



Realkredit Danmark
Greenhouse gas footprint

End-2020

March 2021

REALKREDIT
Danmark

Contents

Contents.....	1
Introduction.....	2
Green initiatives in Realkredit Danmark.....	2
Why calculate GHG footprint?	3
Method used	3
Private housing, offices and shops.....	4
Agriculture.....	5
GHG emissions of the portfolio	6
Underlying data	7
Next steps	8
Disclaimer.....	10

Introduction

Climate change is a global challenge that fundamentally alters the risks that people, businesses and the financial sector face. Denmark is committed to taking the lead on the path towards a more sustainable and greener future. In December 2019, the Danish Parliament passed the first climate law committing the current and future Parliament assemblies to the targets of cutting greenhouse gas (GHG) emissions by 70 percent by 2030 and becoming carbon neutral by 2050.

Delivering on the targets will require enormous efforts. At Realkredit Danmark, we want to support society in succeeding with the green transition and delivering on the targets set forth. As a mortgage bank, we have only limited impact in terms of our own environmental footprint. We can, however, generate significant impact by supporting our customers in their efforts to become more climate-friendly. To this end, we are committed to financing energy-efficient properties and improvements in the energy-efficiency of existing properties, renewable energy and energy supplies based on renewable energy. In doing so, we can turn Denmark just a little bit greener for each mortgage we underwrite.

One way for the financing sector to help society to a more sustainable and greener future is to focus on GHG emissions. In calculating and focusing on GHG-emissions of our lending portfolio, we support our customers directing their efforts to become more climate-friendly in the right direction.

This report publishes the first GHG calculations on property mortgaged by Realkredit Danmark. It adheres to the GHG-model established by Finance Denmark, and is a first step in creating a common approach to comparable and transparent communication of GHG-emissions in the sector. The Danish principles are in alignment with the Partnership for Carbon Accounting Financials (PCAF), yet in a few selected areas adjustments and deviations are allowed to accommodate Danish circumstances and specificities.

Green initiatives in Realkredit Danmark

Thinking green is not new to us. In 2019, we launched the first green covered bond to see the Danish market. The bond is a floating-rate bond maturing in 2022 based on Cibur 6M. The loan was originally offered to large real-estate customers only, but as of Q12021 Realkredit Danmark is also offering the loan to mid-corp customers. Today, the amount outstanding is DKK 7.0bn.

In May 2020, a similar loan, based on Stibor 3M, was offered to the Swedish market. The loan is offered to Swedish customers in the large real-estate segment and has experienced great interest. Today, the amount outstanding is SEK 4.1bn. A similar loan is expected to be introduced to the Norwegian market, shortly.

Realkredit Danmark is committed to influencing customers to make the right energy decisions. In order to guide our customers, Realkredit Danmark has entered into a collaboration with OBH-gruppen – a consulting engineering firm. New and existing customers are offered a visit from a building consultant from OBH providing a housing and energy report stating what to improve and how much the energy consumption will be reduced if the recommended improvements are implemented. If the energy improvements are implemented and financed via Realkredit Danmark or Danske Bank, the price of the housing and energy report will be refunded.

Further, Realkredit Danmark has launched an initiative aimed at customers wanting to improve the energy performance of their property. After documenting the energy improving initiatives, e.g. via an offer from an entrepreneur, loans for energy improvements are exempt from administration and handling fees. As pointed out in 2017 by the Danish Council on Climate Change, energy renovations of properties is the initiative with the greatest potential to help society in becoming green and sustainable and at the lowest economic costs.

Why calculate GHG footprint?

In order for the financial sector to be able to fulfil its responsibilities effectively, it is crucial to have a well-functioning model for calculating the GHG footprint of the lending and investments they help finance. This, in turn, helps the financial institution to reduce GHG footprint of their loans and investments. At the same time, the model can support the dialogue with customers and help them make their footprints greener.

For Realkredit Danmark as a company, the GHG footprint might be useful input in formulating a green strategy.



Method used

The calculation of the GHG footprint of Realkredit Danmark A/S' loan book is based on the principles laid down by Finance Denmark (FIDA)¹. The model is developed in participation with member institutions and in dialogue with several stakeholders and experts from Denmark and abroad such as Statistics Denmark, The Danish Energy Agency, Danish Business Authority and Partnership for Carbon Accounting Financials (PCAF).

The model will be revised on an annual basis based on national and international developments. The model consists of a set of fundamental principles and specific methodology at a detailed level for ten asset classes – including Mortgages, i.e. loans secured by mortgages on real property.

When calculating financed emissions both total property emissions as well as LTV-weighted² property emission are calculated. Thus, this report discloses:

- LTV scaled total emissions
- Total carbon emissions
- Relative carbon emissions (carbon footprint)
- Portfolio coverage

¹ Framework for Financed Emissions Accounting – Principles and methods, Finance Denmark, 2020

² LTV based on property valuation at the time of calculation.

Private housing, offices and shops

Realkredit Danmark is using the methodology from Finance Denmark (FIDA) on this kind of mortgages in order to estimate the GHG footprint.

The model is based on the use of Energy Performance Certificates (EPC's) for properties. Hence, the calculations are based on average expected energy consumption, reflected by the EPC. Given the average energy consumption, the emission is calculated³ using the energy factor as well as updated emission factors⁴ for the type of heating in the specific property.



Realkredit Danmark is using EPC-data from the Danish Energy Agency (Energistyrelsen) distributed by E-nettet.

EPC scores are valid for a period of ten years. Hence, a large part of Realkredit Danmark's portfolio will not have a valid EPC. Further, the GHG emissions stated in the data may be up to ten years old and might not reflect the changes in emission factors since then. This entails a need for Realkredit Danmark to calculate GHG emissions.

If a property has a valid EPC there are four components that are important in order for Realkredit Danmark to calculate the GHG footprint:

- Property type
- Geography
- Year of construction
- Heat supply

Definition of the four components can be found in the description of the GHG-model from FIDA⁵.

If the four components are present in the data delivered by E-nettet Realkredit Danmark will calculate the GHG footprint. In cases where one of the four components is missing, it will not be possible to calculate a GHG value and Realkredit Danmark will use the calculated emission specified in the energy report, delivered by E-nettet. If the energy report is not available from E-nettet the property will not be part of the report.

For each subgroup of the above mentioned components a distribution, based on the total EPC labels in Denmark, is calculated, and the GHG emission of the property is then calculated:

If the property does not have a valid EPC, Realkredit Danmark calculates the energy consumption based on the model described by FIDA⁶.

³ Framework for Financed Emissions Accounting – Principles and methods, Finance Denmark, 2020, p. 32-33

⁴ www.hbemo.dk/haandbog-for-energikonsulenter-hb2019-gaeldende/bilag-1-introduktion-almindeligestemmelser/ener-gimaerkeskalaen

⁵ <https://finansdanmark.dk/media/47145/finance-denmark-co2-model.pdf>

⁶ Framework for Financed Emissions Accounting – Principles and methods, Finance Denmark, 2020, pp. 33-36

As described in the example by FIDA (page 35) GHG emissions for properties without an EPC score are calculated based on a distribution of EPC scores depending on the four parameters listed above. For example,

- a) a detached house with a heated floor area of 100 m² and an unknown EPC score
- b) situated in an urban municipality
- c) constructed in 1955
- d) with natural gas as heating source

has a calculated emission of 4.135⁷ kg/year.

If we change one of the four parameters above we calculate the following emissions:

- If the same house was constructed in 2015 the calculated emission is 683 kg/year
- If the type of heating was 'District heating' instead, the calculated emission is 1,582 kg/year
- If the property is situated in a 'Rural municipality' the calculated emission is 5,179 kg/year

As the example above illustrates, the four parameters are important parameters in terms of GHG emissions.



Agriculture

The FIDA model prescribes agricultural properties below 10 hectares to be calculated using the same methodology as for private housing, offices and shops. However, in this report, Realkredit Danmark differs from the FIDA model in that all agricultural properties are calculated in the same way.

GHG emissions from Realkredit Danmark's agriculture portfolio are calculated with a method, developed with input from Troels Kristensen Aarhus University, based on number and type of animals along with farm size and land use.

The herd is transformed into "animal units" using standard conversion rates, e.

g. 1 dairy cow = 1.33 animal unit whereas 1 pig for slaughter = 0.025 animal unit. Further, the use of land is transformed to GHG emissions per ha given standards based on use of land and whether the land is used for organic or conventional farming.

Information about herds, use of land as well as organic/conventional farming are collected from Realkredit Danmark's internal valuation reports. If it is not stated in Realkredit Danmark's internal valuation reports whether the land is cultivated as organic or conventional farming the average split is applied.

This method for calculating GHG emissions on agriculture is used temporarily until the publication of a new method by SEGES is launched end of 2021 (expected).

⁷ In the FIDA-document the number is 4.108 kg/year. However, the distribution of EPC-labels has changed since the publication of the FIDA-model.

GHG emissions of the portfolio

The GHG emissions in this report covers the emissions of a full year, but calculated on the portfolio as of end-2020. The GHG emissions are calculated per capital centre and divided into five subgroups; i) private, ii) agriculture, iii) Offices and business, iv) holiday homes as well as v) industry. At this stage, Realkredit Danmark has not been able to calculate GHG emissions from industry exposures, but expects to include this in the next report.

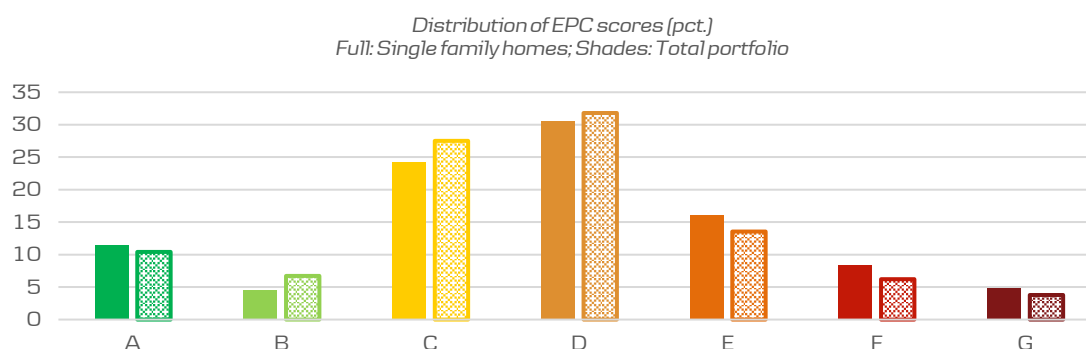
	Total CO ₂ e (t)	LTV-weighted CO ₂ e (t)	Total CO ₂ e footprint (t/bn)	LTV-weighted CO ₂ e footprint (t/bn)	Portfolio coverage
Capital centre S	1.172.597	580.315	3.784	1.872	94,33
Offices and business	76.131	33.896	246	109	85,74
Agriculture	423.402	226.190	1.366	730	100,00
Private	669.955	318.776	2.162	1.029	94,39
Holiday homes	3.109	1.453	10	5	100,00
Industry	0	0	0	0	0,00
Capital centre T	2.629.519	1.269.738	5.638	2.723	93,13
Offices and business	160.733	69.992	345	150	84,04
Agriculture	1.883.617	909.674	4.039	1.951	100,00
Private	581.474	288.555	1.247	619	93,43
Holiday homes	3.695	1.517	8	3	100,00
Industry	0	0	0	0	0,00
Capital centre A	29.720	18.103	852	519	99,83
Offices and business	1.550	1.308	44	37	99,28
Private	28.170	16.795	807	481	99,85
Danske Kredit	848	218	16.961	4.356	89,09
Agriculture	88	6	1.761	116	100,00
Private	759	212	15.180	4.240	88,81
Holiday homes	1	0	20	0	100,00
Other reserves	95.235	32.978	3.791	1.313	73,87
Offices and business	6.626	1.948	264	78	67,78
Agriculture	14.999	4.157	597	165	100,00
Private	73.350	26.800	2.920	1.067	72,75
Holiday homes	260	73	10	3	100,00
Industry	0	0	0	0	0,00
Old capital centres	21.659	7.089	2.071	678	89,17
Offices and business	675	137	65	13	95,04
Agriculture	1.011	14	97	1	100,00
Private	19.972	6.938	1.909	663	88,98
Holiday homes	1	0	0	0	100,00
Total	3.949.579	1.908.440	4.664	2.254	92,73

Holiday homes are calculated as described in the FIDA-model⁸. Hence, the portfolio coverage is 100% for this segment. Likewise, agriculture is calculated on a theoretical model resulting in a portfolio coverage of 100%. Other subgroups are calculated based on data on the specific property. If these data are not available, it's not possible to calculate the GHG emission, and hence the portfolio coverage will be below 100%. Portfolio coverage is calculated based on the number of loans (not the size of the loan).

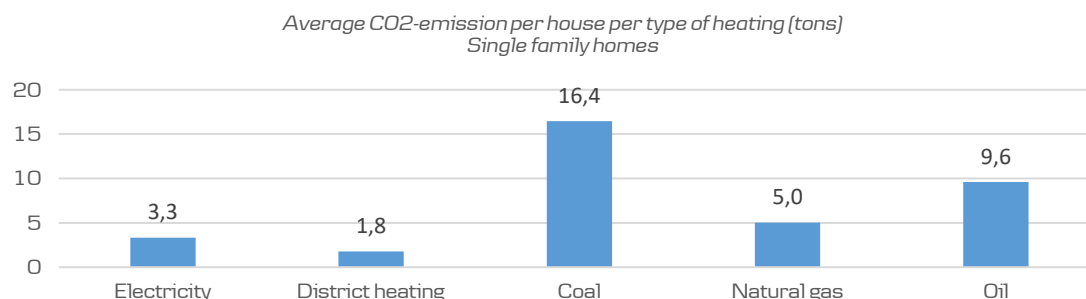
The table above indicates a total GHG emission of 3.9m tons/year and an LTV-weighted emission of 1.9m tons/year. Of this, 2.3m and 1.1m, respectively, originates from the agricultural segment. This compares to a total CO₂ emission of 93m tonnes from the Danish economy⁹.

Underlying data

Taking a closer look at the underlying data shows the following distribution of EPC scores of Realkredit Danmark's portfolio. 17% of the total portfolio of properties in Realkredit Danmark's portfolio with a valid EPC score is scored A or B. 76% has an EPC score of D or better.



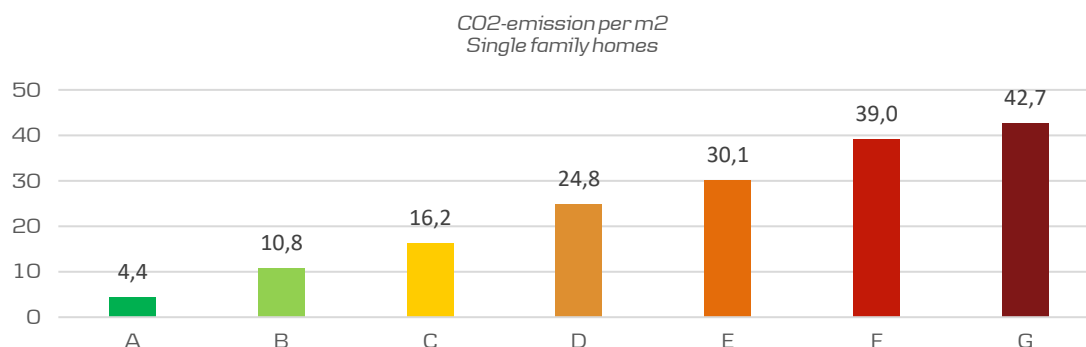
Taking a closer look on the type of heating in single family homes, it is obvious that the type of heating is crucial for the GHG emission of the property. The below figure illustrates the average GHG emission from a single family home in Realkredit Danmark's portfolio by type of heating. It is obvious that coal, oil and natural gas are the type of heating that emit the most GHG.



⁸ Framework for Financed Emissions Accounting – Principles and methods, Finance Denmark, 2020, pp. 36-37

⁹ Danmarks Statistik, Emissionsregnskab, <https://www.dst.dk/da/Statistik/emner/geografi-miljoe-og-energi/groent-nationalregnskab/energi-og-emissioner>

There is no doubt that new houses have a higher EPC score and hence a lower GHG emission per m². However, new houses in Denmark are often bigger than older houses. Hence, it is interesting to make a split of the GHG emission by EPC score per m² in order to investigate whether new houses have lower GHG emissions than older houses.



The above chart clearly shows that EPC A-buildings emit 4.1 kg/m² and hence, they can have double the size than B-buildings and still have a lower GHG emission than a B-building. However, the numbers are not a confirmation of ‘building new’ is more energy efficient than ‘renovating existing’ properties. As mentioned earlier, energy renovations of properties is the initiative with the greatest potential to help society in becoming green and sustainable and at the lowest economic costs. This is supported by a study from Danish engineering, design and consultancy company Rambøll comparing greenhouse gas emissions from the demolition and construction of a new house to the re-construction of the old house. The comparison reveals emissions for demolition and construction of a new house at 56 times that for re-constructing the old house with the same end result in terms of energy-efficiency.

For further interesting splits on Realkredit Danmark’s portfolio, please take a closer look at Realkredit Danmark’s ESG report on Climate change from May 2020 (<https://www.rd.dk/PDF/Investor/Library/Green%20Bond%20Framework/Climate%20change%20MAY2020.pdf>)

Next steps

The preparation of this report has been made on the basis of a joint agreement with Finance Denmark and our peers in the financing industry in Denmark. The report is the first report calculating GHG emissions and the model used is under continuous review given changes in the industry, regulation etc.

Since it’s Realkredit Danmark’s first report on GHG emissions, and since the standard is still developing, Realkredit Danmark urges readers to be careful not to jump to conclusions. The size and composition of the lending portfolio differs between financial institutions, and even though a common calculation method has been developed, the result might still vary until fully implemented. Hence, comparison across institutions is expected to be difficult in the coming years.

Realkredit Danmark considers it too early to set up strategic targets for the management of Realkredit Danmark’s GHG emissions, but by calculating the total emissions and by analysing the underlying data

the report helps Realkredit Danmark identifying key factors driving the GHG emissions and hence offers valuable input for future development of green concepts and focus on energy improvements when advising our customers etc.

This report is prepared on a yearly basis, based on end-of-year data. Next report is expected in February 2022.

Disclaimer

This report has been prepared by Realkredit Danmark A/S. It is provided for informational purposes only and should not be considered investment, legal or tax advice. It does not constitute or form part of, and shall under no circumstances be considered as, an offer to sell or a solicitation of an offer to purchase or sell any securities mentioned in the report. Realkredit Danmark makes no representation or warranties and gives no advice concerning the appropriate legal treatment, regulatory treatment, accounting treatment or possible tax consequences in connection with an investment in securities mentioned in the report. Before proceeding with any such investment investors should determine, without reliance upon Realkredit Danmark A/S, the economic risk and merits, as well as the legal, tax, regulatory and accounting characteristics and consequences, of such an investment and that investors are able to assume these risks. Investors should conduct their own analysis, using such assumptions as they deem appropriate in making an investment decision.

The report has been prepared independently and solely on the basis of publicly available information that Realkredit Danmark A/S considers to be reliable, but Realkredit Danmark A/S has not independently verified the contents hereof. While reasonable care has been taken to ensure that its contents are not untrue or misleading, no representation or warranty, express or implied, is made as to and no reliance should be placed on the fairness, accuracy, completeness or reasonableness of the information, opinions and projections contained in this report. Further, labelling certain securities as "Green Bonds" does not, directly or indirectly imply any representation or warranty of any kind that these securities will satisfy the expectation or perception of any third party, as to what a "Green Bond" label entails, neither at issuance or in future. Realkredit Danmark A/S, its affiliates and subsidiaries accept no liability whatsoever for any direct or consequential loss, including without limitation any loss of profits, arising from reliance on this report.

This report is prepared by personnel from Realkredit Danmark A/S and reflect their opinion as of the date hereof. These opinions are subject to change and Realkredit Danmark A/S does not undertake to notify any recipient of this report of any such change nor of any other changes related to the information provided in this report. This report is not a product of research analysts at Realkredit Danmark A/S.

This report is protected by copyright and is intended solely for the designated addressee. It may not be reproduced or distributed, in whole or in part, by any recipient for any purpose without Realkredit Danmark A/S's prior written consent.

Any reproduction or distribution of the report or other information appearing on the linked webpages, in whole or in part, or any disclosure of any of their contents may be prohibited or limited by the laws of certain jurisdictions. By proceeding to any of the linked webpages you represent, warrant and agree to your compliance with all such prohibitions or limitations.