Green Residential Buildings Methodology Assessment Document

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de volksbank

CFP GREEN BUILDINGS

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De Volksbank is a Dutch retail bank offering financial products to both individuals and companies. 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 Green Loan Portfolio') in accordance with the ICMA Green Bond Principles and market standards.[1] 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 on 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 and bring this in line with the EU Taxonomy Regulation. This methodology will serve as substantiation for the top 15% concept of the EU Taxonomy Regulation, and to substantiate our Eligible Green Loan Portfolio under our Green Bond Framework.

[1] The Green Bond Framework of de Volksbank can be found at: https://www.devolksbank.nl/en/investor-relations/green-bonds

Purpose of this document

The purpose of this document is to provide a methodology explaining the implications of the EU Taxonomy criteria on the selection of Eligible Assets. In this case the acquisition and ownership of buildings and the construction of new buildings. Annex I (Climate Change Mitigation) of the EU Taxonomy Delegated Regulation from June 2021, Section 7.7 and Section 7.1.1[2], formulates the Technical Screening Criteria (TSC) for sustainable buildings for "Substantial contribution to climate change mitigation" as follows:

- For buildings built before the 31st of 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 of December 2020 and at least distinguishes between residential and non-residential buildings.

- For the construction of new buildings as of 2021, the PED must be at least 10% lower than the threshold set for nearly zero-energy building (NZEB) requirements.

The Annex I to the Delegated Act clarifies in footnote 281 that the Primary Energy Demand is the "calculated amount of energy needed to meet the energy demand associated with the typical uses of a building expressed by a numeric indicator of total primary energy use in kWh/m² per year and based on the relevant national calculation methodology and as displayed on the Energy Performance Certificate)."

Moreover, The Energy Performance of Buildings Directive defines in Article2(5) Primary Energy as "energy from renewable and non-renewable sources which has not undergone any conversion or transformation process". It also explains in Annex I that "the energy performance of a building shall be determined on the basis of calculated or actual energy use and shall reflect typical energy use for space heating, space cooling, domestic hot water, ventilation, built-in lighting and other technical building systems".

CFP Green Buildings has been asked to provide consulting services to develop a methodology to define the top 15% most energy-efficient residential buildings in the Netherlands and the definition of the NZEB minus 10%. In accordance with the Climate Bond Initiative ('CBI') Low-Carbon Building Standard as well as market practice. This methodology would form the basis of the selection of assets for the Green Residential Buildings category under de Volksbank's Eligible Green Loan Portfolio, in accordance with their Green Bond Framework.

[2] Data illustrating a significant contribution to the EU taxonomy for large new (apartment) buildings, particularly in the aspects of 7.1.(2) air tightness (blower door test) and thermal integrity (infrared camera test), as well as 7.1.(3) Global Warming Potential, is currently lacking on a broad scale. Consequently, the consideration of 7.1.(2) and 7.1.(3), inclusive of footnotes 283 and 284, fall outside the scope of this methodology.

EPC labels in the Netherlands

Energy Performance Certificates are important instruments that should contribute to the enhancement of the energy performance of buildings. The certificate can potentially influence builders and real estate owners to build with greater energy efficiency and implement energy saving measures in renovation projects.

As a result of the 2002 European Energy Performance of Buildings Directive (EPBD) (2002/91/EC), Energy Performance Certificates (EPCs) have become a mandatory requirement for European Union (EU) Member States. EPCs play a pivotal role within the context of this directive, which mandates that Member States provide information on the energy performance of buildings to the property owners or tenants. To demonstrate and confirm a building's energy performance, an EPC must be made available alongside an inspection report upon which the EPC is based. The recast of the EPBD (Directive 2010/31/EU) in 2010 increased even further the policy attention and the importance of EPCs.

An EPC label serves the purpose of indicating how energy-efficient a home is and suggests energy-saving measures that can be implemented. The assigned letter on an energy label is determined based on fossil energy consumption, expressed in kilowatt-hours per square meter per year (kWh/m^2/year). The label classes for homes range from A to G. Homes with an A label are the most energy-efficient (with a maximum PED of 160 kWh/m^2/year), while houses labeled G are the least energy-efficient. A building with an A+++ energy label can be identified as a nearly zero-energy building (NZEB). The label also provides an overview of housing characteristics, including the type of housing, insulation, glazing, and heating system.
The current status of EPC ratings in the Netherlands is described in the table below.

Table 1 shows that registered EPC A labels currently account for 23.98% of the Dutch residential buildings stock. This exceeds the top 15% of the national or regional building stock expressed as operational PED. Therefore, defining which buildings belong to the top 15% is necessary.

EPC rating	EPC Score (NEN 7120)	PED in kWh/m^2/year (NTA 8800)	Registered certificates	% of total certificates	% of total building stock[3]
A	<1.20	0 < PED < 160	1,965,377	37.48%	23.98%
B	1.21-1.40	160 < PED < 190	819,889	15.64%	10.00%
C	1.41-1.80	190 < PED < 250	1,232,431	23.50%	15.03%
D	1.81-2.10	250 < PED < 290	519,288	9.90%	6.34%
E	2.11-2.40	290 < PED < 335	311,843	5.95%	3.80%
F	2.41-2.70	335 < PED < 380	198,344	3.78%	2.42%
G	>2.70	> 380	196,378	3.75%	2.40%
Total			5,243,550	100.00%	63.15%

Table 1: EPCs in The Netherlands.[4]

[3] There are 8,197,126 residential buildings at 01-01-2024 (most recent data of CBS - https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81955NED/table?fromstatweb).
[4] Source for EPC labels: https://www.ep-online.nl/

Registered certificates

Near the end of 2023, approximately 5.2 million residential buildings in the Netherlands have a registered EPC. Of these buildings, approximately 2 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.

In 2015, all non-labelled residential buildings were allocated with provisional energy certificates. The Dutch government defined 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 of A if a registered EPC was not provided. In practice, 94.2% of these provisional certificates also lead to a registered label A. The provisional energy labels are no longer valid as of 1st January 2021[5] and not used in the assessment to define the top 15% most energy-efficient residential buildings in the Netherlands.

There are some limitations to calculating the percentage of EPC A-rated dwellings as a percentage of the total residential building stock:

- The number of registered certificates is based on the EP-Online database. This database is owned and maintained by the Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland, RVO) and includes all EPCs. The database includes certificates of multi-purpose buildings (e.g., offices combined with housing) and houses with recreational purposes. The Kadaster (national Land Registry Office) does not include these buildings in the residential building stock.
- The total residential building stock also includes monumental buildings. Monumental buildings might have an EPC label; however, it is not mandatory. There are 31,577 national residential monuments, according to Centraal Bureau voor de Statistiek (CBS)[6].

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

[5] https://www.rijksoverheid.nl/onderwerpen/energielabel-woningen-en-gebouwen/vraag-en-antwoord/wat-is-een-geldig-energielabel
[6] Source for data (July 2023): https://www.cbs.nl/nl-nl/cijfers/detail/85538NED

Determining the top 15% of regional residential building stock

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 1. The sources in which these regulations can be verified are attached in the appendix. 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 regulations are likely to have improved efficiency compared to older buildings complying with older regulations. For this reason, the year in which a new building code was introduced can be used to define the top 15% of most energy-efficient residential buildings in the Netherlands.

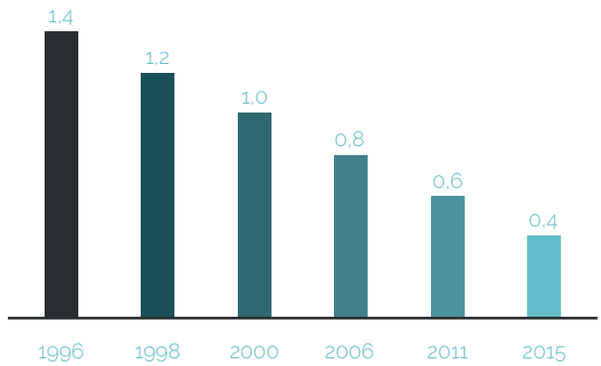

Figure 1: EPC score per year (according to building code).

Until the 1st of January 2021, energy labels were calculated with the NEN7120 methodology resulting in an EPC score for each building which can be compared to the EPC score set in the building regulation. Since the 1st of January 2021, NEN7120 has been replaced by the NTA8800. The NTA8800 also calculates the energy label score but uses the PED as a dimension instead of EPC. Figure 2 shows the thresholds of the energy label classes according to the NTA8800. These limits are expressed in PED.

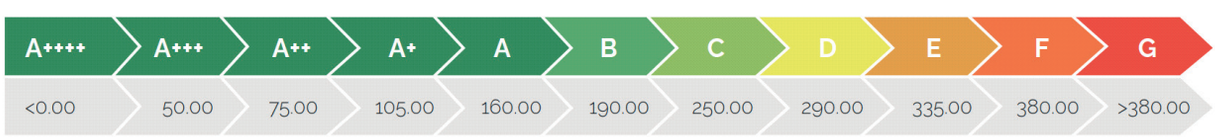

Figure 2: Primary Energy Demand per m² per energy label

Although both methodologies of the NEN7120 and NTA8800 are not entirely comparable, the expected PED of, for example, an EPC A++ would be below 75 kWh/m^2 and have an EPC score of 0.6 or lower.

To determine the top 15%, it is recommended to align it with the year a new Building Code is introduced.[7] This is because buildings will have 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 (figure 1), which corresponds to an EPC rating of A+ (figure 3)[8].

Table 2 lists new buildings built between 2000 and 2020, based on the Kadaster database. On the 1st of January 2024 , there were approximately 8.2 million residential buildings in the Netherlands.[9] Of these buildings, approximately 7.93 million buildings were built before 2020.[10]

Figure 3: Correspondence between EPC scores and energy labels[10].

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

Table 2: All residential buildings built between 2000 and 2020

[7] There is no public data available at the address level regarding the year the permit was requested. The closest public data available is the construction year of the building. However, the year 2006 is chosen because it is a year in which the building code can provide clear delineation. As shown later in this report, the selected cutoff year of 2006 for residential buildings represents 12.28% of the market.
[8] https://zoek.officielebekendmakingen.nl/blg-55501.pdf (page 9)
[9] There are 8,197,126 residential buildings at 01-01-2024 (most recent data of CBS).
[10] https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81955NED/table?fromstatweb (demolition of buildings also taken into account). Data retrieved on 30-1-2024.

The buildings built between 2006 and 2020 represent 12,28% of the total Dutch residential building stock that was built before the 31st of December 2020 (as is required by the EU taxonomy)[11], which means that this part of the building stock will not exceed 15% of the market as shown in table 3.[12]

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% of green residential buildings. To define the top 15% most energy-efficient buildings in the Netherlands, a cut-off year in which a new building code is introduced can be selected as a criterion. Buildings built since 2006 belong to the top 15% newest buildings built until year-end 2020. As it is recommended to align with a year in which a new Building Code is introduced, 2006 will be selected as the cut-off year.

By selecting a cut-off equal to or higher than 2006, it is possible to align with the stricter requirements imposed by the Building Code of those years. This is because buildings will have improved energy efficiency to comply with the stricter Building Code requirements introduced in 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/m^2/year. Currently, buildings built as of 2006 account for 12.28% of the total buildings stock built before the 31st of December 2020, which is within the top 15%.

Period	New build houses	Percentage of residential buildings stock built before YE2020
2002-2020	1,251,165	15.76%
2003-2020	1,180,022	14.86%
2004-2020	1,115,920	14.06%
2005-2020	1,046,088	13.18%
2006-2020	974,547	12.28%

Table 3: Top 15% of residential buildings stock built before the 31st of December 2020

[11] Annex I (Climate Change Mitigation) of the EU Taxonomy Delegated Regulation from June 2021, chapter 7.7: 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.

[12] It is relevant to mention that the top 15% will not deviate too much since the analysis covers only buildings built until the year 2020. So, constant revision (e.g., monthly, semi-annually) of this top 15% can be deemed excessive.

NZEB – 10% requirements for new buildings

The EU Taxonomy formulates the TSC for the construction of new buildings as follows:

'The Primary Energy Demand (PED), defining the energy performance of the building resulting from the construction, is at least 10 % lower than the threshold set for the nearly zero energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU of the European Parliament and of the Council. The energy performance is certified using an as built Energy Performance Certificate (EPC).'

BENG regulations

On 1st January 2021, the NTA8800 was introduced in the Netherlands and included the "Bijna Energieneutrale gebouwen" (BENG) regulations. BENG is the Dutch definition of NZEB and these regulations replace the EPC regulations for new buildings and the energy index for existing buildings. This means that every newly built house has to meet the BENG criteria instead of the EPC regulations.

All new buildings must meet these regulations and 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 demand for heating and cooling. The design of the building, the amount of insulation, and the 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 of 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 an outcome of the calculation, the NTA8800 uses the annual 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 table 5 below.

The EPCs from before 2021 are still comparable to the BENG regulations that are applicable since 2021.[13] The outcome of the BENG calculation leads to an EPC, and the label also provides an overview of housing characteristics, such as the housing type, insulation, glazing, and heating.

Selection of assets according to the criteria

All energy labels that have been registered since 2021 indicate the primary fossil energy usage per kWh/m² /year (EP2 score). This value can be compared to the NZEB requirements in order to select the buildings that are 10% more energy efficient. All energy labels in the Netherlands can be found in the EP-online database.[14] Dutch assets are registered in Kadaster, which provides information on the building years.

Type of residential building	Maximum primary fossil energy usage[15]	10% improvement
Ground bases houses	30 kWh / m² / per year	27 kWh / m² / per year
Flats and apartments	50 kWh / m² / per year	45 kWh / m² / per year

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

[13] https://wetten.overheid.nl/BWBR0020921/2021-07-01
[14] Source for EPC labels: https://ep-online.nl
[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.

Appendix

The table below shows official governmental sources pointing out the Dutch regulations concerning the EPC requirements for newly built houses.

EPC Score requirements	Year introduced	Source	Details
1,4	1996	https://zoek.officielebekendmakingen.nl/stb-1997-461.html	NOTA VAN TOELICHTING, I. Algemeen, 2. Plan van aanpak duurzaam bouwen
1,2	1998	https://zoek.officielebekendmakingen.nl/stb-1997-461.html	ARTIKEL I, Artikel 71a
1	2000	https://zoek.officielebekendmakingen.nl/stb-1999-439.html	ARTIKEL I, Artikel 71a
0,8	2006	https://zoek.officielebekendmakingen.nl/blg-55501.pdf	Page 9
0,6	2011	https://zoek.officielebekendmakingen.nl/stcrt-2010-17595.html	ARTIKEL I, Tabel 5.11
0,4	2015	https://zoek.officielebekendmakingen.nl/stb-2015-425.html	ARTIKEL I, Tabel 5.1

Table 5: Sources underlying the EPC requirements in different building periods (according to building code).

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