

EU Taxonomy Alignment Methodology Document for Green Residential Buildings

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de volksbank



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Intent of this document

De Volksbank is a Dutch retail bank offering financial products to both companies and individuals. To underpin and achieve some of the aims of its wide sustainability strategy, de Volksbank has established a Green Bond Framework ('Framework') under which de Volksbank can issue green bonds to finance and/or refinance a portfolio of Eligible Loans ('Eligible Loan Portfolio') in accordance with the ICMA Green Bond Principles and market standards¹. Due to the nature and the core business of de Volksbank, the main Green Eligible Category in the Framework is the Green Buildings category, which includes mortgages for low-carbon residential buildings in the Netherlands. CFP has been asked to provide consulting services to develop a methodology to define the top 15% low-carbon residential buildings in the Netherlands. In accordance with the Climate Bond Initiative ('CBI') Low-Carbon Building Standard as well as market practice, the top 15% low-carbon residential buildings in the Dutch context have been measured via Energy Performance Certificates ('EPC')² for residential buildings, with EPC rating A automatically belonging to the top 15%³. However, the country's building stock evolves over time, and over the past years the number of buildings with EPC rating A has increased in the Netherlands. Therefore, it is important to redefine the top 15% on a regular basis.

These Green Eligible Loans are selected based on compliance with eligibility criteria in the

Framework, which follow the EU Taxonomy criteria on a best effort basis. The purpose of this document is to provide a methodology explaining the implications of the EU Taxonomy criteria on the selection of Green Eligible Loans. Annex I (Climate Change Mitigation) of the EU Taxonomy Delegated Regulation from June 2021, chapter 7.7, formulates the Technical Screening Criteria for sustainable buildings for "Substantial contribution to climate change mitigation" as follows:

- For buildings built before 31st December 2020, the building has at least an Energy Performance Certificate (EPC) class A. As an alternative, the building is within the top 15% of the national or regional building stock expressed as operational Primary Energy Demand (PED) and demonstrated by adequate evidence, which at least compares the performance of the relevant asset to the performance of the national or regional stock built before 31st December 2020 and at least distinguishes between residential and non-residential buildings.
- For the construction of new buildings as of 2021, the PED needs to be at least 10% lower than the threshold set for nearly zero-energy building (NZEB) requirements.

PED refers to the quantity of energy required to obtain the total amount of energy that a dwelling demands from fossil fuels such as gas and

¹ De Volksbank Green Bond Framework of de Volksbank can be found at: <https://www.dev Volksbank.nl/en/investor-relations/green-bonds>

² In the Netherlands, the definition EPC is also used for the building code for new buildings. In this study, the term EPC is used as definition of the energy certificate ('energielabel' in Dutch)

³ In accordance with Climate Bond Initiative Low-Carbon Buildings Standard for Residential Buildings in The Netherlands

electricity. The higher the number of residents or the bigger the living space, the greater the PED. To achieve the required PED of a residential building, sustainability and retrofitting strategies are essential to reduce primary energy consumption and improve the energy rating.

CFP has been asked to provide consulting services to develop a methodology to define the top 15% most energy-efficient residential buildings, as well as to determine the residential buildings with at least an EPC rating A, in the Netherlands and the definition of the NZEB minus 10%. CFP was not asked to investigate the Do No Significant Harm (DNSH) criteria, such as climate change adaptation.

The following methodology report outlines how CFP has defined the top 15% of the residential building stock.

Executive Summary

Green residential buildings within the top 15% of the national or regional building stock expressed as operational PED in the Dutch context have been determined as follows:

- 17.6% of all residential buildings have a registered EPC⁴ rating A.
- Newly built residential buildings since 2006 should qualify for energy label A+ in most cases and belong to the top 15% (<105 kWh/m²/year).
- As the building stock evolves over time, and more energy-efficient buildings are constructed, it is recommended to redefine the top 15% regularly.

⁴ In the Netherlands, the definition EPC is also used for the building code for new buildings. In this study, the term EPC is used as definition of the energy certificate ('energielabel' in Dutch)

⁵ <https://wetten.overheid.nl/BWBR0020921/2021-07-01>

EPC labels in the Netherlands

EPC labels are important instruments that should contribute to enhancing the energy performance of buildings. The certificate can potentially influence builders and real estate owners to increase energy efficiency and implement energy-saving measures in renovation projects.

EPCs have become a requirement for EU Member States to implement as a consequence of the 2002 European Energy Performance of Buildings Directive (EPBD) (2002/91/EC). EPCs play a central role in the context of Article 20 (2) EPBD. The EPBD asks Member States to provide information on the energy performance of buildings to the owner(s) or tenant(s). To illustrate and confirm the energy performance of buildings, an EPC must be published alongside an inspection report on which the EPC is based. The importance of EPCs has increased throughout the years, notably due to the recast of the EPBD (Directive 2010/31/EU) in 2010. An EPC label therefore aims to indicate how

energy-efficient a home is and which energy-saving measures can be implemented. The assigned letter of a NTA8800 energy label is determined based on fossil energy consumption, expressed in kilowatt-hours per square meter per year (kWh/m²/year). The label classes for homes run from A to G. Homes with the label A are the most energy-efficient (maximum PED of 160 kWh/m²/year), and houses labelled G are the least energy efficient. A building with an energy label A+++ can be identified as a nearly zero-energy building (NZEB)⁶. The label also provides an overview of housing characteristics, such as the housing type, insulation, glazing, and heating. The current situation of EPC ratings in the Netherlands is described in the table below.

Table 1 shows that registered EPC A labels account for 17.6% of the Dutch residential buildings stock. This exceeds the top 15% of the national or regional building stock expressed as operational PED, therefore it is necessary to define which buildings belong to the top 15%.

EPC rating	EPC Score (NEN 7120)	PED in kWh/m ² /year (NTA 8800)	Registered certificates	% of total certificates	% of total building stock
A	<1.20	0 < PED < 160	1,409,239	30.1%	17.6%
B	1.21-1.40	160 < PED < 190	781,388	16.7%	9.8%
C	1.41-1.80	190 < PED < 250	1,205,171	25.8%	15.1%
D	1.81-2.10	250 < PED < 290	557,100	11.9%	7.0%
E	2.11-2.40	290 < PED < 335	329,198	7.0%	4.1%
F	2.41-2.70	335 < PED < 380	204,680	4.4%	2.6%
G	>2.70	> 380	190,426	4.1%	2.4%
Total			4,677,202	100.0%	58.4%

Table 1: EPCs in The Netherlands.⁶

⁶ Source for EPC labels: <https://www.ep-online.nl/>

Registered certificates

By the end of 2021, 4.7 million residential buildings in the Netherlands have a registered EPC. Of these buildings, 1.4 million are registered with an EPC rating A. The energy efficiency of existing residential buildings can be determined using three different methods:

- A more extensive calculation at location (which considers around 150 building characteristics), resulting in the EPC or PED score;
- A calculation made at a distance, by a certified energy advisor and based on the most important building characteristics (this method was used until December 2020);
- The provisional energy label provided by the Dutch government.

These first two methods result in a registered certificate, with an EPC which is calculated by certified energy advisors and validated by audited organisations. The provisional energy labels are no longer valid as of 1st January 2021⁷.

In 2015, all non-labelled residential buildings were allocated with provisional energy certificates. The Dutch government defines these provisional certificates and are based on building characteristics such as the construction year and the type of building. All buildings built in the Netherlands after 2006 received a provisional EPC rating A if a registered EPC was not provided. In practice, 94.2% of these provisional certificates also lead to a registered label A.

To calculate the percentage of EPC A rated dwellings as a percentage of the total residential building stock, there are some limitations.

The impact, however, of both limitations on the definition of the top 15% green residential buildings in the Netherlands is negligible.

- The quantity of registered and provisional certificates is based on the EP-Online database. This database is owned and maintained by the Netherlands Enterprise Agency (RVO) and includes all EPCs. The database includes certificates of multi-purpose buildings (e.g., office combined with housing) and houses with a recreational purpose. The Kadaster⁸ (national Land Registry Office) does not include these buildings in the residential building stock.
- The total residential building stock also includes national and regional monumental buildings. Monumental buildings might have an EPC label, however it is not mandatory. There are 31,637 national residential monuments and 55,801 regional monuments, according to CBS⁹.

⁷ <https://www.rijksoverheid.nl/onderwerpen/energielabel-woningen-en-gebouwen/vraag-en-antwoord/wat-is-een-geldig-energielabel>
⁸ <https://www.kadaster.nl/>

⁹ CBS: Centraal Bureau voor de Statistiek. Most recent data is used, which dates from May 2021.

Determining the top 15% of regional residential building stock

When selecting a year of construction, it is recommended to align it with the year a new Building Code is introduced. This is because buildings will have an improved energy efficiency in order to comply with the Building Code requirements. The Building Code that was introduced in 2006 requires an EPC score of 0.8 or lower, which corresponds to an EPC rating of A+. This EPC score is based on the NEN7120, which describes the methodology for determining the EPC score.

Development of the EPC requirements

The Dutch Building Regulation sets out energy efficiency requirements for different building types using an EPC score. For example, the Dutch Building Code 2000 requires an EPC score of 1.0 or lower.

These EPC scores of buildings improve based on the introduction of a new Building Code. The correspondence between building years and the EPC score is shown in figure 2.

Energielabels NEN7120

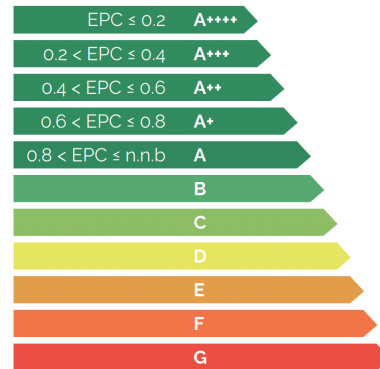


Figure 1: Correspondence between EPC scores and energy labels¹⁰.

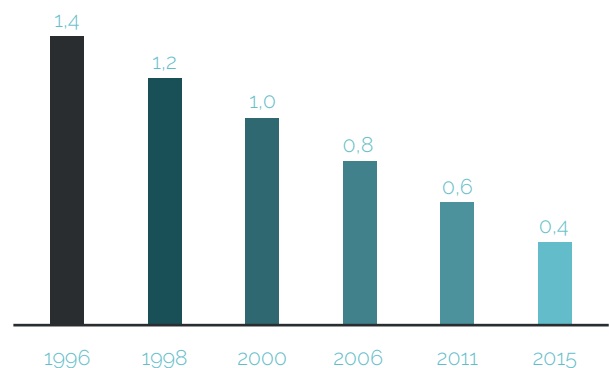


Figure 2: EPC score per year (according to building code).

A+++	A++	A+	A	B	C	D	E	F	G	
<0.00	50.00	75.00	105.00	160.00	190.00	250.00	290.00	335.00	380.00	>380.00

Table 2: Primary Energy Demand per m² per energy label¹¹.

¹⁰ <https://wetten.overheid.nl/BWBR0020921/2021-07-01>
¹¹ <https://wetten.overheid.nl/BWBR0020921/2021-07-01>

Over time, the Dutch Building Regulation became more stringent in energy-efficiency and sustainability requirements for new buildings, resulting in a more efficient PED. Therefore, new buildings built according to the most recent regulation are likely to have improved efficiency compared to older buildings complying with older regulations. Therefore, the building's year of construction can be used to define the top 15% of most energy-efficient residential buildings in the Netherlands.

Since 1st January 2021, the NEN7120 has been replaced by the NTA8800. The NTA8800 also calculates the EPC score, but uses the Primary Energy Demand. Table 2 shows the limits of the energy label classes according to the NTA8800. These limits are expressed in PED.

Although both methodologies of the NEN7120 and NTA8800 are not entirely comparable, the expected PED of an EPC A+ would be below 105 kWh/m².

Period	New built houses
2000	74,774
2001	77,181
2002	71,143
2003	64,102
2004	69,832
2005	71,541
2006	77,103
2007	85,201
2008	84,174
2009	87,835
2010	60,556
2011	62,199
2012	48,668
2013	49,311
2014	45,170
2015	48,381
2016	54,849
2017	62,982
2018	66,585
2019	71,548
2020	69,985
2021	68,633
2022	77,000
2023	80,000
2024	80,000
2025	80,000
2026	80,000

Table 3: All residential buildings built between 2000 and 2025.

Table 3 lists new buildings built between 2000 and 2025¹², based on the Kadaster database.

Table 4 shows that the houses built between 2006 and 2021 represent 13% of the total Dutch building stock, which means that this part of the buildings stock will not exceed 15% of the market.

following years, we can assume that the criterion for the building year can be used until the assessment year of 2024. The table below shows the development of the year of construction as a criterion. In 2024, it is expected to revise the cut-off year to stay within the top 15%.

Considering the building stock growth of the

Assessment year ¹³	Cut-off building year	Residential building stock	Buildings in scope	% of building stock
2021	2006	8,005,000	1,043,180	13,0%
2022	2006	8,082,000	1,120,180	13,9%
2023	2006	8,162,000	1,200,180	14,7%
2024	2006	8,242,000	1,280,180	15,5%

Table 4: Evolution of the top 15% green residential buildings in the Netherlands (2021-2024).

¹² To develop a methodologic approach that is applicable and sufficient for the following years, CFP has included the estimated building stock growth in the upcoming years, based on national governmental data.
¹³ Calculations are performed using real or estimated year end data. Calculations are performed using real or estimated year end data.

Conclusion of the top 15% expressed as Primary Energy Demand

Eligible existing residential buildings must have an EPC rating of A or an operational PED that belongs to the top 15% green residential buildings. To define the top 15% most energy-efficient buildings in the Netherlands, a cut-off year of construction can be selected as criterion. By selecting a cut-off of 2006, it is possible to align with the stricter requirements that were imposed by the Building Code of 2006.

Residential buildings built since 2006 comply with an EPC score of 0.8 or lower, which in most cases, corresponds to an EPC certificate A+. This translates into a selection of buildings with a PED of <105 kWh/m²/year. Currently, buildings built as per 2006 account for 13% of the total buildings stock, which is within the top 15%. However, the top 15% is evolving due to new buildings being built and thus being added to the building stock. Therefore, it is expected to redefine the top 15% in 2024.

BENG – 10% **requirements for** **new buildings**

On 1st January 2021 the NTA8800 was introduced in the Netherlands and included the BENG regulations. These regulations replace the EPC regulations for new buildings and the energy index for existing building. This means that every newly built house has to meet the BENG criteria instead of the EPC regulations.

BENG stands for 'nearly energy-neutral buildings' ("Bijna Energieneutrale Gebouwen" in Dutch). All new buildings must meet these regulations. They are derived from and are in line with the European Energy Performance of Buildings Directive. The BENG regulations for new buildings make a distinction in three different criteria: BENG 1, BENG 2 and BENG 3.

BENG 1: Maximum energy demand in kWh per square meter per year. This indicator focuses particularly on the demand for heating and cooling. The design of the building, the amount of insulation and orientation of the building are key in calculating the energy demand.

BENG 2: Maximum primary fossil energy usage in kWh per square meter per year. This indicator is the sum of all energy related aspects of a building. This includes heating, cooling, heating systems for water and mechanical or natural air ventilation. When energy is generated locally with, for instance, solar panels, the amount of generated energy can be deducted from this indicator.

BENG 3: Percentage renewable energy that is generated specifically at the building area.

The method for the calculations is the most important difference between the EPC and the NTA8800. Both methods contain strict regulations in order to improve the sustainability of buildings. Insulation is still important and electrical heating with heat pumps is in both cases considered better than heating with gas.

The generation of renewable energy on-site, such as solar energy, still has a positive impact on the energy performance rating.

The NTA8800 also changes the regulations for energy certificates for existing buildings. The new calculation for existing buildings is most comparable with the BENG 2 calculation for new buildings. Instead of using an index as outcome of the calculation, the NTA8800 uses the primary fossil energy usage measured in kWh/m², for both new and existing building certificates.

The EU Taxonomy introduces a criterion that qualifies buildings that outperform the NZEB requirements by at least 10% in primary energy. In the case of the Netherlands, this is best presented in terms of BENG 2 and the 10% improvement displayed in the table below.

The EPCs from before 2021 are still comparable to the BENG regulations that are applicable since 2021¹⁴. The outcome of the BENG calculation still leads to an EPC and the label also provides an overview of housing characteristics, such as the housing type, insulation, glazing and heating.

Type of residential building	Maximum primary fossil energy usage ¹⁵	10% improvement
Ground bases houses	30 kWh / m ² / per year	27 kWh / m ² / per year
Flats and apartments	50 kWh / m ² / per year	45 kWh / m ² / per year

Table 4: BENG 2 requirements for new buildings and 10% improvement.

¹⁴ <https://wetten.overheid.nl/BWBR0020921/2021-07-01>

¹⁵ In accordance with the EU Taxonomy, new buildings built as of 1 January 2021 are Taxonomy-aligned if the net primary energy demand of the new construction is at least 10% lower than the primary energy demand resulting from the relevant NZEB requirements. When referring to primary fossil energy consumption, the system losses (such as pipe losses during heating), auxiliary energy (such as pumps) and the efficiency of the generators (such as the central heating boiler) are included. This is not the case with energy demand.



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