

# Methodology And Assumptions: Sustainable Transparency Template

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Jyske Realkredit

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## 1 Sustainable Transparency Template

This document describes the methodologies applied to produce the 'Sustainable Transparency Template' (STT) for Jyske Realkredit.

The STT is produced to provide investors investing in Jyske Realkredit's covered bonds transparency about how the assets in the cover pool affects the climate. The STT contain information about CO<sub>2</sub>-emission and Energy Performance Certificates (EPCs) for properties financed through Jyske Realkredit, as well as the distribution of energy resources used in the properties, including the proportion of the total energy consumption derived from renewable energy sources.

As Denmark has a well-developed system for producing EPCs for properties that reflect the expected energy consumption of individual properties, it is possible to produce the STT for Jyske Realkredit. Moreover, Denmark has detailed information about the energy consumption of the various sectors in Denmark, as well as the types of raw materials used for energy generation and their respective CO<sub>2</sub>-emissions. The template is produced, as far as possible, by using data for the individual properties financed through Jyske Realkredit. Where no data are available for individual properties, statistical calculations are used to estimate its energy performance or the fuel type in energy generation.

## 2 EPC Property score

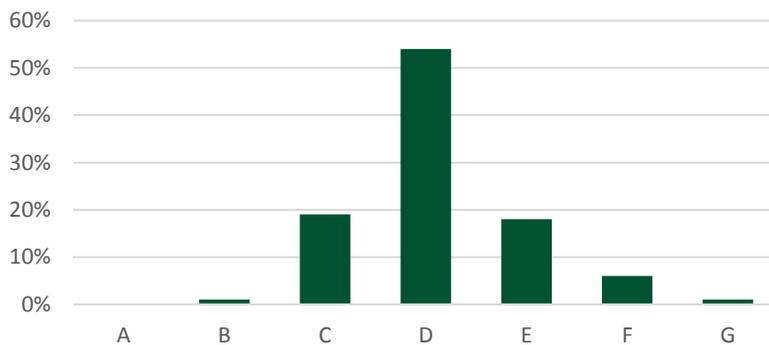
The EPC score for properties in Denmark is retrieved from the Danish Energy Agency. Data are retrieved for all properties in Denmark with a valid EPC.

For properties for which Jyske Realkredit has granted loans and which have a valid EPC, this EPC is attached directly to the property.

For properties with no valid EPC, the distribution of EPCs for the total population is used to estimate energy performance. To this end, distributions have been made for all properties with a valid EPC in Denmark, based on property type, area (Copenhagen and environs, Aarhus and environs, Large provincial towns and Small provincial towns), year of construction and type of heating used to heat the property (gas, oil, district heating etc.).

As an example, the figure below shows the distribution of valid EPCs for apartment buildings in Copenhagen built in the 1891-1930 period, heated by district heating. A total of 5,034 valid EPCs match this category. Thus, a property in Jyske Realkredit's portfolio that matches this category and does not have a valid EPC will be distributed as having 0% EPC grade A, 1% EPC grade B, 19% EPC grade C, 54% EPC grade D etc.

Figure 1 Distribution of EPCs for blocks of flats in Copenhagen built between 1891 and 1930 and heated by district heating



Source: Danish Energy Agency and own calculations

For the distributions, only combinations of categories (Property type, area, year of construction of the property and source of heating) with more than 20 observations are used. For properties in Jyske Realkredit's portfolio with no valid EPC or with a combination of categories for which a distribution cannot be made, a less granular distribution is made of all properties with a valid EPC, based on property type, area and year of construction.

Approximately 61% of the properties (in terms of outstanding debt) of Jyske Realkredit's Capital Centre E have a valid EPC. About 33% are assigned an EPC value based on the distribution using property type, geographical area, year of construction and source of heating. About 2% are assigned an EPC value based on the less granular distribution, and for about 0.5%, it has not been possible to assign an EPC value. For about 4.5%, it is not relevant to assign an EPC value (manufacturing industry, warehouses, holiday homes, undeveloped plots etc.).

The Appendix provides a breakdown of the categories.

### 3 Energy consumption

The energy consumption in the Harmonised Transparency Template (HTT) is based on data for the energy consumption of the Danish household sector and the commercial sector. The tables are produced to illustrate the energy generation composition for Jyske Realkredit's portfolio.

Information about Denmark's energy consumption and production is published by the Danish Energy Agency in an annual report. In this report, the energy consumption is distributed between the various sectors using the energy and for the types of raw materials used in the various sectors.

Jyske Realkredit primarily provide loans for properties whose main purpose is residential use or to serve as premises for retail shops or offices. For these properties the primary energy consumption of the owner depends on the energy condition of the building. The distribution of the energy consumption in the STT is based on the energy consumption from these buildings. Loans for commercial properties where most of the energy consumption is used for production, for instance in manufacturing or agriculture, are excluded in the distribution and displayed by the template in a separate field. Similarly, properties with no energy consumption (primarily undeveloped plots) and installations for renewable energy generation (such as wind turbines) are displayed in separate fields. Other sectors are broken down as follows:

1. Properties for residential use: single-family homes and apartment buildings
2. Properties for commercial (non-residential) use: retail, private service and public services

The distributions of energy consumption are based not on information about individual properties, but information about the sectors specified above. The greatest geographical difference in energy production in Denmark is that in large Danish cities, a large portion of the energy production takes place at large CHP plants, while heat generation, in particular, outside large towns and cities takes place at small, decentralised heating plants and CHP plants. Allowance is made for this difference in energy generation when the energy consumption is distributed between owner-occupied dwellings and apartment buildings. Most apartment buildings are located in areas in which energy is produced at large CHP plants, while most single-family homes are located in areas where heat is generated at decentralised plants. Thus, the distribution will vary between Jyske Realkredit's cover pools, depending on the portfolio allocation of the individual cover pool. Energy consumption statements are updated annually. Therefore, quarterly changes in the energy consumption distribution are due solely to portfolio allocation changes.

#### 3.1 Total energy consumption

This table illustrates the energy consumption distribution between heating and electricity for Danish sectors. The statement is produced exclusively based on figures provided by the Danish Energy Agency and is thus not affected by the loan composition of the capital centre. The statement has been produced to provide an overview of the relationship between energy consumption for heating and electricity in Denmark.

#### 3.2 Heating

The table Heating is produced based on the statement of the type of energy used for heating properties in various sectors.

The table showing the distribution of energy sources for heat production is produced based on the Danish Energy Agency's annual energy consumption report. In this report, the total heat consumption is calculated based on the source of energy used to generate the heat, for instance oil, coal, district heating and electricity. If the energy type is not directly attributable to a direct energy source, e.g. electricity and district heating, a further breakdown is made of the energy input for generation. The secondary generation is based on inputs in energy generation for all of Denmark.

The table below provides an example of how the energy consumption distribution has been produced for single-family homes.

Table 1 Heat consumption for single-family homes (TJ) in Denmark in 2016

	Total consumption	Production electricity	Production district heating	Sum	Total Distribution
Oil	7,817	53	352	8,222	6.9%
Natural gas	21,575	357	6,419	28,351	23.9%
Coal	0	1,463	6,365	7,828	6.6%
Waste not bio degradable	0	117	3,191	3,308	2.8%
Renewable energy	49,642	3,047	18,040	70,730	59.6%
Electricity	5,037				
District heating	34,368				
Other	190			190	0.2%
<b>Total</b>	<b>118,629</b>	<b>5,037</b>	<b>34,368</b>	<b>118,629</b>	<b>100.0%</b>

Source: Danish Energy Agency and own calculations

Thus, 59.6 % of the energy used for heating single-family homes in Denmark comes from renewable energy sources. This figure varies from sector to sector, depending on the energy composition.

Similar tables are created for other sectors, and the tables of the various sectors are weighted together, based on the share of total lending accounted for by the individual sector in the cover pool.

### 3.3 Electricity

Total energy consumption for electricity is produced in the same manner as the heat consumption distribution above, based on the Danish Energy Agency's annually published data. The distribution of raw material inputs for electricity generation, like for heat generation, is estimated based on inputs for the total electricity generation in Denmark.

## 4 Calculated CO<sub>2</sub>-emission

Emissions of greenhouse gasses from production of electricity and heat in almost entirely CO<sub>2</sub>. In the STT we therefor only calculate CO<sub>2</sub>-emissions and not emissions from other greenhouse gasses.

In order to calculate the CO<sub>2</sub>-emissions for properties the model use the following five variables: EPC-score, Property type, Heating source, Heated m<sup>2</sup> and CO<sub>2</sub>-emission factors. The EPC-scores and CO<sub>2</sub>-emission factors are published by the Danish Energy Agency, while property type, heating source and heated m<sup>2</sup> are based on data from the IT and Development Agency of the Danish Ministry of Taxation. For properties without a valid EPC the model uses the estimated EPC-score explained in [section 2](#).

The energy consumption for heating depends on the energy consumption of the property (measured by EPC) and heated m<sup>2</sup>. The model calculates the property's energy consumption as an average of the minimum and maximum consumption for a given EPC-score<sup>1</sup>. The Danish Energy Agency publish CO<sub>2</sub>-emissions factors for each heating source<sup>2</sup> and by combing these factors with the calculated energy consumption, the model estimates a property's yearly CO<sub>2</sub>-emission.

Example: CO<sub>2</sub>-emission for a single family house, 150 m<sup>2</sup>, EPC-score B and natural gas for heating:

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*Calculated energy consumption:  $(90 + 2700/150) * 150 = 16.200 \text{ kWh/year}$*

*CO<sub>2</sub>-emission:  $16.200 \text{ kWh/year} * 0,204 \text{ kg CO}_2/\text{kWh} = 3.305 \text{ kg CO}_2/\text{year}$*

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The calculations are based on a property's net energy consumption. The model only includes the part of a property's energy consumptions, which ensures a standard temperature inside the property. The Danish Energy Agency decides the standard temperatures<sup>3</sup>. The model does not take into account what temperature individual households sets, as well as it does not include energy consumption used for appliances.

CO<sub>2</sub>-emissions are calculated for all properties financed in Jyske Realkredit. The CO<sub>2</sub>-emissions do not depend on the loan size or loan to value.

For holiday houses there only exist few EPC since holiday house owners are not obligated to show a valid energy performance certificate when selling the house. When calculating the CO<sub>2</sub>-emission for holiday houses the model use average numbers produced by the Danish Energy Agency and Statens Byg-geforskningsinstitut<sup>4</sup>. In order to estimate CO<sub>2</sub>-emission the model use average numbers for energy consumption used to heating and size. The majority of holiday houses have electricity as heating source.

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<sup>1</sup> <https://spareenergi.dk/forbrugere/boligen/energimaerkning-boliger/huse>

<sup>2</sup> <http://www.hbemo.dk/haandbog-for-energikonsulenter-hb2019-gaeldende/bilag-4-energimaerkning-af-eksisterende-bygninger/vejledende-tekniske-bilag-og-tabeller/braendsel/braendvaerdier-og-co2-emissionsfaktorer>

<sup>3</sup> <http://www.hbemo.dk/haandbogen>

<sup>4</sup> <https://spareenergi.dk/forbrugere/boligen/sommerhus/skal-du-koebe-sommerhus>

## 5 Appendix

Information about energy consumption is available at the Danish Energy Agency's website – ens.dk.

In the distribution of EPCs for properties in Jyske Realkredit's portfolio without a valid EPC, the following categories are used:

Property type	Area	Construction year	Heat source
Single-family homes	København/Frederiksberg	-1890	District heating
Townhouse	Aarhus	1891-1930	Electric heating
Appartments	Large cities	1931-1950	Natural gas
Production	Smal cities/towns	1951-1960	Oil
Office		1961-1972	Coal
Properties for social purposes		1973-1978	Biofuel
Holiday houses		1979-1998	
		1999-2006	
		2007-2010	
		2011-	

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