

---

REPORT

# SSB Boligkreditt Green Buildings portfolio

---

CLIENT

SSB Boligkreditt AS

SUBJECT

Norwegian Energy Efficient Buildings- Green residential buildings

DATE: / REVISION: January 27, 2020 / 01

DOCUMENT CODE: 10215594 -TVF-RAP-001

---



Multiconsult

This report has been prepared by Multiconsult on behalf of Multiconsult or its client. The client's rights to the report are regulated in the relevant assignment agreement. If the client provides access to the report to third parties in accordance with the assignment agreement, the third parties do not have other or more extensive rights than the rights derived from the client's rights. Any use of the report (or any part thereof) for other purposes, in other ways or by other persons or entities than those agreed or approved in writing by Multiconsult is prohibited, and Multiconsult accepts no liability for any such use. Parts of the report are protected by intellectual property rights and/or proprietary rights. Copying, distributing, amending, processing or other use of the report is not permitted without the prior written consent from Multiconsult or other holder of such rights.

## REPORT

PROJECT	<b>SSB Boligkreditt Green Buildings portfolio</b>	DOCUMENT CODE	10215594-TVF-RAP-001
SUBJECT	Norwegian Energy Efficient Buildings- Green residential buildings	ACCESSIBILITY	Open
CLIENT	<b>SSB Boligkreditt</b>	PROJECT MANAGER	Stig Jarstein
CONTACT	Carl Fredrik Hjelle	PREPARED BY	Stig Jarstein, Birgitte Ramm
		RESPONSIBLE UNIT	10105080 Renewable Energy Advisory Services

REV.	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY
01	27.01.2020	Final	STJ	BIR	RGA
00	13.12.2019	Draft	STJ	BIR	RGA

## TABLE OF CONTENTS

### Contents

<b>1</b>	<b>Introduction</b> .....	<b>5</b>
<b>2</b>	<b>Loan Portfolio Analysis SSB Boligkreditt</b> .....	<b>6</b>
2.1	Eligible buildings .....	6
2.2	Availability of data to identify other eligible buildings .....	6
<b>3</b>	<b>Eligibility criteria- Residential buildings</b> .....	<b>8</b>
3.1	New or existing Norwegian residential buildings that comply with the Norwegian building code of 2007 (TEK07) or later codes for small residential buildings, and code of 2010 (TEK10) and later codes for apartments: 10 %.....	8
3.1.1	Time lag between building permit and building period .....	10
3.1.2	Building age statistics.....	12
3.1.3	Eligibility under criterion 1 .....	14
3.2	Norwegian residential buildings with EPC-labels A, B or C .....	14
3.2.1	EPC labels to identify energy efficient residential buildings .....	14
3.2.2	EPC grading statistics .....	15
3.2.3	Eligibility under criterion 2 .....	18
3.3	Refurbished residential buildings with substantial CO <sub>2</sub> emissions reduction targets .....	18
3.3.1	Eligibility under criterion 3.....	18
<b>4</b>	<b>Impact assessment</b> .....	<b>19</b>
4.1	Residential buildings qualifying according to criterion 1 (building code criterion) .....	19

# 1 Introduction

## Assignment

On assignment from SSB Boligkreditt, subsidiary of Sandnes Sparebank, Multiconsult has applied developed criteria and a methodology to identify the most energy efficient residential buildings in Norway, to be used with respect to a potential green bond issuance. In this document we describe SSB Boligkreditt's identification criteria, the evidence for the criteria and the result of an analysis of the loan portfolio of SSB Boligkreditt. The criteria to select the buildings is based on credible standards in Norway such as the Norwegian building regulation and Energy Performance Certificates.

## Energy

Apart from these criteria, we also want to stress that residential buildings in Norway are mostly heated with renewable energy. The energy consumption of Norwegian buildings is predominantly electricity, with some district heating and bioenergy. The share of fossil fuel is very low and declining.

Statistics Norway made in 2013 a statistic on energy use in Norwegian households. The demand was covered by electricity (79 %), fossil oil and gas (4 %) and bioenergy etc. (16 %). Already in 2007, the building code was in clear disfavour of fossil energy, and the use of fossil energy in buildings has declined since. From 2020, all use of fossil oil is banned from use in buildings. The fuel mix in Norwegian district heating production in 2018 included only 5.2 % from fossil fuels (oil and gas) (Fjernkontrollen<sup>1</sup>). In 2018, the Norwegian power production was 98 % renewable (NVE<sup>2</sup>).

As shown in figure 1, the Norwegian production mix in 2018 gives resulting emissions of 11 g CO<sub>2</sub>/kWh. Using a life-cycle analysis, the Norwegian Standard NS 3720:2018 "Method for greenhouse gas calculations for buildings" take into account international electricity trade and that the consumption is not necessarily equal to domestic production. The mentioned standard calculates the average CO<sub>2</sub>- factor for the lifetime of a building to 136 g CO<sub>2</sub>/kWh for EU28+ Norway and 18 g CO<sub>2</sub>/kWh for Norwegian production mix only. Applying the factor based on EU28 + Norway energy production mix and including the use of renewable bio energy, district heating and heat pumps, the resulting CO<sub>2</sub>- factor for Norwegian residential buildings<sup>3</sup> is on average 126 g CO<sub>2</sub>/kWh.

---

<sup>1</sup> <http://fjernkontrollen.no/>

<sup>2</sup> <https://www.nve.no/energy-market-and-regulation/retail-market/electricity-disclosure-2018/>

<sup>3</sup> Multiconsult. Based on building code assignments for DIBK

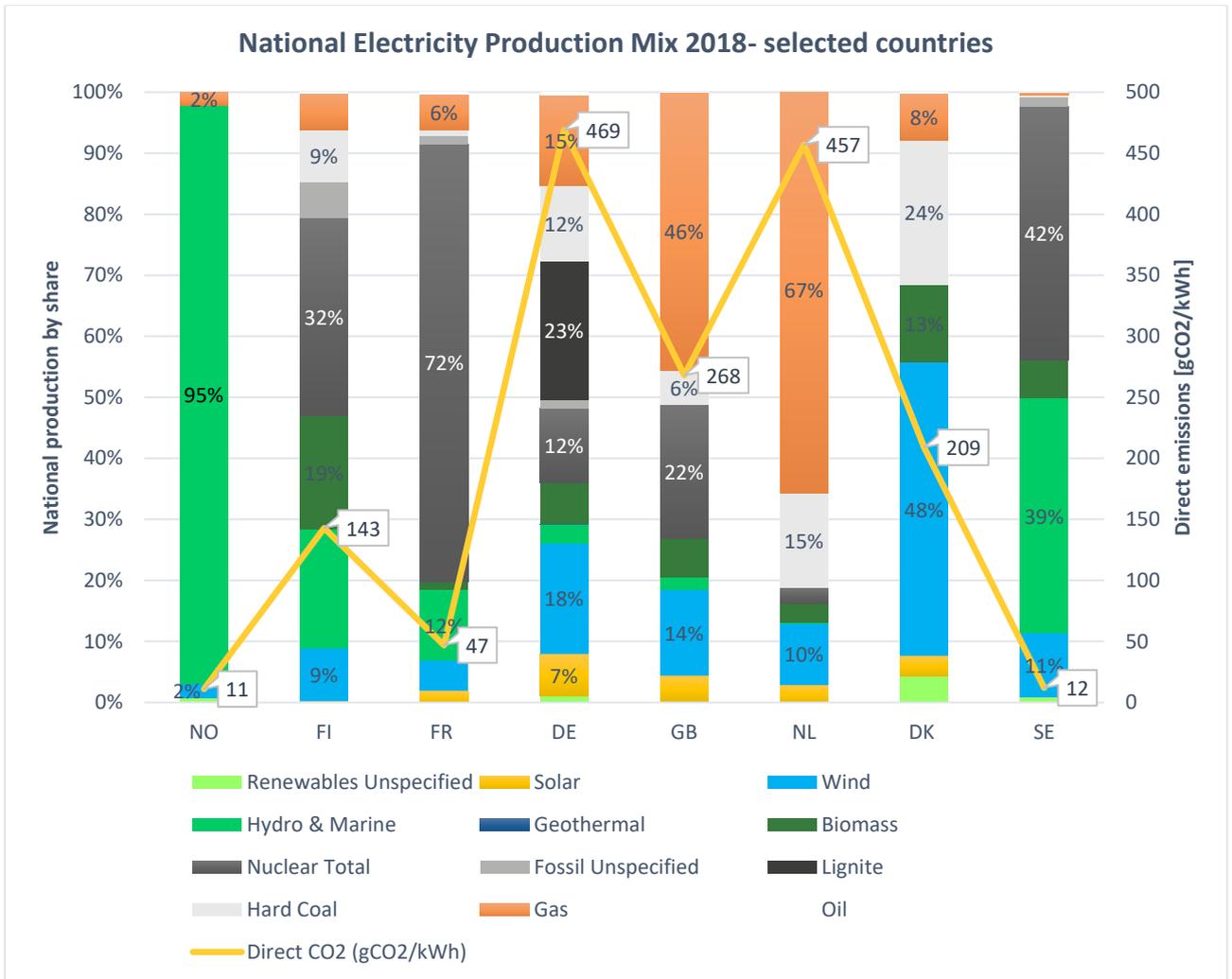


Figure 1 National electricity production mix in some relevant countries (European Residual Mixes 2018, Association of Issuing Bodies<sup>4</sup>)

## 2 Loan Portfolio Analysis SSB Boligkreditt

The Green loan portfolio of SSB Boligkreditt will consist of residential buildings that meet the criteria as formulated below.

### 2.1 Eligible buildings

Multiconsult has investigated SSB Boligkreditt’s portfolio and can confirm that the reviewed buildings have been identified as eligible for green bonds according to SSB Boligkreditt’s eligibility criteria related to building code for residential buildings.

### 2.2 Availability of data to identify other eligible buildings

Reliable energy performance data for buildings are today not easily available for lenders or investors. The Energy Performance Certificate (EPC), a possible source of data, is publically available. Enova,

<sup>4</sup> <https://www.aib-net.org/facts/european-residual-mix>

entity owned by the Norwegian Ministry of Climate and Environment, is responsible for the Energy Performance Certificate system (EPC). The released data is limited to some key items as energy label. Specific energy demand or certificate history for individual assets is not made available. With granted access to utilise the database, it is possible to link the individual residences to the register, and produce the energy certificate results for individual assets, based on some key information:

- Address- street and number, postal code
- Building identifiers GNR (Gårdsnummer) and BNR– (Bruksnummer)

The complete database is available for statistical purposes and an investigation shows that, comparing the number of certificates with actual buildings in the building stock from Statistics Norway, coverage of individual dwellings is less than 50 %. This is based on raw data, even before the database has been cleaned of double entries and test entries. Low coverage influence the basis for establishing a base line and eligibility criteria. Low coverages reduces the pool volume of which a bank may identify objects in their portfolio.

All buildings over 1,000 m<sup>2</sup> are required to have a certificate. New buildings are much better represented in the statistics than older and less energy efficient buildings. In case all buildings had a certificate, the distribution in the statistics would shift towards poorer energy grades.

### 3 Eligibility criteria- Residential buildings

Multiconsult has studied the Norwegian residential building stock and identified three solid eligibility criteria for Green Bonds on energy efficient buildings. The criteria have been aligned with the Climate Bonds Initiative (CBI) and will be published as a CBI baseline for Norwegian residential buildings. The criteria that derive the baseline are similar to the CBI methodology already used in similar markets. Criterion 1 identifies the top 10 % most energy efficient residential buildings countrywide. The CBI baseline methodology also includes criteria using data from Energy Performance Certificates when available and according to CBI taxonomy, residential buildings may also qualify after being refurbished to a standard resulting in at least a 30 % reduction in energy demand<sup>5</sup>.

Eligible Residential Green Buildings for SSB Boligkreditt must meet the following eligibility criteria:

1. New or existing Norwegian residential buildings that comply with the Norwegian building code of 2007 (TEK07) and later codes for small residential buildings<sup>6</sup> and code of 2010 (TEK10) and later codes for apartments are eligible for green bonds as all these buildings have significant better energy standards and account for less than 15 % of the residential building stock. A two year lag between implementation of a new building code and the buildings built under that code must be taken into account.
2. Existing Norwegian residential buildings with EPC-labels A, B or C. These buildings may be identified in data from the Energy Performance Certificate (EPC) database.
3. Refurbished residential buildings with substantial CO<sub>2</sub> emissions reduction targets qualify. The minimum target value is determined by the term of the bond (e.g. 5 year bond > 30%).

#### 3.1 New or existing Norwegian residential buildings that comply with the Norwegian building code of 2007 (TEK07) or later codes for small residential buildings, and code of 2010 (TEK10) and later codes for apartments: 10 %

Changes in the Norwegian building code have consistently over several decades resulted in more energy efficient buildings. As of 2019, 10 % of Norwegian residential buildings are eligible according to the SSB Boligkreditt criterion.

The methodology is based on Climate Bonds Initiative (CBI) taxonomy, where the top 15 % most energy efficient buildings are considered eligible. SSB Boligkreditt's baseline and criterion are in line with the CBI baseline methodology for energy efficient residential buildings for Norwegian conditions published in spring 2018.

---

<sup>5</sup> <https://www.climatebonds.net/standard/buildings/upgrade>

<sup>6</sup> Include residential buildings from single family houses, detached, undetached and semi-detached dwellings, and buildings with up to four apartments.

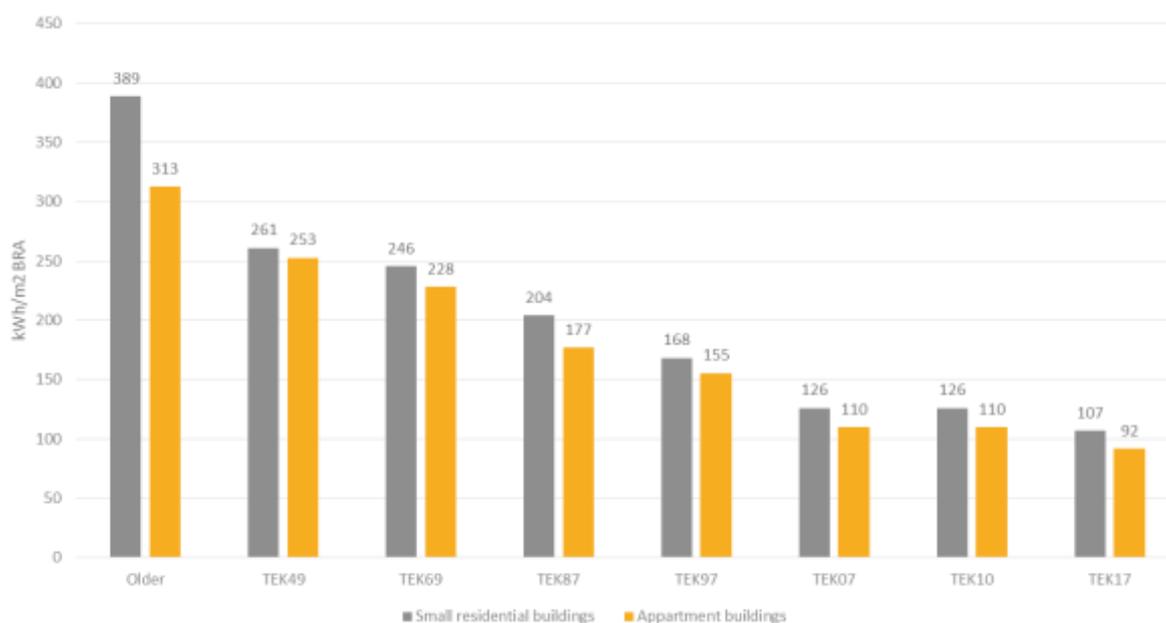


Figure 2 Development in calculated specific net energy demand based on building code and building tradition, (Multiconsult, simulated in SIMIEN)

Net energy demand is calculated for model buildings used for defining the building code (TEK07/TEK10/TEK17). The result presented in figure 2 illustrates how the calculated energy demand declines with decreasing age of the buildings. From TEK07 to TEK17 the reduction is about 15 % and the former shift from TEK97 to TEK07 was no less than 25 %. Note that, for small residential buildings, there was no change between TEK07 and TEK10 with respect to energy efficiency requirements.

The figure gives theoretical values for representative models of an apartment and a small residential building, simulated in the computer programme SIMIEN and in accordance to Norwegian Standard NS 3031:2014 *Calculation of energy performance of buildings. Method and data*, and not based on measured energy use. In addition to the guiding assumption in Norwegian Standard NS3031:2014, experience with building tradition is included. For older buildings the calculated values tend to be higher than the actual measured use, mostly because the ventilation air flow volume is assumed as high as in newer buildings, but no heat recovery. Indoor air quality is assumed not to be dependent on building year. The simulated values are the same as the values used for setting the energy grades in the EPC-systems, and for setting the energy levels in the building code of 2017.

Building code	Specific energy demand apartment buildings (model homes)	Specific energy demand small residential buildings (model homes)
TEK 07/ TEK 10	110 kWh/m <sup>2</sup>	126 kWh/m <sup>2</sup>
TEK 17	92 kWh/m <sup>2</sup>	107 kWh/m <sup>2</sup>

Table 1 Specific energy demand calculated for model buildings

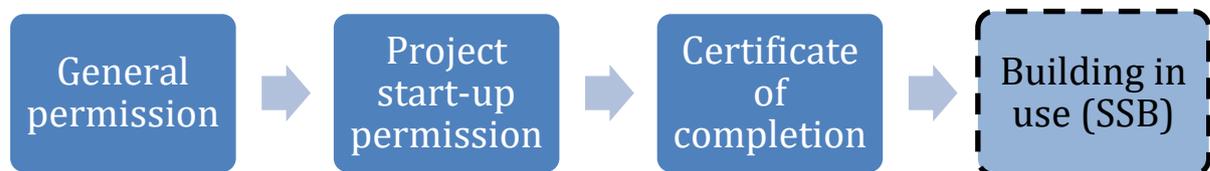
Table 1 includes the specific energy demand calculated by using the standard model buildings for the building codes relevant for identifying the top 10 % most energy efficient residential buildings in Norway.

The building codes are having a significant effect on energy efficiency. An investigation of the energy performance of buildings registered in the EPC database younger than 1997 show a clear improvement in the calculated energy level for buildings finished after 2008/2009 when the building code of 2007 came into force. The same observation on improvement can be done from 1997 to 1998 when the building code of 1997 came into force.

In the period between 1998 and 2009, a period when there was no influence by change in the building code, it is difficult to see any clear changes, however a small reduction of energy use might have taken place in the latest years. This might be due to an increased use of heat pumps in new buildings, and to a certain degree, better windows.

### 3.1.1 Time lag between building permit and building period

After the implementation of new a building code there is some time lag before we see new buildings completed according to this new code. The lag between the date of general permission received (no; rammetillatelse), which decides which code is to be used, and the date at which the building is completed and taken into use, varies a lot depending on such things as the complexity of the site and project, financing and the housing market.



The time from granted general permission to granted project start-up permission is often spent on design, sales and contracting. Based on Multiconsult's experience, six months to a year is a reasonable timespan for residential buildings in this phase. The figure below, based on statistics from Statistics Norway (SSB), indicates that approximately six months to a year construction period is standard for residential buildings.

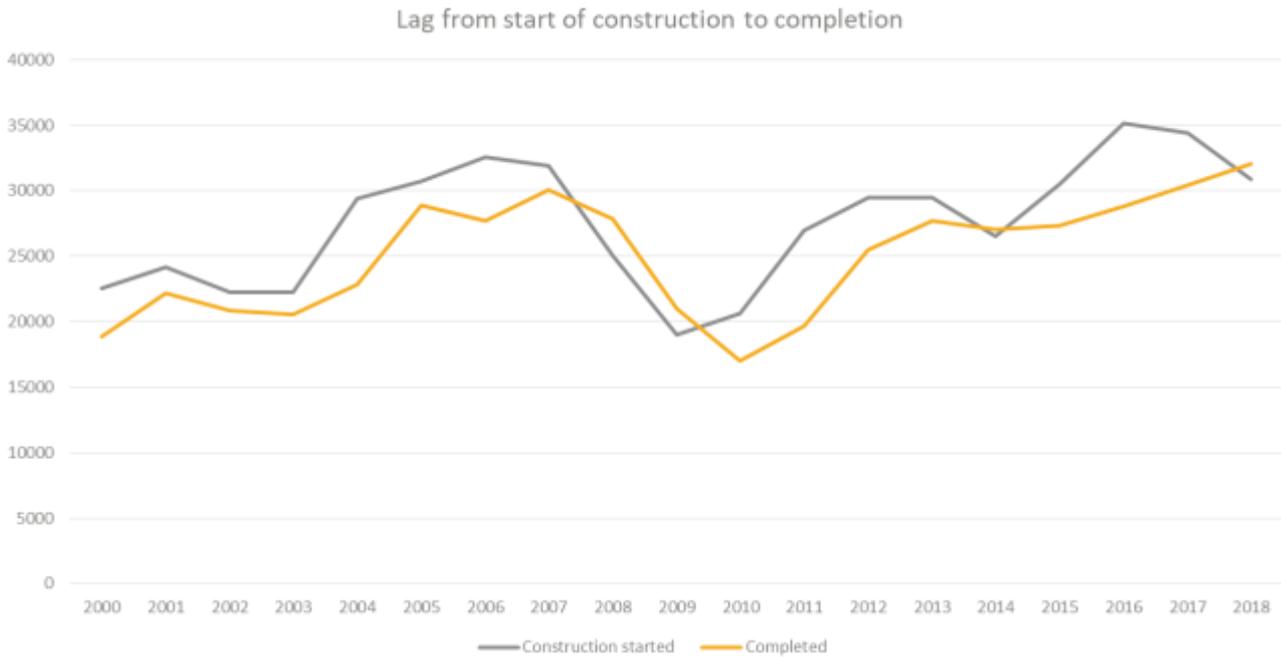


Figure 3 Project start-up and completion (Statistics Norway, bygningsarealstatistikken)

The 2007 building code was implemented in February 2007 and the 2010 building code was implemented July 1<sup>st</sup> 2010. Based on the discussions on time for design and construction, we regard a time-lag of two years, in most cases, between code implementation and buildings based on this code to be a robust and conservative assumption. The data available on completed construction is only available to the issuer on a yearly basis. Since the energy requirements were unchanged from TEK07 to TEK10 it is a very robust assumption that all buildings finished in 2012 have used energy requirements according to TEK10. There are likely buildings finished in 2011 built under the 2010 code as well, but equally, the year 2012 may also contain projects built based on TEK07. All buildings finished in 2009- 2011 are assumed to have used TEK07. There are likely buildings finished in 2008 built under that code as well, but equally, the year 2009 may also contain some delayed projects built later based on TEK97.

3.1.2 Building age statistics

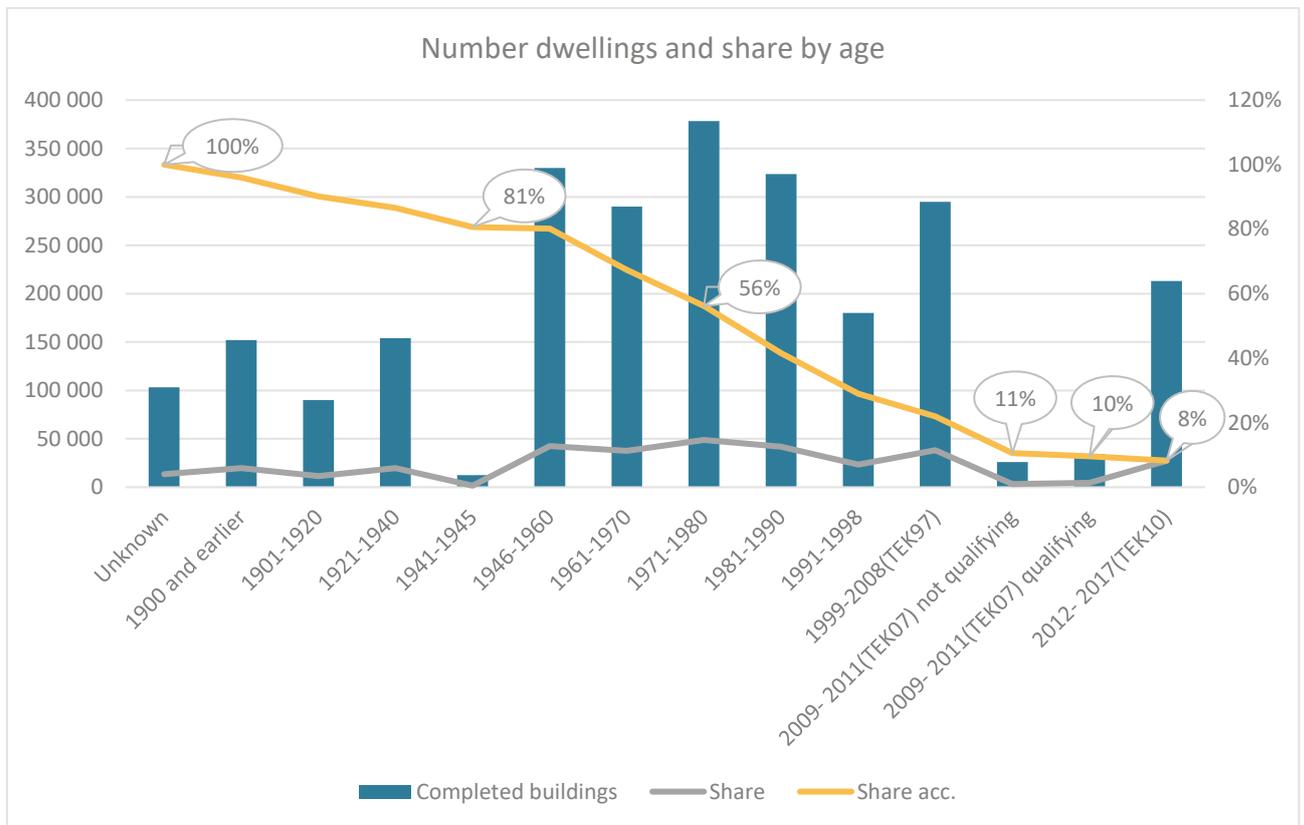


Figure 4 Age and building code distribution of dwellings (Statistics Norway and Multiconsult)

Figure 4 above shows how the Norwegian residential building stock is distributed by age. The same statistics are adjusted by new intervals available by using statistics on building area (Bygningsarealstatistikken). The figure shows how buildings finished in 2012 and later (and built according to TEK10) amount to 8 % of the total stock. Adding the small residential buildings built under the TEK07 code, the total qualifying dwellings accounts for 10 % of the total stock. Based on theoretical energy demand in the same building stock, the same 10 % of the stock makes up for only 4 % of the energy demand in residential buildings and 3 % of the related CO<sub>2</sub>- emissions. The difference between energy demand and CO<sub>2</sub>-emissions are due to the slightly less CO<sub>2</sub>-intensive heating solutions in newer buildings.

Boligstatistikken, Tabell: 06266: Boliger, etter bygningstype og byggeår (K). Adjusted to match the development of building code.

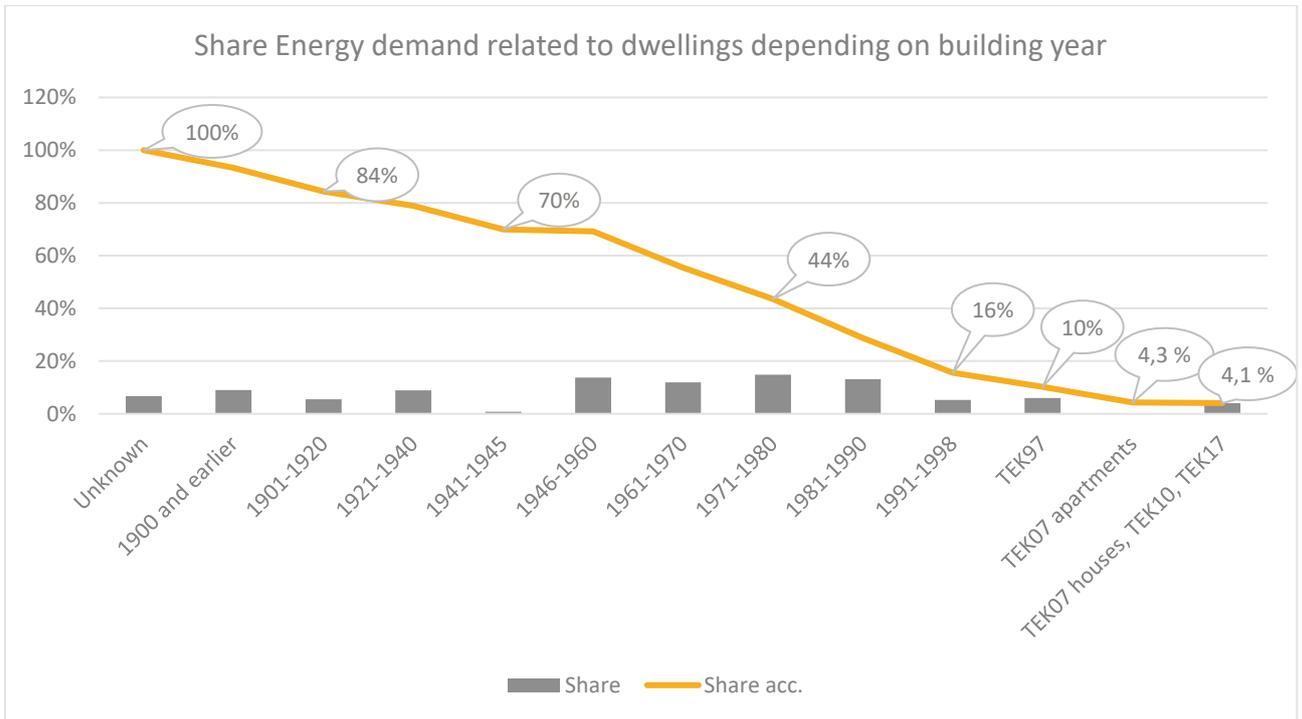


Figure 5 The building stock’s relative share of energy demand dependent on building year and code (Statistics Norway and Multiconsult)

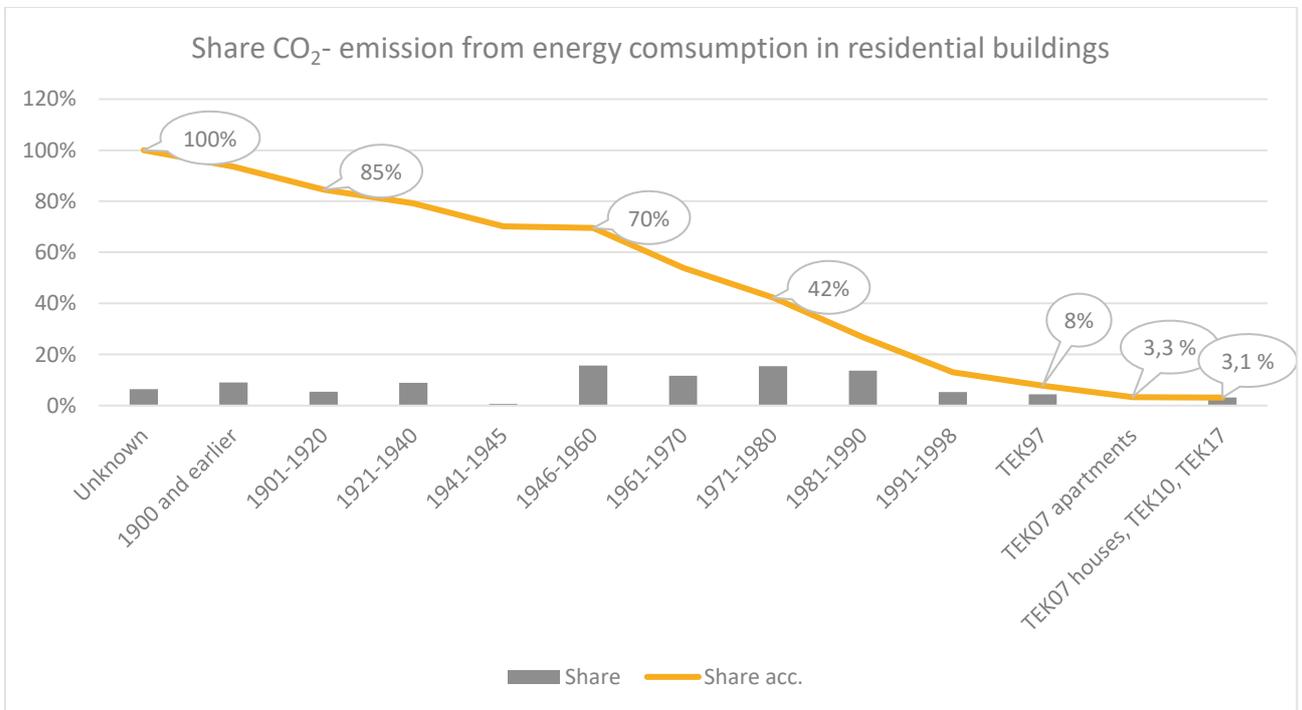


Figure 6 The building stock’s relative share of CO<sub>2</sub> –emissions related to energy demand dependent on building year and code (Statistics Norway and Multiconsult)

### 3.1.3 Eligibility under criterion 1

Over the last several decades, the changes in the building code have pushed for more energy efficient buildings. The building stock data indicates that 10 % of the current residential buildings in Norway were constructed using the code of 2007 (TEK07) and later codes for small residential buildings and code of 2010 (TEK10) and later codes for apartments.

Combining the information on the calculated energy demand related to building code in Figure 2 and information on the residential building stock in Figure 4, the calculated average specific energy demand on the Norwegian residential building stock is 256 kWh/m<sup>2</sup>. Building code TEK07 (small residential buildings), TEK10 and TEK17 gives an average specific energy demand for existing houses and apartments, weighted for actual stock, of 122 kWh/m<sup>2</sup>.

Hence, compared to the average residential building stock;

- the building code TEK07 (small residential buildings), TEK10 and TEK17 gives a calculated specific energy demand reduction of 52 %

New or existing Norwegian residential buildings that comply with the Norwegian building code of 2007 (TEK07) and later codes for small residential buildings and code of 2010 (TEK10) and later codes for apartments are eligible for green bonds as all these buildings have significantly better energy standards and account for less than 15 % of the residential building stock. A two year lag between implementation of a new building code and the buildings built under that code must be taken into account.

## 3.2 Norwegian residential buildings with EPC-labels A, B or C

### 3.2.1 EPC labels to identify energy efficient residential buildings

The Energy Performance Certificate (EPC) system would be a trustworthy and good source for definition of green mortgages. All buildings with an energy grade of A and B is eligible as green residential buildings according to this criteria.

The Energy Certificate Performance System became operative in 2010. It was made obligatory for all new residences finished after the 1<sup>st</sup> of July 2010 and all old residences that are sold or rented out, to have an Energy Performance Certificate.

The figure below shows how the complete stack of residences in Norway is distributed by building code, and their certificate label. Because of the earlier mentioned lag between code implementation and constructed buildings, there are no building recorded in the TEK17 column.

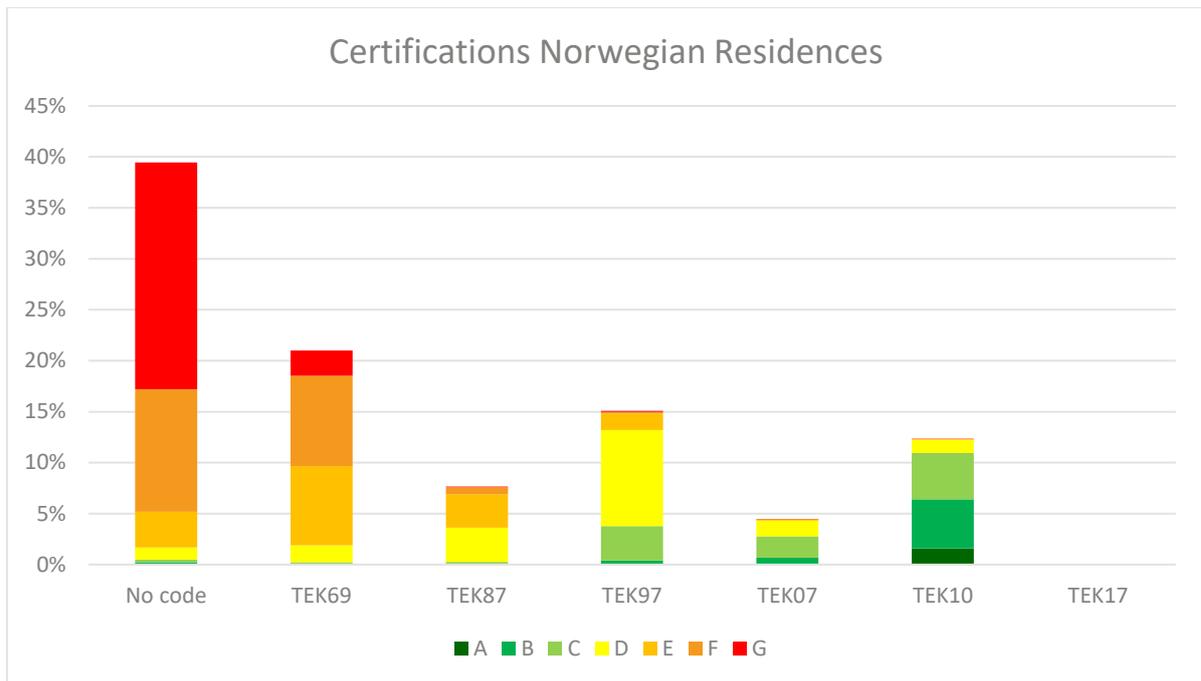


Figure 7 Total volume of residences in Norway, including individual houses and apartments, distributed per building code and Energy Performance Certificate. The numbers are based on statistics from Statistics Norway for number of Residences and statistics from the current EPC database (representative for 50 % of the total building stock).

The registered properties in the EPC database are considered to be representative for the buildings built under the same building code, however not representative for the total stock as younger buildings are highly overrepresented in the database. There is currently a coverage ratio of EPC labels relative to the total building stock equal to 50 %. In total 12 % of the Norwegian Residences are expected to get a C or better. Extracting only buildings built before 2009, 4.2 % of the total stock is expected to get a B or better. These are buildings that have initially been built, or through refurbishment, attained higher energy efficiency standards than the original building year (and respective building code) would imply.

### 3.2.2 EPC grading statistics

#### Short facts about the Norwegian EPC

The energy label in the EPC system is based on calculated delivered energy, including the efficiencies of the building's energy system (direct power, heat pump, district energy, solar energy etc.). The building codes are defined by net calculated energy, not including the building's energy system.

The EPC does as of today consist of an energy label (A-G) and a heating label (defined as colour). The heating label is seldom used, and not considered relevant in the context of the criteria.

Registration is performed in two ways. Professionals must certify new buildings and non-residence buildings. Non-professional building-owners that are selling their house or apartment can however do the certification themselves in a simplified registration system. This latter system is based on simplified assumptions and conservative values, and its results are therefore less precise and might give a lower energy label than when professionals do the registration.

The energy grade is a result of calculated energy delivered to the residential building in "normal" use. The calculation method is described in the Norwegian Standard NS 3031. The table below shows the

relationship between calculated energy delivered per square meters and energy grades for houses and apartments. This is the current grade scale:

Delivered energy per m <sup>2</sup> heated space (kWh/m <sup>2</sup> )							
	A	B	C	D	E	F	G
<b>Houses</b>	95	120	145	175	205	250	above F
<b>Sq. m adjustment</b>	+800/A	+1600/A	+2500/A	+4100/A	+5800/A	+8000/A	
<b>Flats/Apartments</b>	85	95	110	135	160	200	above F
<b>Sq. m adjustment</b>	+600/A	+1000/A	+1500/A	+2200/A	+3000/A	+4000/A	

Table 2 Delivered energy EPC energy labels (Source: [www.energimerking.no](http://www.energimerking.no))

A = heated floor area of the dwelling

Example: a 150 sq. m *small residential building* would have a C qualification limit of  $145+2500/150 = 161.67$  kWh/m<sup>2</sup>

### The grading system and C-label

The C grade is defined for residences so that a building built after the building codes of TEK2007 in most cases should get a C.

The limit value for reaching a C is calculated based on a representative model of a small residential building and an apartment, built according to the building code of 2007, with an assumed moderate system efficiency for the building's energy system.

Residences built after the building code of 2007, as are included in criteria 1, will hence mostly get a C or better, but might also get a D.

As can be seen in figure 7, some buildings built after TEK 07 have indeed received a D. However, these are often 'strong' D's and will by a margin still be among the top 15 % of most energy efficient residences, and are included in criteria 1.

Particularly for apartments, the defined limit value between C / D in the grading system is set for an average apartment. An apartment in the top or bottom floor or at the corner will have a higher heat loss, and will more likely get a D, and in some rare cases even an E, even though the building code of 2007 is used. But these apartments are still more energy efficient than apartments with similar locations in older apartment buildings, and are included in criterion 1.

Since a large part of the certifications are done in the simplified registration mode which are based on simplified and conservative assumptions, and not by professionals, a larger share of existing TEK07-buildings do get a D, and in some rare cases even an E. Another reason why some existing houses and apartments built after the code of 2007 get a D, is that the grade scale has been revised and tightened three times between 2011 and 2015. E.g. a small residential building that had a C when it was new in 2012, could have a D in its EPC if given a new EPC in 2015.

Therefore, most of the poorer grades D (and E) for TEK07-buildings are due to either one or a combination of these things; the conservative method of calculation in the simplified registration system, unfavourable location of an apartment in apartment buildings, a geometrically unconventional building form with higher energy losses than the representative model, and/or the revised and tightened grading scale. So the building itself is not necessarily less energy efficient.

Figure 8 shows the energy grades in the already granted certificates to Norwegian residential buildings.



Figure 8 Energy Performance Certificates by grade- residential buildings only, representative only of buildings with EPCs (Source: energimerking.no, August 2019)

The EPC coverage is, however not equally distributed over the building stock. Figure 9 shows the age of the buildings with EPCs and in the building stock, respectively, and how much of the building stock is represented in the EPC database. This illustrates how younger buildings have a substantially higher coverage in the EPC database than older buildings.

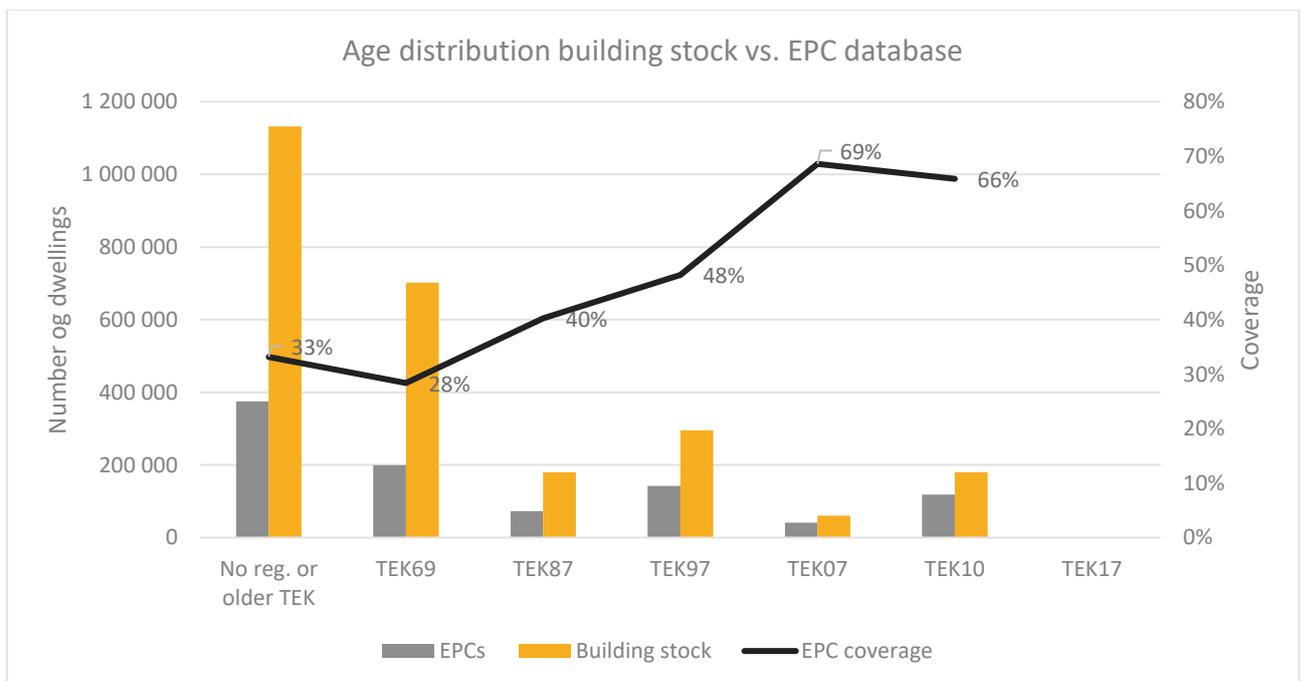


Figure 9 Age distribution in Energy Performance Certificates vs. actual residential building stock and EPC coverage by building year (Source: energimerking.no and Statistics Norway, August 2019)

Assuming registered EPCs for each time period are representative for the building stock, we are able to indicate what the label distribution would be if all residents were given a certificate. Figure 10 illustrates how EPCs would be distributed based on this assumption. 12 % of the residents would have a C or better.

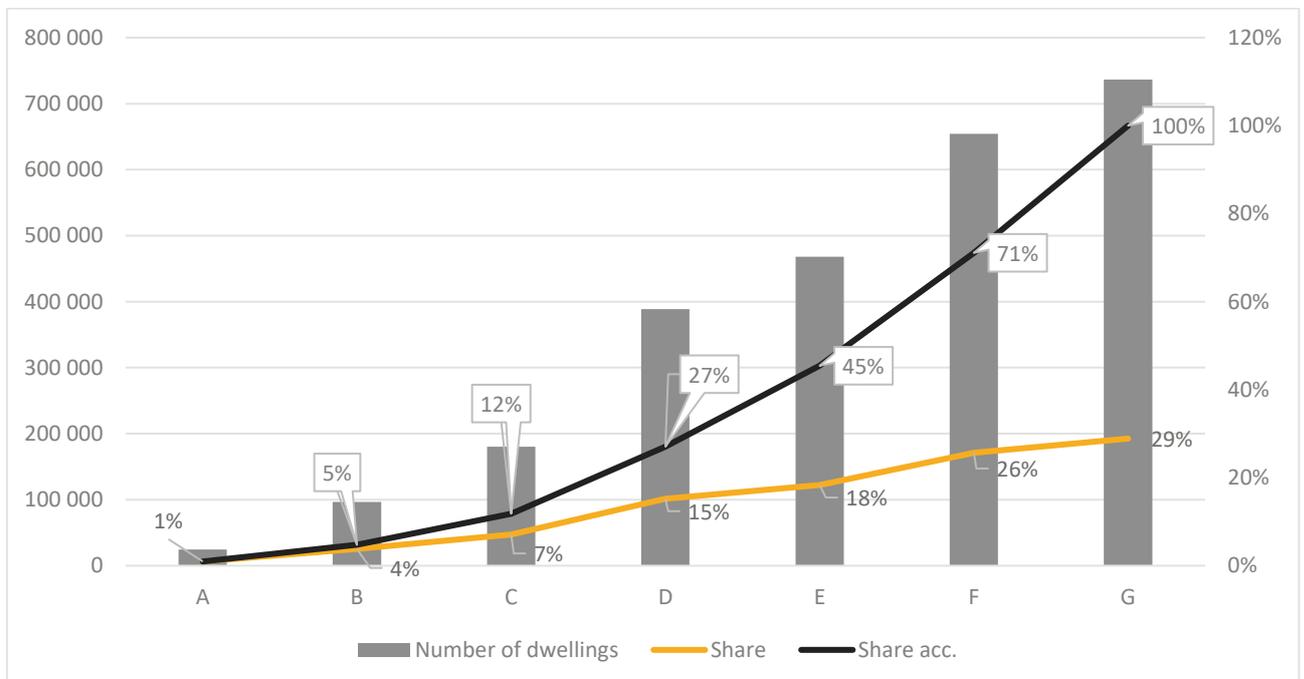


Figure 10 EPCs extrapolated to include the whole residential building stock (Source: energimerking.no and Statistics Norway, Multiconsult, August 2019)

### 3.2.3 Eligibility under criterion 2

An Energy Performance Certificate is mandatory for new buildings and existing residential buildings that are sold or rented. The EPC data indicates that 12 % of the current residential buildings in Norway will have a C or better.

### 3.3 Refurbished residential buildings with substantial CO<sub>2</sub> emissions reduction targets

Refurbished buildings with substantial CO<sub>2</sub> emission reduction targets qualify for green bonds against this criterion. This is in line with CBI's refurbishment criterion in their Property Upgrade Climate Bonds Certification methodology where the carbon reduction targets can be derived using a linear equation between a 30-year bond and a 5-year bond.

The CO<sub>2</sub>- emissions related to operation of residential buildings is dominated by direct and indirect emissions related energy use. Energy supply differs to some degree between buildings but in a heavily electrified heating market in Norway, the grid factor dominate the calculations and energy efficiency will most likely qualify most buildings according to this criteria rather than fuel switch. If historic EPC-labels are made available, the EPC database may be a source to identify eligible objects.

#### 3.3.1 Eligibility under criterion 3

Refurbished residential buildings with substantial CO<sub>2</sub> emissions reduction targets qualify. The minimum target value is determined by the term of the bond (e.g. 5 year bond > 30%).

## 4 Impact assessment

Impact is only calculated for the residential buildings criteria in the earlier sections.

The grid factor on electricity consumption, as average in the buildings lifetime, is based on a trajectory from the current grid factor to a close to zero emission factor in 2050 and steady until the end of the lifetime. (The expected life of a building from 2010 is 60 years.) According to Norwegian Standard NS 3720:2018 "Method for greenhouse gas calculations for buildings", greenhouse gas factor for electricity used in buildings is to be calculated on a life-cycle basis according to two scenarios:

Scenario	CO <sub>2</sub> - factor (g/kWh)
European (EU28+ Norway) consumption mix	136
Norwegian consumption mix	18

Table 3 Electricity production greenhouse gas factors (CO<sub>2</sub>- equivalents) for two scenarios (source: NS 3020:2018, Table A.1)

The following calculations apply the European mix in table 5. This is in line with Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting (January 2019)<sup>8</sup>. 136 gCO<sub>2</sub>/kWh constitute the GHG emission intensity baseline for energy use in buildings with a life span of 50-60 years and assuming that the CO<sub>2</sub>-factor of the European production mix is close to zero in 2050.

To calculate the impact on climate gas emissions the trajectory is applied to all electricity consumption in all buildings. Electricity is the dominant energy carrier to Norwegian buildings but the energy mix includes also bio energy and district heating, resulting in a total specific factor of 123 g CO<sub>2</sub>eq/kWh. A proportional relationship is expected between energy consumption and emissions.

### 4.1 Residential buildings qualifying according to criterion 1 (building code criterion)

SSB Boligkreditt's criterion - New or existing Norwegian residential buildings that comply with the Norwegian building code of 2007 (TEK07) or later codes for small residential buildings, and code of 2010 (TEK10) and later codes for apartments.

A reduction of energy demand from the average 255 kWh/m<sup>2</sup> of the total residential building stock to 123 kWh/m<sup>2</sup> (TEK07/TEK10) or 103 kWh/m<sup>2</sup> (TEK17) dependent on building code is multiplied to the emission factor and area of eligible assets to calculate impact.

The eligible buildings in SSB Boligkreditt's portfolio is estimated to amount to 133,906 square meters. The available data include area per object in intervals. Area per dwelling is calculated on the basis of the average area derived from these intervals.

<sup>8</sup> [https://www.kommunalbanken.no/media/545579/npsi\\_position\\_paper\\_2019\\_final.pdf](https://www.kommunalbanken.no/media/545579/npsi_position_paper_2019_final.pdf)

Criterion	Type of dwelling	Number of objects	Area total [m <sup>2</sup> ]
Criterion 1 (Building code)	Apartments	261	20,965
	Undetached houses	108	14,450
	Detached houses	211	42,245
Criterion 2 (EPC)	Apartments	197	14,332
	Undetached houses	63	7,304
	Detached houses	186	34,610
Total criterion 1 and 2		1,026	133,906

Table 4 Eligible objects and calculated building areas

Based on the calculated figures in table 10, the energy efficiency of this part of the portfolio is estimated. All these residential buildings are not included in one single bond issuance.

---

*The calculated average specific energy demand for the eligible assets is 123 kWh/m<sup>2</sup>. This is 52 % lower than the calculated average of the total residential building stock.*

---

The table below indicates how much more energy efficient the eligible part of the portfolio is compared to the average residential Norwegian building stock. It also present how much the calculated reduction in energy demand constitutes in CO<sub>2</sub>-emissions.

	Area	Reduced energy compared to baseline	Reduced CO <sub>2</sub> -emissions compared to baseline	
Eligible buildings in portfolio	133,906 m <sup>2</sup>	<b>18 GWh/year</b>	EU28+ Norway	<b>2,200 tons CO<sub>2</sub>/year</b>

Table 5 Performance in rounded numbers of eligible objects compared to average building stock