considering making building-level data publicly available, it is advisable to assess the risk that cross-referencing between national registers would enable the owner to be identified. Based on this assessment, anonymised building-level data can be made publicly available where it is established that this poses no substantial risk to the protection of the building owner's privacy and personal data.

Certain types of users may require access to more detailed data, which may include personal data. As a general rule, the more detailed the raw building data, the higher the probability that it will contain information relating to an identifiable individual. To that end, it is recommended that Member States introduce a tiered-access approach, based on registration.

Providing access to raw building data has implications for individuals' right to protection of personal data. National law providing such access must comply with the GDPR. Guidance on EU data protection rules is provided by national DPAs and the European Data Protection Board. Member States should consult their national DPA when preparing legislation transposing the Directive.

For example, only the administrator of the database (national authority) and delegated authorities and the natural or legal person who enjoys a legal right in connection with a particular building should have access to the complete data for that dwelling.

Other parties, such as independent experts or prospective tenants or buyers, must also be granted access to the complete energy performance certificate, with the permission of the owner of the building, as envisaged in Article 22(2) of the Directive. When granting permission, the owner should have the option to provide only time-limited access, and possibly to restrict access to on-screen viewing of the certificate.

The access of local authorities to the energy performance of buildings database must be in line with personal data protection legislation. Therefore, Member States must ensure that the data can only be seen by authorised staff. Specific security measures, such as access controls (authentication) or encryption are recommended. Access to non-anonymised data should be provided for a limited number of staff as in the case of other local administrative databases.

Another degree of access could be provided for research and statistical purposes. In such instances, Member States should ensure that direct identifiers relating to the building owners or occupants (e.g. full names) are redacted to the necessary degree and that data is shared at a sufficiently aggregated level.

For publicly available information, raw anonymised data could be made available in machine-readable format, facilitating its further use for specialised statistics and research. When

developing the database, Member States should take account of the obligation to implement appropriate technical and organisational measures to ensure data protection by default and by design. They must ensure the security of the information stored within the database, in terms of confidentiality, integrity and availability.

Controls on access and roles can be used to ensure the confidentiality and integrity of the data and to ensure it cannot be seen, changed or removed without authorisation.

The availability of the data should also be ensured through back-ups and secure connections.

6. REPORTING TO THE EU BUILDING STOCK OBSERVATORY

As indicated by Article 22(6), the information from the national energy performance of buildings database must be transferred to the EU Building Stock Observatory at least once a year. The Commission will adopt implementing acts to further clarify the common reporting templates. The first such implementing act must be adopted by 30 June 2025.

To enable transfer of information from national databases to the EU BSO for the first implementing act, the Commission will develop a digital reporting interface and will provide appropriate explanations and information (workshops, user manual and technical assistance) to the authorities designated by the Member States to be in charge of reporting.

7. EXAMPLES OF CURRENT DATABASES AND BEST PRACTICES

Most of the publicly available national databases relating to the energy performance of buildings which were in place before the recast EPBD serve to ensure the availability and usability of EPC data acquired at regional and national level. Member States have developed EPC registers in a wide variety of ways, differing greatly in scope, format, procedures for data acquisition and processing[9]. Among this range, it is possible to identify some best practices and examples to provide guidance for the development of such databases.

7.1. Size of the database

The size of the database is an important aspect, because it is directly connected to the amount of information that can be aggregated and generated. The information stored in the database can be used for a variety of purposes: to incentivise renovation (e.g. by providing information on applicable tax benefits or other financial incentives), to support the expertise developed in one-stop shops, or to promote initiatives like sustainable responsible investments.

Given the wide variety of potential uses of the building information, the model database would be designed to host and collect as much information as possible, though the information collected is also important. It is thus recommended that Member States consider the integration of as many variables and as much data as possible. In this regard, the Portuguese and Danish EPC databases have been identified as examples of best practice:

- Portugal's database includes up to 250-300 variables for each building of different types: geographic information, technical systems, building identification, energy balance indicators, ventilation, envelope, building characterisation and improvement measures[10]. It was created in 2007 and contained around 1.5 million EPCs by 2019.

[9] Ruggieri Gianluca, Carmen Maduta, and Giulia Melica, *Progress on the implementation of Energy Performance Certificates in EU*, Publications Office of the European Union (2023), available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC135473.

[10] Libório, Paulo et al., *The logbook data quest: Setting up indicators and other requirements for a renovation passport* (2018), available at: https://www.oneplanetnetwork.org/sites/default/files/ibroad-the-logbook-data-quest.pdf; the Portuguese EPC database is available at: https://www.sce.pt/.

To ensure that the database can rapidly process large amounts of data, it was built from the outset to be able to work with big datasets. It does not store PDF versions of certificates but only contains the raw data that can be used to produce an EPC when needed[11].

- Denmark's database includes all EPCs generated since 2006, and it allows for a significant amount of data to be reused for the generation of new EPCs. This follows from a process including on-site data collection, data calculation by EPC software, data validation, submission and conversion to EPC. Data can also be used to carry out analyses based on the extensive knowledge of the building stock[12].

7.2. Interoperability of databases

An interoperable database allows data to be exchanged, merged and aggregated with other national databases. This gives rise to new data points that can be used for the purposes described above, especially to support policymaking at national level. A good practice in this regard can be identified in the Portuguese database. The information stored in each EPC aggregates up to 6 different IDs at building level, and 5 IDs at building unit level, resulting in a total of 11 IDs, which enable each building to be identified across different interfaces and databases, such as national land registers or utilities platforms[13]. These different types of IDs include:

- the INSPIRE ID (European building identifier enabling environmental spatial information to be shared among public sector organisations, in order to facilitate public access to spatial information across Europe);
- national ID;
- utilities ID;
- fiscal ID;
- notary ID[14].

7.3. Interface and functionalities of the database

To ensure the widespread dissemination of information through EPC databases, Member States have often included services that allow for multiple uses of the data. To maximise the potential of EPCs, it is essential that they are made available to as many relevant stakeholders as possible[15]. For example, the Danish EPC database is available through different channels:

- The EMOData service enables a full data file to be downloaded in xml format, with predefined search functions[16];
- The energy performance certificate of a specific building can be accessed through https://old.sparenergi.dk/forbruger/vaerktoejer/find-dit-energimaerke or boligejer.dk;

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11 *Energy Performance Certificates across the EU – A mapping of national approaches* (2014), available at: https://bpie.eu/wp-content/uploads/2015/10/Energy-Performance-Certificates-EPC-across-the-EU.-A-mapping-of-national-approaches-2014.pdf.

12 The Danish EPC databases is available (based on free registration) at: https://emoweb.dk/emodata/test/#

13 Ibid 10

14 Ibid 10

15 Geissler, Susanne, Alexandros G. Charalambides, and Michael Hanratty, 'Public Access to Building Related Energy Data for Better Decision Making in Implementing Energy Efficiency Strategies: Legal Barriers and Technical Challenges' (2019) *Energies*, 12, 2019, available at: https://doi.org/10.3390/en12102029.

16 https://emoweb.dk/emodata/test/#.

- A map of energy performance certificates is also available at https://old.sparenergi.dk/demo/addresses/map (Figure 2).

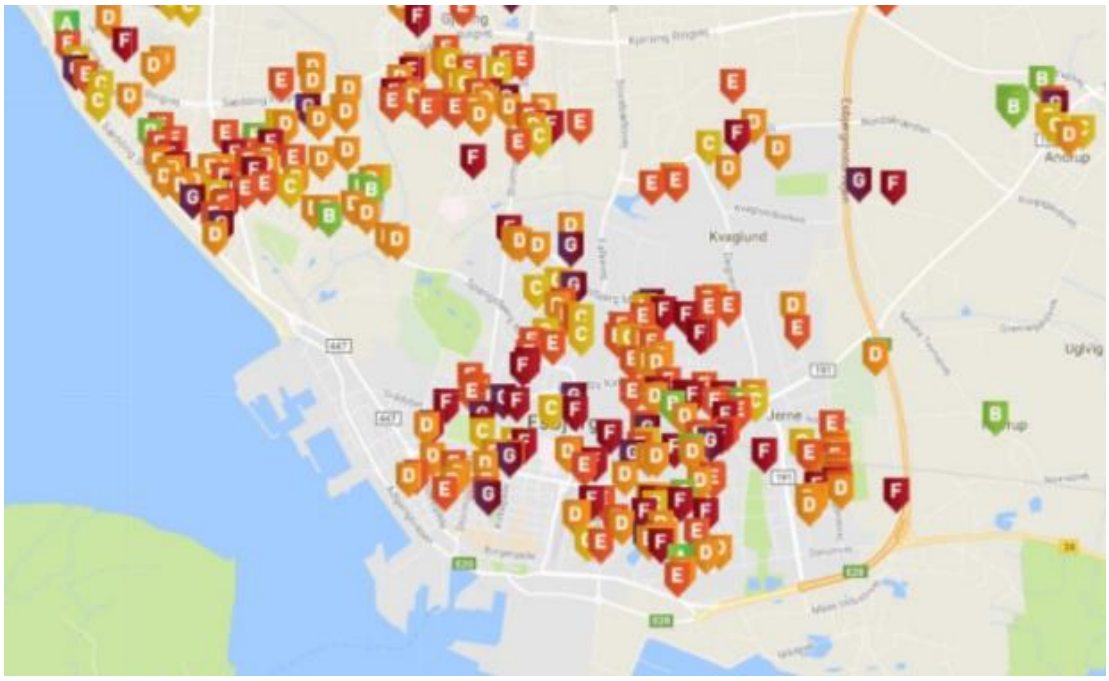

Figure 2: Mapping interface of energy performance certificates database in Denmark

The variety of services available in Denmark makes the database useful for stakeholders with different backgrounds, such as research institutes and universities, financial institutions, web services, public authorities, NGOs, real estate agencies or journalists, who are common users of this service. The map service makes it possible to see the energy performance class of different buildings within a perimeter, but also to search for your own personal EPC in digital format or to consult an overview of all the EPCs active in the database[17]. Alternatively, the raw data available on the EMOD service can be used for specialised statistics and research purposes.

The databases can be used to encourage building owners to use EPC data, and to bridge the gap between owners and stakeholders on the renovation market. For example, the Portuguese database allows users to search directly for qualified experts and technicians[18]. From a personal data perspective, this functionality requires the consent of the experts, who must explicitly agree to having their name and contact details publicly available on the platform. The portal also compiles information for investors, providing an overview of available benefits and incentives associated with energy certificates. Moreover, qualified technicians can access a reserved section with guidelines for their professional activities. Other stakeholders (such as municipalities, notaries or real estate agencies) also have their dedicated sections within the database.

Anonymised building stock information could also be presented in a user-friendly format that can be easily understood by the public.

[17] Brand Kristen, Bernhard von Manteuffel, Andreas Hermelink 'Energy Performance Certificate Database in Denmark – Fact sheet' (2018), available at: https://www.euki.de/wp-content/uploads/2018/09/fact-sheet-energy-performance-certificate-database-dk.pdf.

[18] https://www.sce.pt/pesquisa-de-tecnicos/.

A good example of presenting aggregated data is the map and analysis service included in the French portal Go-Rénove[19]. This functionality allows users to filter perimeters by administrative clusters (e.g. departments, municipalities, districts). The map service is integrated with the national land register, providing information at building level. The synthesis function provides aggregated data, clearly illustrated through a dashboard interface. This approach is specifically recommended for providing the aggregated information required by Article 22(4) of the Directive 'on the share of buildings in the national building stock covered by energy performance certificates and aggregated or anonymised data on the energy performance, including the energy consumption, and, where available, the life-cycle GWP of the buildings covered'. Member States may consider implementing such functionalities to enable buildings in a specific perimeter to be compared through an accessible and easy-to-use interface.

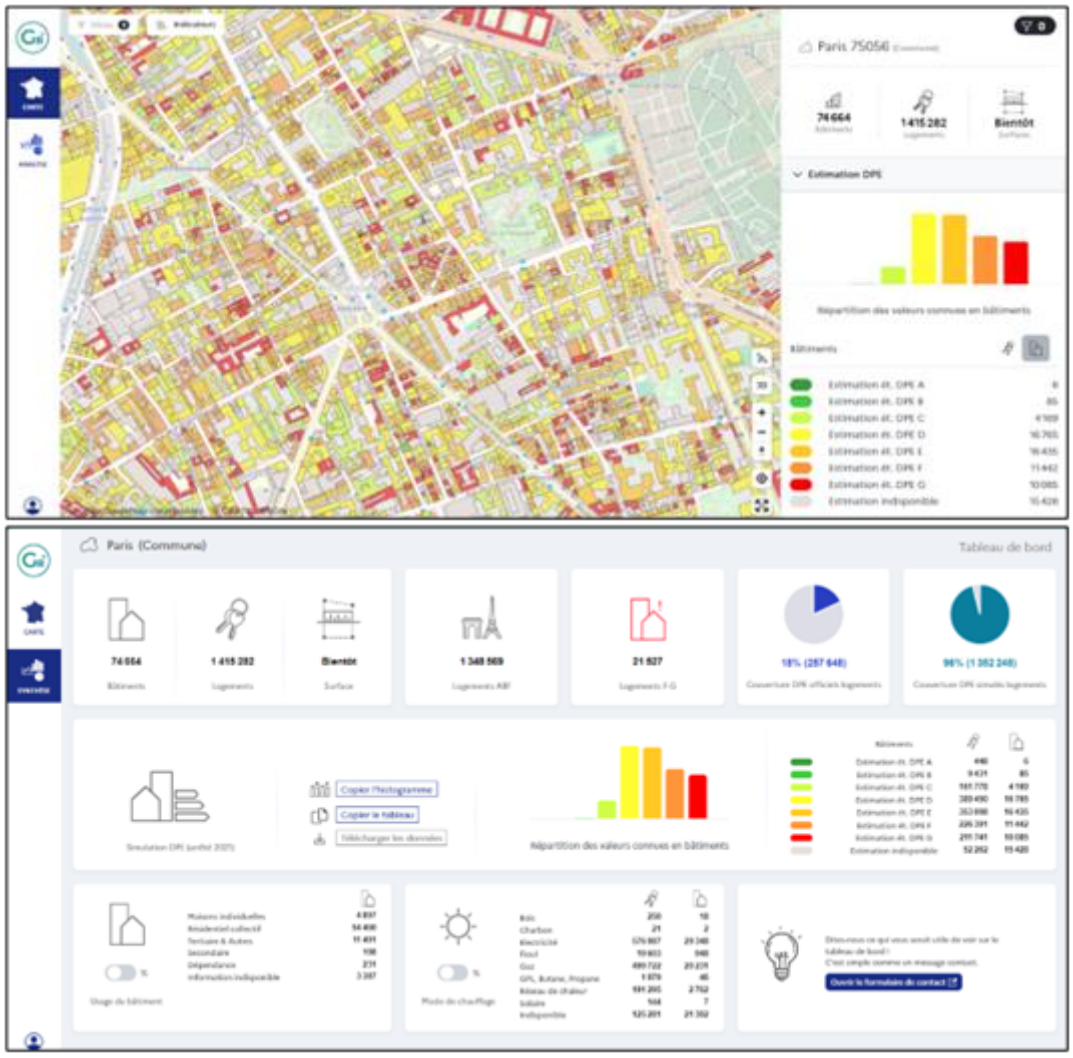

Figure 3: Captures from the public Interface of the French portal Go-Rénove

The database can also be designed to bring together multiple categories of stakeholder, providing specific sections and functionalities targeted for each, while bridging the gap between building owners, technical experts and the national authorities.

Another example of best practice is the portal of Flemish Region in Belgium, which collects all relevant information about a property centrally[20]. Woningpas is a digital logbook owned

19 https://territoires.gorenove.fr/.

20 https://woningpas.vlaanderen.be/.

by public entities in Flanders and is automatically available to building owners and housing companies. Data in Woningpas is connected to external platforms via application programming interfaces (APIs) and includes a digital vault for certifications, plans and relevant documents. It has a function for inputting data about renovation activities and a housing quality check tool. Since 2022 it has also been possible to share an individual Woningpas with authorised third parties and the public.

7.4. List of identified national databases

A recent Joint Research Centre report assesses progress on the implementation of the EPC in the EU[21]. The report provides detailed information about the national systems, including national EPC registers and their main websites. The table below gives a list of EPC databases identified across the EU Member States. These databases may be a good starting point for developing energy performance databases as required by Article 22.

Table 1: National databases related to the energy performance of buildings, in place in the EU Member States

Austria	https://www.energieausweise.net/ (for Regions Burgenland, Kärnten, Niederösterreich, Tirol, Salzburg and Steiermark) https://www.wien.gv.at/wukseagis/public/ (for Region Wien) For Region Oberösterreich, the database is not publicly available: https://www.statistik.at/datenbanken/adress-gebaeude-und-wohnungsregister/energieausweisdatenbank-eadb/zugang-und-technische-informationen https://www.eawz.at/ (for Region Vorarlberg)
Bulgaria	https://portal.seea.government.bg/bg/IndustrialSystemsReport
Belgium	Brussels Capital Region: https://www.peb-epb.brussels/certificats-certificaten/ Flanders: https://authenticatie.vlaanderen.be/stb/html/ssologin https://woningpas.vlaanderen.be/ Wallonia: https://peb.energie.wallonie.be/bddpeb
Cyprus	https://epc.meci.gov.cy/
Croatia	https://eenergetskicertifikat.mgipu.hr/login.html
Czechia	https://www.mpo-enex.cz/Login.aspx?ReturnUrl=%2f
Denmark	https://emoweb.dk/emodata/test/ https://old.sparenergi.dk/forbruger/vaerktoejer/find-dit-energimaerke https://boligejer.dk/

[21] Progress on the implementation of energy performance certificates in EU - Publications Office of the EU (europa.eu).

	https://old.sparenergi.dk/demo/addresses/map
Estonia	https://livekluster.ehr.ee/ui/ehr/v1
Finland	https://www.energiatodistusrekisteri.fi/ and for statistics: https://www.energiatodistusrekisteri.fi/tilastot?kayttotarkoitus=1&vuosimin=2&vuosimax=2020
France	https://observatoire-dpe-audit.ademe.fr/accueil https://territoires.gorenove.fr/
Germany	n/a
Greece	https://bpes.ypeka.gr/?page_id=21
Hungary	https://www.e-epites.hu/e-tanusitas/
Ireland	https://ber.seai.ie/NAS/Login/UserLogin.aspx?ReturnUrl=%2fnas https://ndber.seai.ie/NDNAS/Login/UserLogin.aspx?ReturnUrl=%2fndnas%2f
Italy	Centralised national database: https://siape.enea.it/ Region Abruzzo: https://apeabruzzo.enea.it/ricerca.php Region Emilia Romagna: https://sace.regione.emilia-romagna.it/ElencoRicercaApeScaduti.aspx Region Friuli-Venezia Giulia: https://fvgenergia.it/extcenedfvg/html/public/visuraApe.jsf Region Lombardia: https://www.dati.lombardia.it/Energia/Database-CENED-2-Certificazione-ENergetica-degli-E/bbky-sde5/about_data Region Piemonte: https://servizi.regione.piemonte.it/catalogo/sistema-informativo-per-prestazione-energetica-degli-edifici-sipee Region Umbria: https://ape.regione.umbria.it/Account/Register/RSSNNA97L67A785I?returnurl=%2FHome%2FIndex Region Veneto: https://venet-energia-edifici.regione.veneto.it/ricerca_certificati.php For the other regions, building data must be requested from the authorities in writing.
Latvia	https://bis.gov.lv/bisp/lv/epc_documents
Lithuania	https://is.energis.lt/
Luxembourg	n/a
Malta	n/a

Netherlands	https://www.ep-online.nl/ https://www.energielabel.nl/woningen/zoek-je-energielabel/ https://public.ep-online.nl/swagger/index.html
Poland	https://rejestrcheb.mrit.gov.pl/
Portugal	https://www.sce.pt/ and https://www.sce.pt/estatisticas/ https://portalcasamais.pt/ https://portaldaenergia.azores.gov.pt/portal/Servicos/SCE-Acores/Indicadores?portalid=0
Romania	Information must be requested from the national authorities through this form: https://cauta.mdlpa.ro/upload_form.
Slovakia	https://www.inforeg.sk/ec/
Slovenia	https://www.energetika-portal.si/podrocja/energetika/energetske-izkaznice-stavb/register-energetskih-izkaznic/ https://ipi.eprostor.gov.si/jv/
Spain	EPC databases set at regional level https://analisis.datosabiertos.jcyl.es/explore/dataset/certificados-de-eficiencia-energetica/table/?sort=fecha_inscripcion (Castilla y Leon)
Sweden	https://sokenergideklaration.boverket.se/