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## REPORT

PROJECT	<b>SpareBank 1 Østfold Akershus Green Portfolio Impact Assessment 2023</b>	DOCUMENT CODE	10251152-01-TVF-RAP-001
SUBJECT	Impact assessment - energy efficient residential and commercial buildings	ACCESSIBILITY	Open
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In summary, the assessed impact is significant for both examined asset classes in the SpareBank 1 Østfold Akershus portfolio qualifying according to the bank's green bond criteria.

The total impact of the assets in the portfolio is close to approximately 1 000 ton CO<sub>2</sub>e/year:

<i>Energy efficient residential buildings</i>	<i>745 ton CO<sub>2</sub>e/year</i>
<i>Energy efficient commercial buildings</i>	<i>223 ton CO<sub>2</sub>e/year</i>
<i>Total</i>	<i>968 ton CO<sub>2</sub>e/year</i>

When scaled by the banks share of financing, the impact is estimated to approximately 500 ton CO<sub>2</sub>e/year:

<i>Energy efficient residential buildings</i>	<i>375 ton CO<sub>2</sub>e/year</i>
<i>Energy efficient commercial buildings</i>	<i>118 ton CO<sub>2</sub>e/year</i>
<i>Total</i>	<i>493 ton CO<sub>2</sub>e/year</i>

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# 1 Introduction

## Assignment

On assignment from SpareBank 1 Østfold Akershus, Multiconsult has assessed the impact of the part of SpareBank 1 Østfold Akershus' loan portfolio eligible for green bonds.

In this document we briefly describe SpareBank 1 Østfold Akershus' green bond qualification criteria and the result of an analysis of the bank's loan portfolio. More detailed information about the eligibility criteria is available on SpareBank 1 Østfold Akershus' website<sup>[1]</sup>.

### 1.1 CO<sub>2</sub>- emission factors related to electricity demand and production

The eligible assets are either producing renewable energy and delivering into the existing power system or using electricity from the same system. The energy consumption of Norwegian buildings is also predominantly electricity, with some district heating and bioenergy. The share of fossil fuel is very low and declining.

As shown in figure 1, the Norwegian production mix in 2022 (88% hydropower and 10% wind) results in emissions of 7 gCO<sub>2</sub>/kWh. The production mix is also included in the figure for other selected European states for illustration.

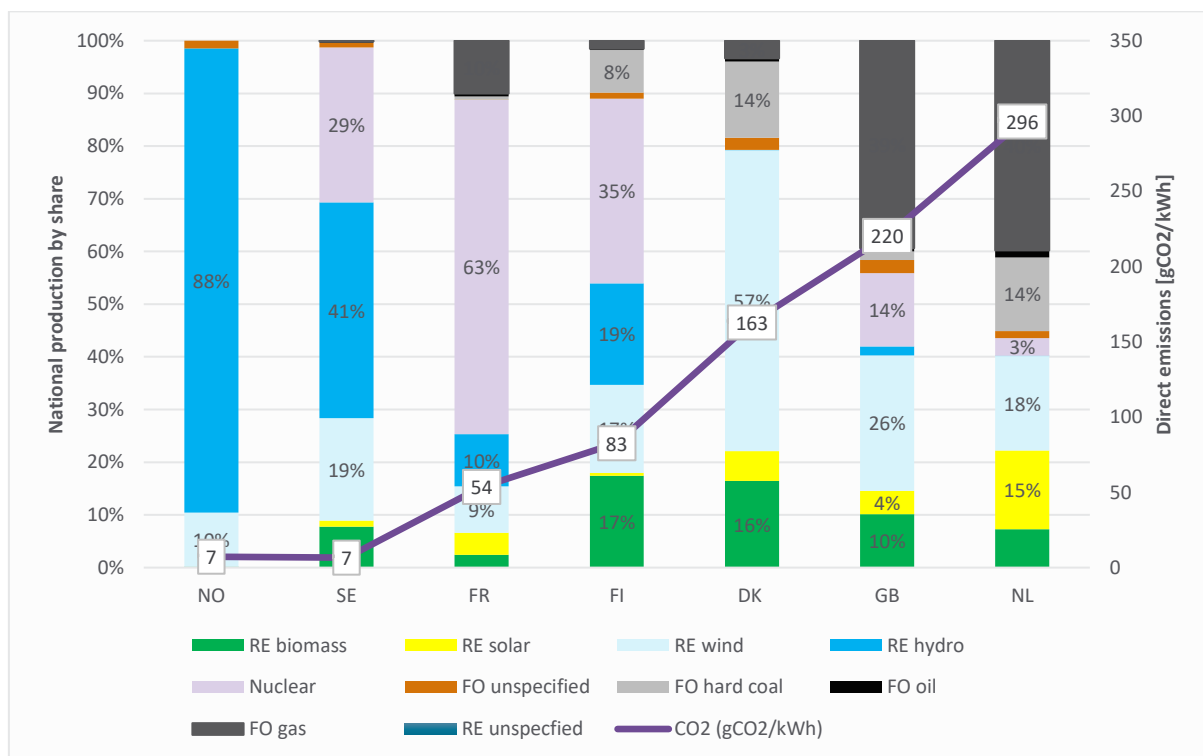


Figure 1 National electricity production mix in some selected countries (European Residual Mixes 2022, Association of Issuing Bodies<sup>[2]</sup>)

<sup>[1]</sup> <https://www.sparebank1.no/nb/ostfold-akershus/om-oss/samfunnsansvar/retningslinjer-og-rammeverk.html>

<sup>[2]</sup> <https://www.aib-net.org/facts/european-residual-mix>

Power is traded internationally in an ever more interconnected European electricity grid. For impact calculations, the regional or European production mix is more relevant than national production. Using a life cycle analysis, the Norwegian Standard NS 3720:2018 “Method for greenhouse gas calculations for buildings” considers international electricity trade and that the consumption is not necessarily equal to domestic production. The grid factor, as average in the lifetime of an asset, 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 mentioned standard calculates, on a life cycle basis, the average CO<sub>2</sub>-factor for the next 60 years, a lifetime relevant for buildings and renewable energy assets, according to two scenarios as described in table 1.

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

Scenario	CO <sub>2</sub> -factor (g/kWh)
European (EU27 + UK + Norway) consumption mix	136
Norwegian consumption mix	18

The impact calculations in this report apply the European mix in table 1. This is in line with Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting (February 2020)<sup>3</sup>.

Applying the factor based on EU27 + UK + Norway energy production mix, the resulting CO<sub>2</sub>-factor for Norwegian residential buildings<sup>4</sup> is on average 111 gCO<sub>2</sub>e/kWh due to the influx of bioenergy and district heating in the energy mix. This factor is used in impact calculations in section 2.

<sup>3</sup> [https://www.kbn.com/globalassets/dokumenter/npsi\\_position\\_paper\\_2020\\_final\\_ii.pdf](https://www.kbn.com/globalassets/dokumenter/npsi_position_paper_2020_final_ii.pdf)

<sup>4</sup> Multiconsult. Based on building code assignments for DIBK

## 2 Energy efficient residential buildings

### 2.1 Eligibility criteria

Eligibility in this impact assessment for existing residential buildings in the SpareBank 1 Østfold Akershus portfolio is identified against an EPC criterion and a refurbishment criterion as formulated below. These criteria are in line or stricter than the equivalent CBI's proxy criterion for Norwegian residential buildings.

#### ***Existing residential buildings built before 1st January 2022:***

- Built after 2018
  - Current standard (TEK17) and EPC A
- Built in or before 2018
  - Relevant standard (TEK10 or earlier) and EPC A or B

#### ***Refurbished buildings:***

- ENOVA supported projects and solutions.
- Renovations leading to minimum 30% energy efficiency improvements, measured in specific energy (kWh/m<sup>2</sup>) compared to the calculated label based on the building code in the year of construction.

OR

- Renovation leading to at least a two-step improvement in the EPC-label relative to the calculated label based on the building code in the year of construction. A lower threshold is set at an achieved EPC "D".

Due to data availability on refurbished buildings in the portfolio, this impact assessment considers only buildings as eligible if they have specific delivered energy demand (kWh/m<sup>2</sup>) measured in EPC-label minimum 30% lower than the calculated energy demand based on the building code in the year of construction. A lower threshold is set at an achieved EPC D. Buildings older than 1999 can qualify with EPC C and older than 1989 with EPC D.

Note that Sparebank 1 Østfold Akershus also have an eligibility criterion for new buildings. However, data is not available to check whether or not the buildings built in 2021 or later are performing 20% better than the energy efficiency standards in the TEK17 code, so this criterion is not included in this impact assessment.

### 2.2 Impact assessment - Residential buildings

A reduction of energy demand is multiplied to the emission factor and the area of eligible assets to calculate impact for buildings qualifying to the criteria. For the buildings qualifying according to the EPC-criterion, the difference in specific energy demand between achieved energy label and weighted average in the EPC database is used. For buildings qualifying on the refurbishment criterion, the difference between achieved energy label and assumed original energy label based on the year of construction.

The eligible residential buildings in SpareBank 1 Østfold Akershus' portfolio is estimated to amount to almost 66 000 square meters. The available data include reliable area for 80 % of the objects. For

objects where this data is not available, the area per dwelling is calculated based on average area derived from national statistics (Statistics Norway<sup>5</sup>).

Eligibility is first checked against the EPC criterion. The remaining buildings are checked against the refurbishment criterion, so no double counting of objects will occur. There are 450 eligible dwellings in SpareBank 1 Østfold Akershus' portfolio. Most of the buildings, 346 objects, are eligible through the EPC criterion, of which 23% are A's and the rest have energy label B.

Table 2 Eligible residential objects and qualifying building area

	Number of units				Area qualifying buildings in portfolio [m <sup>2</sup> ]				
	EPC A	EPC B	EPC C <1999	EPC D <1989	EPC A	EPC B	EPC C <1999	EPC D <1989	Sum
Small residential buildings	19	170	26	62	3,710	28,882	5,776	13,439	<b>51,807</b>
Apartments	61	96	5	11	5,024	7,860	400	782	<b>14,066</b>
<b>Sum</b>	<b>80</b>	<b>266</b>	<b>31</b>	<b>73</b>	<b>8,734</b>	<b>36,742</b>	<b>6,176</b>	<b>14,221</b>	<b>65,873</b>

Based on the calculated figures in Table 2, the energy efficiency of this part of the portfolio is estimated based on calculated energy demand dependent on energy label. All these residential buildings are not necessarily included in one single bond issuance.

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 also includes bioenergy and district heating, resulting in a total specific emission factor of 111 gCO<sub>2</sub>e/kWh. A proportional relationship is expected between energy consumption and emissions.

Table 3 below indicates how much more energy efficient the eligible part of the portfolio is compared to the average residential Norwegian building stock. It also presents how much the calculated reduction in energy demand constitutes in avoided CO<sub>2</sub>-emissions.

Table 3 Performance of eligible residential objects compared to average building stock

	Avoided energy demand compared to baseline	Avoided CO <sub>2</sub> -emissions compared to baseline
Eligible buildings in portfolio	<b>6.7 GWh/year</b>	<b>745 tons CO<sub>2</sub>e/year</b>
Scaled by engagement	<b>3.4 GWh/year</b>	<b>375 tons CO<sub>2</sub>e/year</b>

<sup>5</sup> Table 06513: Dwellings, by type of building and utility floor space



### 3 Energy efficient commercial buildings

#### 3.1 Eligibility criteria

Eligibility in this impact assessment for existing commercial buildings in the SpareBank 1 Østfold Akershus' portfolio is identified against an EPC criterion and a refurbishment criterion as formulated below.

**Existing buildings built before 1<sup>st</sup> January 2022:**

- EPC A

OR

- Buildings that meet both of the following criteria:
  - Buildings that receive or are expected to receive one or more of the following certification standards:
    - A BREEAM or BREEAM-NOR "Excellent" (or better)
    - Nordic Swan Ecolabel
    - FutureBuilt with FutureBuilt ZERO criteria for "lavutslippsbygg og områder"

AND

- that have received, or are expected to receive one or more of the following energy efficiency thresholds
  - Built after 2018 → EPC = A
  - Built before 2018 → EPC = A or B
  - Receive a "Paris Proof" from Grønn Byggallianse\*\*\*

**Refurbished buildings:**

- ENOVA supported projects and solutions.
- Professional technical consultations, energy audits and management services related to the improvement of energy performance of buildings.
- Renovations leading to minimum 30% energy efficiency improvements, measured in specific energy (kWh/m<sup>2</sup>) compared to the calculated label based on the building code in the year of construction.

OR

- Renovation leading to at least a two-step improvement in the EPC-label relative to the calculated label based on the building code in the year of construction. A lower threshold is set at an achieved EPC "D".

Note that data is not made available on certification (Bream etc.) for commercial buildings in the portfolio. Therefore, in this impact assessment only buildings with EPC A qualify for the EPC criterion for existing buildings.

Due to data availability on refurbished buildings in the portfolio, this impact assessment considers only buildings as eligible if they have specific delivered energy demand (kWh/m<sup>2</sup>) measured in EPC-label minimum 30% lower than the calculated energy demand based on the building code in the year of

construction. A lower threshold is set at an achieved EPC D. Buildings older than 2009 can qualify with a EPC B, older than 1999 with EPC C and older than 1989 with EPC D<sup>6</sup>.

Note that Sparebank 1 Østfold Akershus also have an eligibility criterion for new buildings. However, data is not available to check whether or not the buildings built in 2022 or later are performing 20% better than the energy efficiency standards in the TEK17 code, so this criterion is not included in this impact assessment.

### 3.2 Impact assessment - Commercial buildings

The eligible commercial buildings in SpareBank 1 Østfold Akershus' portfolio is estimated to amount to 28,655 square meters. The available data include reliable area for 90 % of the objects. For objects where this data is not available, the area per building type is calculated based on average area derived from national statistics (Statistics Norway<sup>7</sup>).

Eligibility is first checked against the EPC criterion. The remaining buildings are checked against the refurbishment criterion, so no double counting of objects will occur. There are nine eligible commercial buildings in SpareBank 1 Østfold Akershus' portfolio. Four of the buildings have energy label A, while the rest qualify on the refurbishment criterion.

Table 4 Eligible commercial objects and qualifying building area

	Number of units				Area qualifying buildings in portfolio [m <sup>2</sup> ]				
	EPC A	EPC B <2009	EPC C <1999	EPC D <1989	EPC A	EPC B <2009	EPC C <1999	EPC D <1989	Sum
Office buildings	4	0	1	4	12,284	0	882	15,854	<b>29,020</b>

Based on the calculated figures in Table 4, the energy efficiency of this part of the portfolio is estimated based on calculated energy demand dependent on energy label. All these commercial buildings are not necessarily included in one single bond issuance. Impact is computed similarly as for residential buildings, using definitions of building codes and energy labels for commercial building types and the same specific emission factor as for residential buildings.

Table 5 below indicates how much more energy efficient the eligible part of the portfolio is compared to the average residential Norwegian building stock. It also presents how much the calculated reduction in energy demand constitutes in avoided CO<sub>2</sub>-emissions.

Table 5 Performance of eligible commercial objects compared to average building stock

	Avoided energy demand compared to baseline	Avoided CO <sub>2</sub> -emissions compared to baseline
Eligible buildings in portfolio	<b>2.0 GWh/year</b>	<b>223 tons CO<sub>2</sub>e/year</b>
Scaled by engagement	<b>1.1 GWh/year</b>	<b>118 tons CO<sub>2</sub>e/year</b>

<sup>6</sup> Due to longer lag before implementation of new building codes, the years 2010, 2000 and 1990 are used for hotel and restaurant buildings

<sup>7</sup> Table 06513: Dwellings, by type of building and utility floor space