NIRAS Climate Account 2017

Prepared February to March 2019

22. MARTS 2019

Table of content

1	**Introduction**	**3**
1.1	Organisational and operational boundaries	3
2	**Results 2017**	**5**
2.1	The total CO2-emissions in 2017	5
2.2	Production of renewable energy	7
3	**Development of Emissions from 2013 - 2017**	**9**
3.1	Scope 1+2	9
3.2	Scope 3	10
3.3	Annual comparison of key figures	10
4	**Conclusions**	**12**

1 Introduction

This Climate Account is made for the Danish consultancy company NIRAS A/S. NIRAS is an international multidisciplinary consultancy company with activities in Denmark and 26 countries across the world.

The account follows The Greenhouse Gas (GHG) Protocol Corporate Standard[1].

1.1 Organisational and operational boundaries

This report estimates the GHG-emissions caused by NIRAS A/S activities in the year 2017 and is the fifth of its kind. Hence, 2013 is the baseline year.

The operational boundary covers scope 1, scope 2 and part of scope 3 (business travel) caused by NIRAS' Danish operations. The scopes are defined by the GHG protocol and are further explained in section 2.

The NIRAS offices included in the Climate Account 2017 are:

- Allerød
- Aalborg
- Aarhus
- Esbjerg
- Kolding
- Odense
- Nykøbing Falster
- Holbæk
- Frederikshavn
- Holsterbro
- København
- Virum

For this inventory a selected range of activities (within scope 1, 2 and 3) have been included, dependent on the accessibility of data and to which degree it is possible to influence the magnitude of the emissions. The included activities are:

Scope 1

- Natural gas for heating
- Use of company cars
- Use of employee cars for business purpose (car allowance)

Scope 2

- Electricity used in offices
- District heating used in offices
- Production of renewable energy

Scope 3

- Transportation by train

[1] http://www.ghgprotocol.org/standards/corporate-standard

- Transportation by airplane

In future reports the organisational and operational boundaries may vary (new activities included/old activities excluded), and new measurements as well as new GHG emission sources may be applied. In case of such an occurrence, NIRAS will conduct a recalculation and back-cast these data points.

In the following section the results of the 2017 Climate Account are presented.

2 Results 2017

The emissions are categorized into either direct or indirect emissions. Direct emissions are defined as emissions that are directly caused by a source operated or owned by NIRAS. Indirect emissions arise from the NIRAS' consumption of energy products and services, i.e. sources for which NIRAS does not have direct control or ownership.

The direct and indirect emissions are divided into the following scopes (see The GHG Protocol Corporate Standard):

- Scope 1: All direct emissions caused by the company, e.g. emissions from company cars and from company owned boilers for energy production.
- Scope 2: All indirect emissions caused by the company's purchase of energy, including electricity and district heating.
- Scope 3: Other indirect emissions caused by the company's procurement of goods and services, for example procurement of IT equipment, consulting, food, outsourced activities, travel, advertising, marketing, waste, etc.

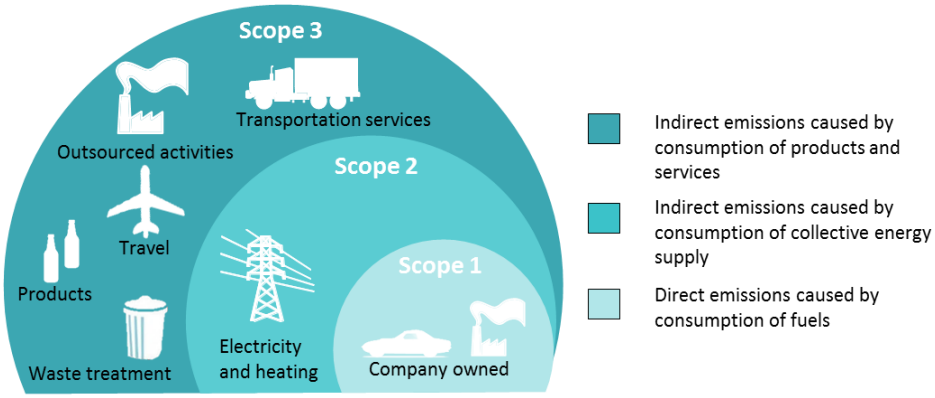

Figure 1: Scope 1-3 according to the GHG Protocol Corporate Standard.

2.1 The total CO2-emissions in 2017

In 2017 the total GHG-emissions for NIRAS A/S were 3,222 ton of CO_2, which corresponds to 2.1 ton per fulltime employee.

In Table 1, the distribution of the emissions is presented according to the different scopes and activities. The development in emissions from 2013 to 2017 are addressed in section 3.

	2017	
Activities	Ton CO_2	% share
Scope 1	**947**	**29%**
Natural gas for heating	280	30%
Use of company cars	238	25%
Use of employee cars for business purpose	429	45%
Scope 2	**804**	**25%**
Electricity used in offices	526	65%
District heating used in offices	278	35%
Scope 3	**1,471**	**46%**
Transportation by train	12	1%
Domestic air transport	223	15%
Continental air transport	356	24%
Intercontinental air transport	880	60%
Total	**3,222**	**100%**

Table 1 CO2-emissions in 2017 divided according to the different scopes and activities.

The results from Table 1 are also presented in the multi-layer pie chart below:

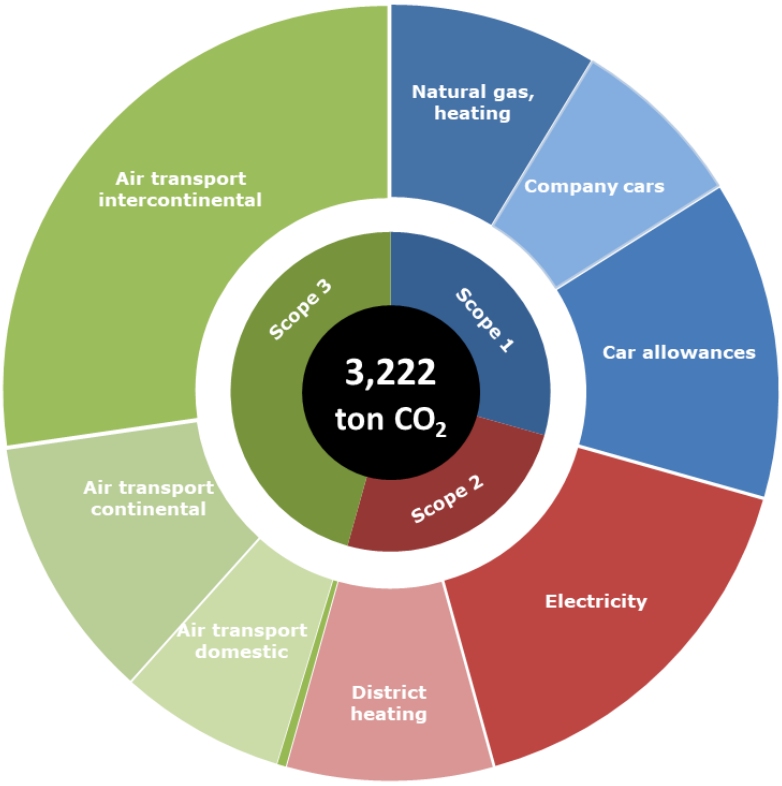

Figure 2 The distribution of CO2-emissions in 2017 between copes and activities

2.2 Production of renewable energy

NIRAS produces renewable energy (electricity) based on solar panels. The company additionally collects food waste from, which is used to produce electricity and heat by a third party.

The solar panels produced a total of 156,874 kWh at the Allerød office in 2017. From these 7,732 kWh were sold back to the grid. The remaining 149,142 kWh were used at the Allerød office and constituted 14 % of the electricity consumed in the building. By producing electricity from solar cells a reduction of 27,000 kg CO_2 has been accomplished.

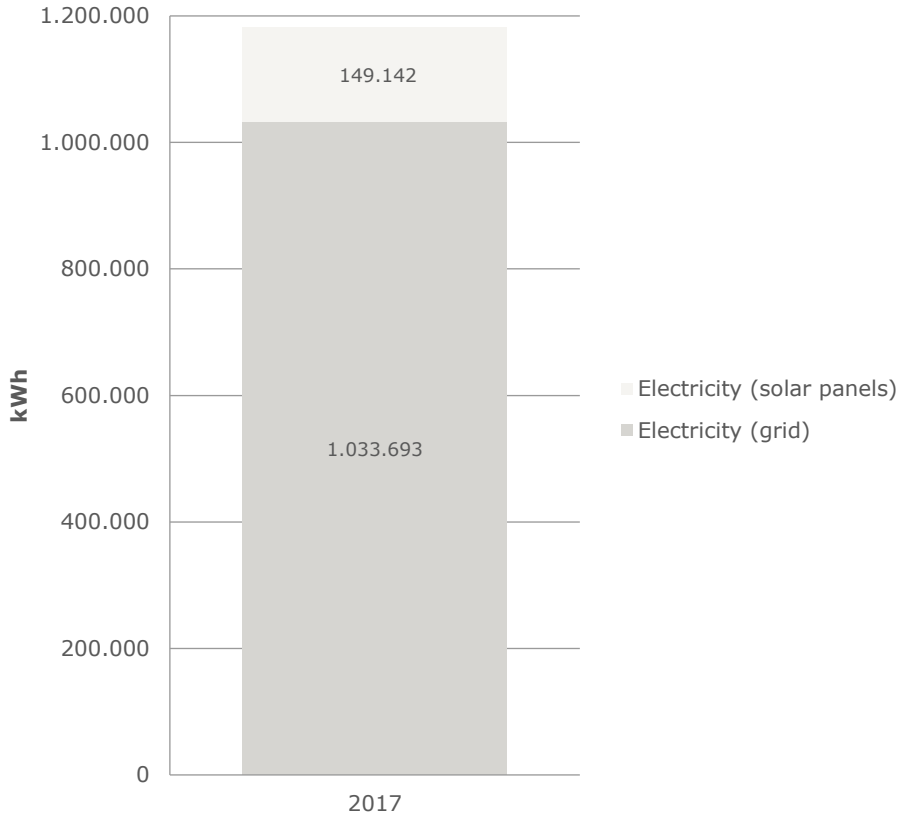

Figure 3 Division of the total consumption of electricity at the Allerød office on electricity from the grid and from solar panels (2017).

As presented in Figure 4, the amount of electricity consumption at the Allerød office based on solar panels constitutes 150.000 kWh in 2017, which corresponds to 13 % of the total electricity consumption. The relative electricity consumption based on solar panels varies between 13 % and 18 % from 2013 to 2017.

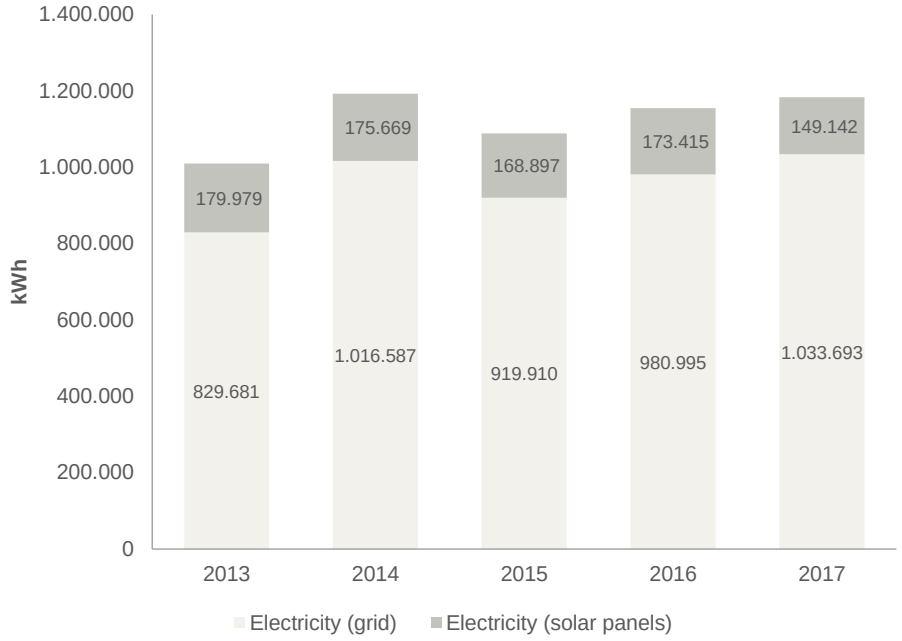

Figure 4 Consumption (kWh) of electricity at the Allerød office – divided into electricity from the grid and from solar panels (2013 - 2017).

Furthermore NIRAS sells food waste for energy production to a company called Biotrans Nordic. The arrangement of food collection for district heating and electricity production was initiated in mid-2013, and the annual energy production depends on the amount of food waste generated from NIRAS' offices. The two largest offices - Allerød and Aarhus - are part of the "food waste to energy" arrangement. (The Aarhus office was included in the arrangement in 2017).

Food waste collected at NIRAS in 2017 produced a total of 28,016 kWh of electricity and 35,020 kWh of heating. Table 2 shows how the energy production nearly tripled from 2016 to 2017. This is mainly due to the fact that Aarhus was included in the arrangement, and the number of fulltime employees at the Allerød increased due to the merger with Alectia in 2017.

	2013	2014	2015	2016	2017
Collected food waste	20	39	28	29	82
Electricity production, food (kWh)	6,618	14,661	9,333	9,944	28,016
Heat production, food (kWh)	8,288	18,360	11,688	12,455	35,020

Table 2 Production of energy and electricity from food collection 2013 to 2017. The Aarhus office was included in the arrangement in 2017.

3 Development of Emissions from 2013 - 2017

Table 3 below illustrates how the total emissions from NIRAS has developed from 2013 to 2017.

	2013	2014	2015	2016	2017	
Activities	Ton CO_2	Ton CO_2	Ton CO_2	Ton CO_2	Ton CO_2	% (2017)
Scope 1	**934**	**909**	**924**	**1,071**	**947**	**29%**
Natural gas for heating	229	196	209	246	280	30%
Use of company cars	318	346	320	397	238	25%
Use of employee cars for business purpose	387	367	395	429	429	45%
Scope 2	**610**	**537**	**368**	**592**	**804**	**25%**
Electricity used in offices	504	455	274	472	526	65%
District heating used in offices	106	82	94	120	278	35%
Scope 3	**605**	**752**	**739**	**1,301**	**1,471**	**46%**
Transportation by train	15	18	12	14	12	1%
Domestic air transport	51	55	42	35	223	15%
Continental air transport	159	230	242	269	356	24%
Intercontinental air transport	380	449	443	983	880	60%
Total	**2,149**	**2,198**	**2,031**	**2,964**	**3,222**	**100%**

Table 3 Comparison of CO2 emissions across scopes from 2013 to 2017

Table 3 shows that the total emissions increased with 1,073 ton CO_2 from 2,149 ton in 2013 to 3,222 ton in 2017. In 2017 scope 1 emissions constitute 29 % of the total emissions, whereas scope 2 and 3 make up 25 % and 46 %* respectively.

**It should be noted that this climate account only include part of the sources related to scope 3.*

3.1 Scope 1+2

Scope 1 includes CO_2 emissions from natural gas for heating, use of company cars and use of employee cars (car allowances). Scope 2 includes emissions from electricity and district heating consumed in offices. In 2017 the total amount of emissions from scope 1 and 2 activities is 1,751 ton CO_2 (compared to 1,663 in 2016).

The results show that scope 1 emissions decrease from 2016 to 2017 primarily due to a decrease in use of company cars - a number which was expected to rise due to the merger. During the preparation of this report it has become evident that data on use of company cars has been inaccurate during the previous years (hence overestimated). For the Climate Account 2018 it is recommended to correct the results historically.

Scope 2 is dependent on the national emission factor for electricity, which varies annually. The annual emission factor for electricity is determined by the composition of energy sources in the national electricity grid, i.e. the amount of renewable energy (e.g. wind and sun energy) versus fossil energy (e.g. coal and natural gas). Hence, the inter-annual change to the national emission factors affects the inter-annual comparison of Climate Accounts. The national emission factor for electricity (g CO2 per kWh electricity) decreased with more than 25 % from 2016 to 2017. If the emission factor had been stable from 2016 to 2017 the emissions from scope 2 would constitute nearly 1,000 ton (compared to 804 ton).

	2013	2014	2015	2016	2017
g CO2/kWh	358	288	192	243	181
Change (%) compared to previous year		-20%	-33%	27%	-26%

Table 4 illustrates the average emission factor for grid delivered electricity in Denmark from 2013 to 2017. The emission factor varies annually, which influences CO2 emissions from electricity use. The annual emission factor for electricity is determined by the composition of energy sources in the national electricity grid, i.e. the amount of renewable energy (e.g. wind and sun energy) versus fossil energy (e.g. coal and natural gas).

3.2 Scope 3

The relative importance of scope 3 emissions in the climate account remains on the same level from 2016 to 2017. The activities within scope 3 presented in this report are all transportation by air and train. The CO_2 emissions from the activity *intercontinental air transport* contributes with 880 ton CO_2, which corresponds to 27 % of the total emissions in 2017. The emission factor from air transport (CO2/km) is very CO2-intensive compared to other modes of transport.

For the 2018 Climate Account it would be interesting to include all scope 3 emissions, i.e. the total emissions from purchase of goods and services. This in order to map out emission "hot spots" and initiate emission reducing actions from these indirect emissions.

3.3 Annual comparison of key figures

In order to compare the results inter-annually the emissions should also be compared to the number of employees and office square meters i.e. the key figures. Hence, in this section the key figures from 2013 to 2017 are represented.

Table 5 presents the emissions per full time employee and the emissions per office square meter in 2013 - 2017. The number of fulltime employees at NIRAS' Danish offices increased with 523 employees from 2013 to 2017. However, the CO_2 emissions per full time employee decreased from 2.6 ton in 2016 to 2.1 ton in 2017.

The square meters of NIRAS offices have expanded from 30,634 m^2 in 2016 to 44,406 m^2 in 2016. The CO_2 emission per office square meter is related to the activities *electricity*, *district*- and *natural gas* for heating used in the offices. As presented in Table 5, the emissions decreased from 27.4 kg CO_2/m^2 in 2016 to 24.4 kg CO_2/m^2 in 2017.

It should be emphasized that the key numbers for 2017 are expected to stand out due to the merger. Both office spaces and the number of employees in 2017 have been established based on a weighted average. Moreover, due to the fact that some offices contractually belonged to NIRAS beyond the time period where it was staffed with NIRAS employees, energy use (and CO_2 emissions) per m2 becomes less intensive.

	2013	2014	2015	2016	2017
Total ton CO_2	2,149	2,198	2,031	2,964	3,222
Ton CO_2 from office buildings	839	733	577	840	1,084
Number of full time employees	1,009	1,089	1,090	1,151	1,532
Total heated area (m^2)	25,468	25,785	30,248	30,634	44,406
Ton CO_2 / full time employee	2.1	2.0	1.9	2.6	2.1
Kg CO_2 / m^2	33.0	28.4	19.1	27.4	24.4

Table 5 Emissions related to employee number and office square meters. It should be emphasized that the key numbers for 2017 are expected to stand out due to the merger. Both office spaces and the number of employees in 2017 have been established based on a weighted average.

4 Conclusions

The emissions of CO_2 caused by NIRAS A/S activities in Denmark increased from 2,964 ton in 2016 to 3,222 ton in 2017, which correspond to an increase of 9 %.

The total scope 1 and scope 2 emissions increased slightly with 5 % from 2016 to 2017, and scope 3 emissions increased with 13 %.

Emissions pr. m^2 decreased from 27.4 kg CO_2/m^2 in 2016 to 24.4 kg CO_2/m2 in 2017. Furthermore, the emissions pr. fulltime employee decreased from 2.6 to 2.1 ton CO_2. It is very important to emphasize that the results, including the key figures are expected to stand out for 2017 due to the merger. Both office spaces and the number of employees in 2017 have been established based on a weighted average. Moreover, due to the fact that some offices contractually belonged to NIRAS beyond the time period where it was staffed with NIRAS employees, energy use (and CO_2 emissions) per m2 becomes less intensive.