

NIRAS Climate Account 2019

NIRAS

MARTS 2021

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1 Introduction

This climate account is conducted for the Danish consultancy company NIRAS. NIRAS is an international multidisciplinary consultancy company with activities in Denmark and 26 other countries across the world.

The aim of the climate account is to estimate the greenhouse gas (GHG) emissions caused by NIRAS activities, in Denmark in 2019. NIRAS GHG emissions have been documented since 2013.

The climate account includes both direct and indirect emissions, both calculated in CO₂-eq. Direct emissions are related to the consumption of fuels in NIRAS' own equipment and vehicles (scope 1). Indirect emissions are associated with the production of purchased energy (scope 2) and the production of purchased goods and services and employee transportation (scope 3). This account follows The Greenhouse Gas Protocol Corporate Standard¹.

1.1 Organisational and operational boundaries

This climate account is delimited to the Danish part of NIRAS which constitutes more than 70 % of its business. The operational boundary covers scope 1, scope 2 and scope 3 emissions caused by NIRAS' Danish operations. The scopes are defined by the GHG protocol and are further explained in section 5.1.

All Danish offices are included in NIRAS' Climate Account 2019, which are:

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

For this inventory, all internal activities (within scope 1, 2 and 3) are been included. In this context, external activities refer to those conducted in projects in which NIRAS act as consultant for. The included activities are:

Scope 1

- Natural gas for heating
- Use of company cars

Scope 2

- Electricity used in offices
- District heating used in offices
- Consumption of own produced renewable energy

Scope 3

- Procurement of goods and services
- Transportation by train
- Transportation by airplane
- Use of employee cars for business

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 can conduct a recalculation and back-cast these data points.

¹ <http://www.ghgprotocol.org/standards/corporate-standard>

1.2 Corrections and changes

1.2.1 New method for calculating procurement of goods and services

The account for 2018 was the first time NIRAS included a full scope 3 including procurement of goods and services. In the 2018 account, the calculation of CO₂ emissions from procured goods and services was performed by importing data into the software SimaPro. For the 2019 accounting, the calculation method is changed to export emission factors from SimaPro and calculating the emissions in Excel instead. This method is re-calculated for 2018 data to compare the two years in this report.

1.2.2 Updated emission factors from Exiobase

For the 2019 account, emissions factors from Exiobase are updated from v3.3.13b2 to v3.3.16b and recalculated for 2018 data for comparison.

1.2.3 Use of employee cars for business

In previous years' climate account, emissions from the use of employees own cars for business purposes has been accounted for in scope 1 and has in the 2019 account been moved to scope 3, where it correctly belongs in accordance with the GHG-protocol. This correction has been performed backwards for all years (2013-2018) for comparison. It is recommended that the emissions factor for travel by employee cars be updated in future climate accounts and previous years recalculated with the updated factors, as the newer and more precise factors have been published since. This adjustment is expected to give rise to higher emissions from this travel, but has not been completed in the 2019 accounts as a decision on how far back the new factors can and will be applied is still pending.

1.2.4 Transport by air

As in previous years' climate account, a monetary amount on air flight, provided by Carlson Wagonlit Travel (CTW), is deducted from the monetary data on procured goods and services. Instead, flight data is added as CO₂ calculations, calculated and provided by CTW. However, it is in the 2019 account noted that the data on emissions and monetary price from CTW includes both internal- and external (project related) flights. The 2018 account thereby accounted correctly for flight emissions but incorrectly removed a too large monetary amount from the purchasing data, which in that case was not assigned the right emission factor. The error is corrected in the 2019 account which now includes CO₂ emissions from all flights but only deducts the monetary amount equal to the internal air travel expenses without removing non-air related amounts.

1.2.5 Canteen data

Data on emissions caused by the canteen lies within procurement of goods and services in scope 3 and is therefore only relevant for 2018 and 2019 accounts. In 2018, the climate account did not include the canteen emissions. In this 2019 climate account the emissions from the canteen are included as a part of scope 3 and the 2018 emissions have been recalculated to include canteen related emissions. Sponsorships (e.g. for sports clubs) were excluded in 2018 as well but included in this 2019 account. However, it does not contribute with a large share of emissions.

1.2.6 Weather/temperature correction

Previous years' climate accounts have accounted for shifting weather conditions when calculating emissions from heating and energy by applying

weather/temperature corrections to the results. This 2019 climate account shows results without weather/temperature corrections for the first time, as it shows a more transparent view of the emissions. In this report, data from previous years are recalculated without weather/temperature corrections to compare across all years.

1.2.7 Transport by train

Since 2018, a new ticket system in the Danish public transport sector, has changed NIRAS' practice regarding registration and payment of public transport for employees. As a result of this, data on the specific amount of public transportation used is difficult to extract. For this 2019 climate account, an amount very similar to that of 2018 has been assigned.

1.2.8 Updated key figures

Virum office location closed and Sortemosevej 21 in Allerød has been added.

2 Results 2019

The total GHG-emissions for NIRAS in 2019 were 12.535 ton CO₂-eq, which corresponds to 7 ton CO₂-eq per fulltime employee and 0,28 ton CO₂-eq per office m². Figure 1 shows the distribution within scope 1, 2 and 3.

Figure 1 - Total emissions allocated in scopes

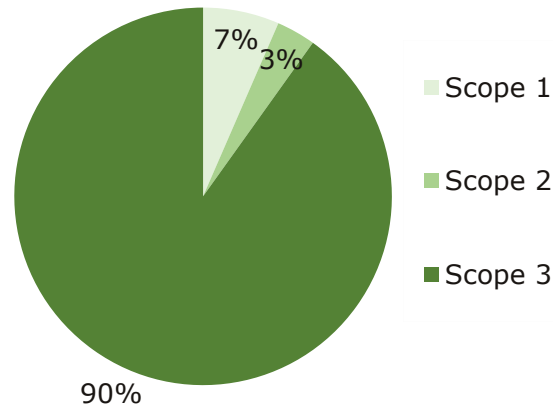


Table 2.1 shows the distribution of the emissions according to the different scopes and activities in 2019.

Table 2.1: Distribution of emission on all scopes.

Activity	Tons CO ₂ e	% share	
Scope 1		7%	
Natural gas for heating	491		4%
Use of company cars	328		3%
Scope 2		3%	
Electricity used in offices	364		3%
District heating used in offices	57		0%
Scope 3		90%	
Procurement of goods and services	9.620		77%
Use of employee cars for business	622		5%
Transportation by train	53		0%
Transportation by air	1.003		8%
Total	12.535	100%	100%

Scope 3 accounts for 90 % of the total emissions and scope 1 and 2 represents 7 % and 3 %, respectively. Procurement of goods and services accounts for 77 % of the total emissions which is by far the greatest share.

Expanding the category Procurement of goods and services into the individual procurement categories, Table 2.2 shows the top 12 contributors to the total share of emissions across all three scopes.

Table 2.2: Top 12 contributors to of the total emissions.

Rank	Scope	Activity/ procurement categories	Tons CO ₂ e	% share
1	Scope 3 Procurement	Canteen operation	1.913	15,3%
2	Scope 3 Procurement	Rent of premises	1.377	11,0%
3	Scope 3	Transportation by air	1.003	8,0%

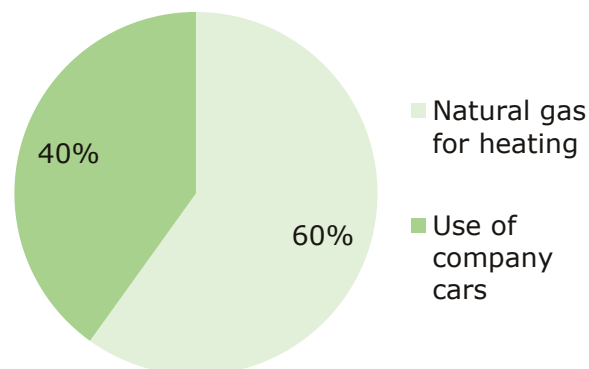
4	Scope 3	Use of employee cars for business	622	5,0%
5	Scope 3 Procurement	Software	571	4,6%
6	Scope 3 Procurement	Other staff costs	541	4,3%
7	Scope 3 Procurement	Repair and maintenance of premises	537	4,3%
8	Scope 3 Procurement	Leasing cars	508	4,1%
9	Scope 1	Natural gas for heating	490	3,9%
10	Scope 3 Procurement	Contracted benefits - Executing	375	3,0%
11	Scope 2	Electricity	363	2,9%
12	Scope 1	Company cars	328	2,6%

Canteen operations (from procurement of goods and services) is the largest contributor to the total emissions with 15 %. Thereafter, the rent of premises contributes with 11 % and transportation by air with 8 %.

2.1 Scope 1

Scope 1 includes emissions from natural gas for heating and the use of company cars. Up until 2019, the use of employee cars for business was wrongly placed within scope 1 and is therefore for this climate account moved to scope 3 in accordance with the GHG-protocol. The total amount of GHG emissions from scope 1 activities are 420 ton CO₂-eq. Figure 2 illustrates the share of each category in scope 1.

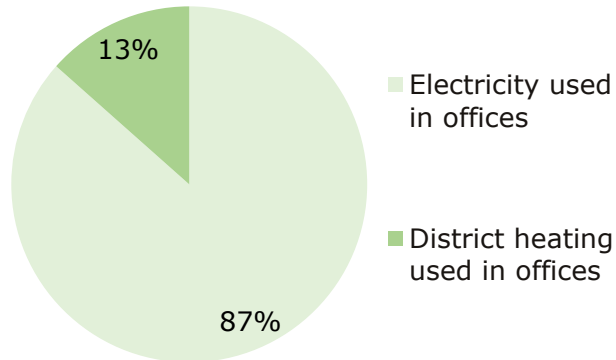
Figure 2 - Distribution of CO₂ emissions in scope 1.



2.2 Scope 2

Scope 2 includes CO₂ emissions from electricity and district heating used in the offices. Figure 3 illustrates how much of the impact in scope 2 that is caused by heat and electricity.

Figure 3 - Distribution of CO₂ emissions in scope 2.

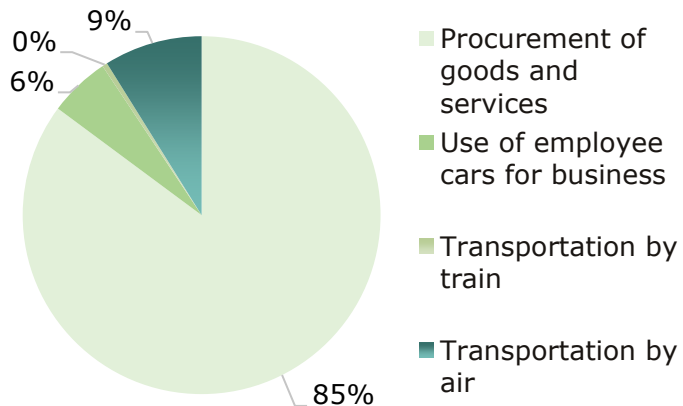


2.3 Scope 3

The 2019 climate account is the second year to include procurement of goods and services in a full scope 3 account. The inclusion of scope 3 makes it possible to identify and recommend new areas of improvements for more effective actions to reduce GHG emissions.

Figure 4 shows the distribution within scope 3. It is clear to see that procurement of goods and services contributes the most by 85 %.

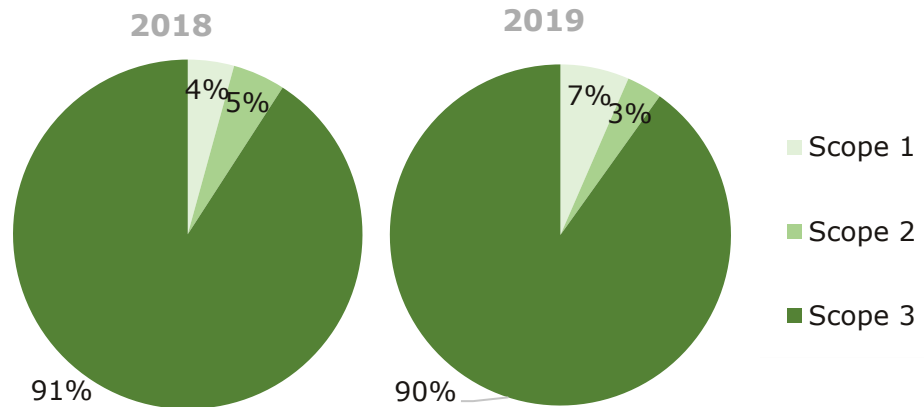
Figure 4 - Distribution of CO₂ emissions in scope 3.



3 Development

3.1 Full development 2018-2019

Figure 5 Development of scope 1, 2 and 3 (including procurement of goods and services) from 2018-2019



Total	2018	2019
Scope 1	543	819
Scope 2	617	420
Scope 3	11.525	11.297
Total	12.684	12.535

The total emissions from all scopes were reduced by approx. 150 tons from 2018 to 2019, or a little over 1 %.

Scope 2 emissions were reduced significantly by almost 200 tons of CO₂ and fell more than 30 % from 2018 to 2019. Scope 3 emissions were also reduced from 2018 to 2019, falling by approx. 230 tons of CO₂ or approx. 2 %.

These reductions are countered by a significant rise in Scope 1 emissions, that increased by approx. 275 tons of CO₂ or more than 50 % from 2018 to 2019. There are two contributing factors to this increase. The first factor is the significant rise in natural gas consumption for heating at the offices in Allerød. Full time use of the space at Sortemosevej 21 started in December 2018 and has continued throughout 2019, giving rise to a sharp rise in the heating demand. The second factor is a significant rise in fuel consumed in company owned cars, which rose by almost 30 % from 2018 to 2019.

3.1.1 Key figures

The two key figures calculated are CO₂-eq per full time employee and CO₂-eq per office square meter. The key figures are calculated as the total emissions divided by number of employees and heated square meters, respectively.

Key figures are calculated separately for 2018-2019 including procurement of goods and services and show that emissions result in 7,0 tons CO₂-eq per employee and 0,288 tons CO₂-eq per m² in 2019. Compared to 2018 results, this is a decrease of 2,6 % for CO₂-eq per employee and increase of 4,8 % for CO₂-eq per m².

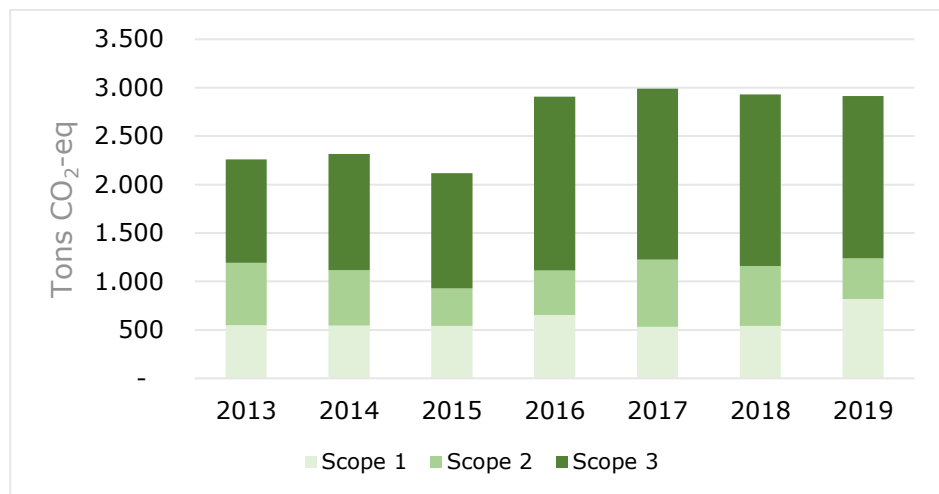
3.2 Total development 2013-2019

The NIRAS climate account has been conducted since 2013. Since procurement of goods and services is included in the 2018-2019 account only, those two are compared for full scope 3 accounts separately.

In this sections, the years 2013-2019 are compared for all three scopes with the exception of procurement of goods and services in scope 3. Significant changes to this year's account are recalculated for the previous years in order to compare the results and are described further in Section 1.2

The development of emissions from scope 1, 2 and part of scope 3 are illustrated in Figure 6. The full data is available in Appendix 1.

Figure 6 - Development of scope 1, 2 and 3 from 2013-2019 (excluding procurement of goods and services).

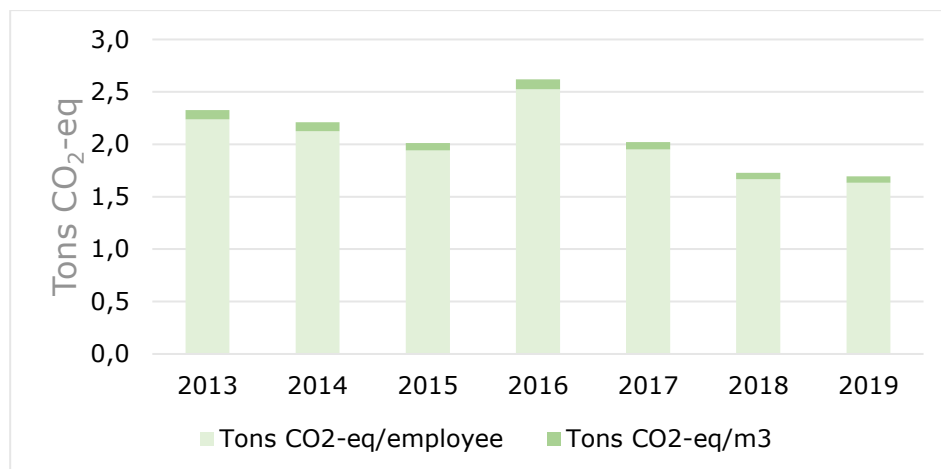


The total emissions in 2019 (without procurement of goods and services) are 2.915 tons CO₂-eq, which shows a slight reduction of 0,5 % compared to 2018 with 2.931 tons CO₂-eq.

3.2.1 Key figure development

The comparison of the key figures (calculated without procurement of goods and services) over the years 2013-2019 are illustrated in Figure 7. The full data on key figures is available in Appendix 2.

Figure 7 - Comparison of key figures from 2013 to 2019.

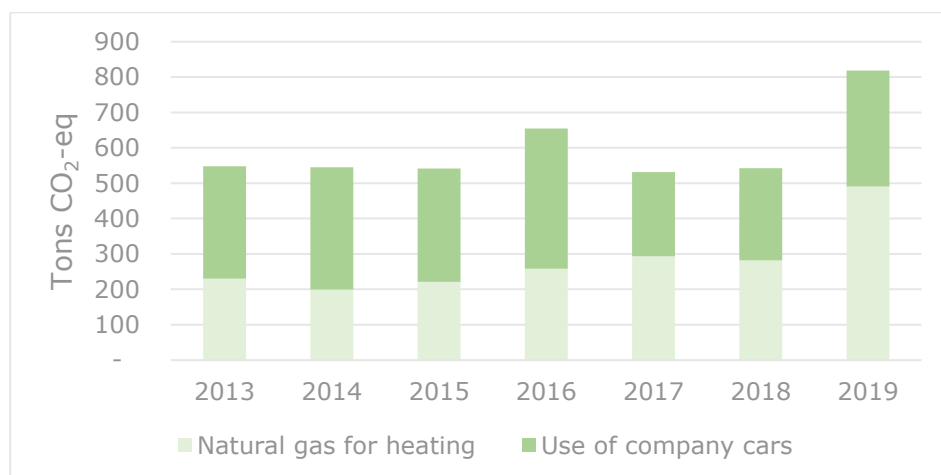


The amount of 1,6 tons Co₂-eq per employee and 0,067 tons Co₂-eq per office m².

3.2.2 Scope 1 development

The development from 2013 to 2019 is seen in Figure 8. The correction of replacing the use of employee cars for business from scope 1 to scope 3 has been recalculated for the former years to be able to compare.

Figure 8 Development of scope 1

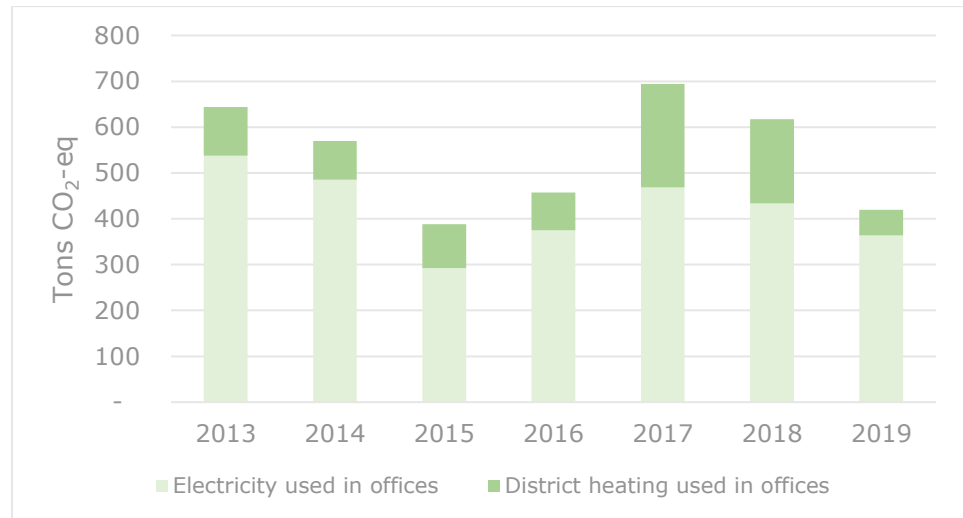


The emissions from scope 1 amounts to 819 tons CO₂-eq which is an increase of 51 % compared to 2018. This is mainly due to the use of natural gas for heating which has increased by more than two thirds compared to 2018, which is explained by the inclusion of Sortemosevej 21 in late 2018 in addition to Sortemosevej 19, increasing the heated area in Allerød as opposed to the former years.

3.2.3 Scope 2 development

The development from 2013 to 2019 is seen in Figure 9.

Figure 9 Development of scope 2



The emissions from scope 2 amounts to 420 tons CO₂-eq in 2019. This is a decrease of 32 % compared to 2018.

3.2.3.1 Emission factors

Emissions from scope 2 is dependent on the national emission factors for electricity and district heating, which vary annually. The annual emission factors for electricity and district heating are determined by the composition of energy sources in the national electricity grid and the district heating network, i.e. the amount of renewable energy (e.g. wind and solar energy) versus fossil energy (e.g. coal and natural gas).

This means that the development in emissions does not necessarily indicate a decrease in energy use as a result of initiatives by the company but just as well a development in the Danish electricity grid and district heating network.

The emission factor used to calculate the emissions from the amount of energy used has decreased from 194 g CO₂-eq per kWh in 2018 to 135 g CO₂-eq per kWh.

3.2.4 Production of renewable energy

3.2.4.1 Electricity from solar panels

NIRAS produces renewable energy (electricity) from solar panels. The electricity production, sale and consumption is shown in Table 3.1 in kWh for the years 2013-2019. The produced electricity is either consumed on the site of production or sold to the grid. The consumed electricity results in emission reductions in the total climate account, whereas the sold electricity does not as in accordance with the GHG-protocol.

The solar panels are in 2013-2018 placed in Virum and Allerød. The increase in production from 2017-2018 is due to new solar panels in Virum. The decrease in production in 2019 is due to NIRAS' termination of the Virum office and therefore only the Allerød office solar panels are included.

Table 3.1 production, sale and consumption of electricity from solar own panels.

[KWh]	2013	2014	2015	2016	2017	2018	2019
Production	193.521	182.290	180.842	182.092	164.601	350.599	183.033
Sale	14.396	6.566	10.659	8.409	7.737	8.446	7.449
Consumption	179.125	175.724	170.183	173.683	156.864	342.153	175.584

3.2.4.2 Heat from food waste

NIRAS collects food waste from the canteen in Allerød and Aarhus, which is used to produce electricity and heat by a third party.

NIRAS' food waste is used for energy production by 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.

Food waste collected at NIRAS in 2019 produced a total of 37.536 kWh of electricity and 46.921 kWh of district heating.

Table 3.2 Production of energy and electricity from food collection 2013 to 2019.

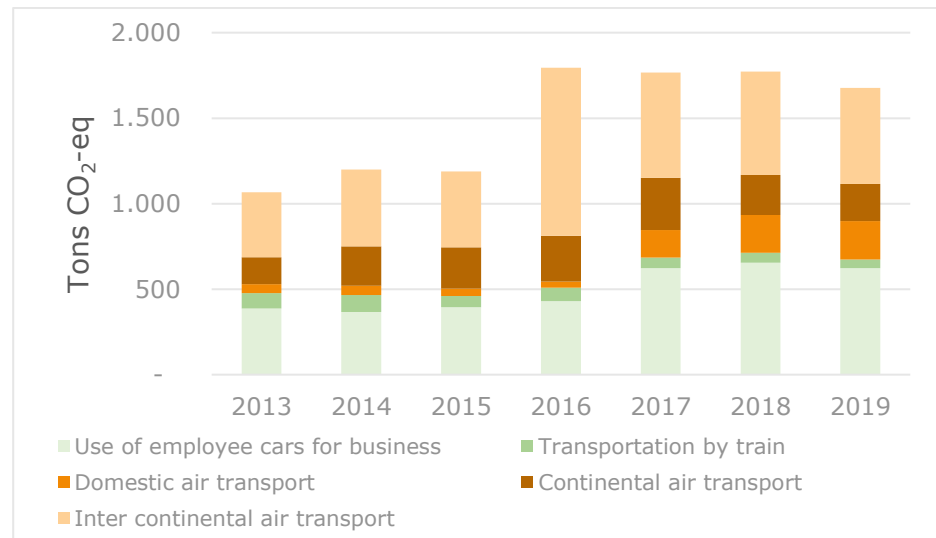
	2013	2014	2015	2016	2017	2018	2019
Food waste [Ton]	19	39	27	29	82	102	107
Electricity [kWh]	6.618	14.661	9.333	9.944	28.016	34.714	37.536
District heating [kWh]	8.287	18.360	11.688	12.455	35.020	43.393	46.921

It is important to note that the goal is to minimize waste. Therefore an increase in energy and heat production, should not be seen as a positive development. However, expanding the collection of food waste to other offices is desirable.

3.2.5 Scope 3 development

The development from 2013 to 2019 is seen Figure 10. The figure shows scope 3 emissions without procurement of goods and services.

Figure 10 Development of scope 3 (without procurement of goods and services) from 2013-2019.



The total emissions from scope 3 in 2019 are 1.677 tons CO₂-eq which is a reduction by 5 % compared to 2018.

4 Conclusions and recommendations

NIRAS activities in Denmark emitted 12.535 ton CO₂-eq in 2019 when accounting for all scope 3 climate account, including procurement of goods and services. The result can only be compared to the 2018 climate account results, as these are the only two years that a full scope 3 has been produced.

When comparing scope 1, 2 and 3 results (without procurement of goods and services) from NIRAS' climate accounts from 2013-2019, the level of CO₂-emissions in 2019 corresponds to an increase of 29 % compared to 2013 and a 1 % decrease from 2018. When comparing key figures for the same results, CO₂ emissions per employee and office square meters in 2019 1,6 and 0,063 tons CO₂-eq respectively. This is almost equal to those of 2018 and a reduction of 27 % when comparing to 2013. This means that when accounting for the growth of the company, a significant reduction has been made in the CO₂-intensity of the company's activities.

The climate account includes procurement of goods and services in 2018 and 2019. In 2019, the total Scope 3 emissions account for 90 % of the total emissions and within this scope procurement of goods and services alone account for 85 % of the emissions. When looking at all activities and procurement categories across all scopes, the canteen contributes with 15 % of the total emissions in 2019. Thereafter, rent of premises, transportation by air and use of employee cars for business (all from scope 3) account for 11 %, 8 % and 5 % respectively.

CO₂ emissions per employee and office square meters are 7 and 0,27 tons respectively in 2019 when including procurement of goods and services.

From the 2018-2019 account it is possible to identify hot spots and specific areas of improvements with potential for CO₂ reductions, since the full picture of the CO₂-emissions are mapped including procurement of goods and services.

Within Scope 1 and 2, the most effective initiatives to reduce CO₂-emissions are those that will either decrease the consumption of natural gas for heating and fuels for transportation, or replace these consumptions with less CO₂-intensive alternatives. For the natural gas consumption, this would mean replacing the gas boiler at the Allerød offices by e.g. a heat pump and for transportation increasing the use of electric cars.

Reducing travel activities in general, for example via an increased use of Teams and other virtual meeting opportunities, will have an effective impact on the total emissions.

Within the procurement of goods and services, a continued focus on reducing the impact of canteen operations, by minimizing waste and reducing the consumption of climate intense foods, is the most effective means of reducing emissions in the short and medium term.

As 2020 is expected to be a year heavily impacted by the COVID-19 pandemic, it is recommended that this year's climate account are used to updated the procedures and methods used to gather data, calculate transportation emissions from business travel in employee cars and a range of other elements in the approach. This is recommended to develop the company's climate accounts further for an increased accuracy and transparency, as well as to strengthen the use of the climate accounts as a tool to guide the company's climate actions.

5 Method

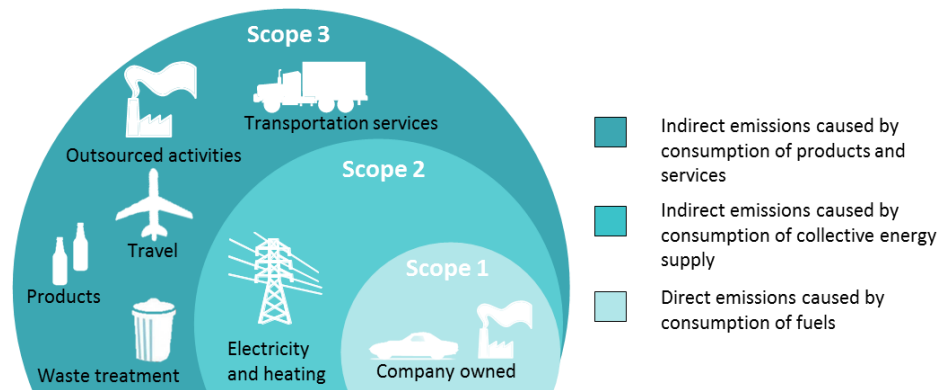
5.1 Scope 1, 2, and 3 emissions

The GHG 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) as illustrated in Figure 11:

- 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, transport etc.

Figure 11 Scope 1, 2 & 3 according to the GHG Protocol Corporate Standard



The assessment of emissions in **Scope 1** is based on consumption of fuel, natural gas and mileage stated in physical units [L, km driving and m³]. The consumption is multiplied with emission factors to calculate the contribution of CO₂ from transport by cars and natural gas for heating.

Scope 2 is based on the same principles as scope 1. National emissions factors are multiplied with the use of electricity and district heating given in kWh.

The assessment of **Scope 3** is a mix of two methods. The main part of scope 3 is based on procurement data. The different procurement categories are matched with emission factors, which indicate an impact per monetary unit.

Where the consumption of a specific service/action is known in physical units or the CO₂ emissions are known from other parties (e.g. air transport), the category and the associated budget is removed from the procurement data. The associated budgets that are accounted for in scope 1 and 2 are also removed from the procurement list. The impact is calculated with same method as described in scope 1

and 2 if the consumption is known in physical units (e.g. mileage on employee cars for business) and then the final impact for the category is added to the procurement based assessment.

CO₂-reducing initiatives will only be incorporated in the climate account if the initiatives also results in a monetary saving since the account is based on an economic model.

Depreciations have been included in the climate account as is. This means that emissions are allocated to the expenses used every year (even though the products/service were delivered in a previous year where the emissions actually occurred).

5.2 Data in physical units

The categories that have been removed from the procurement list and calculated with other methods in NIRAS' Climate account are:

Air transport - CO₂ emissions has been delivered by CWT.

Transport by car (except from taxa) - since it is included in scope 1 and the emissions are calculated based on mileage [km] and liter of diesel and gasoline.

The remaining budget for public transport in the procurement list have been compared with the amount spend on public transport in 2018, which for both years is around 400.000-500.000 DKK. It is not possible to estimate the budget used on public transport in 2019 since NIRAS' have changed practice regarding registration and payment of public transport for employees.

Heat and electricity consumption are in some cases only provided in expenses. In this case an estimated is made based on empirical data.

Appendix 1 Comparison of results 2013-2019

	2013	2014	2015	2016	2017	2018	2019
Scope 1	548	546	541	655	531	543	819
Scope 2	645	570	388	457	694	617	420
Scope 3	1.067	1.200	1.187	1.795	1.766	1.772	1.677
Total	2.259	2.315	2.117	2.907	2.992	2.931	2.915

*Tons CO2-eq

Appendix 2 Comparison of key figures

Key figures calculated from total scope 1, 2 and 2 emissions without procurement of goods and services from 2013-2019.

Key figures	2013	2014	2015	2016	2017	2018	2019
Total emissions [tons CO ₂ -eq]	2.259	2.315	2.117	2.907	2.991	2.931	2.915
Amount of employees	1009	1089	1090	1151	1532	1760	1786
Tons CO₂-eq/employee	2,2	2,1	1,9	2,5	1,9	1,7	1,6
Office square meters [m ²]	26.064	27.489	30.248	30.634	44.406	46.158	43.498
Tons CO₂-eq/m²	0,9	0,8	0,7	0,9	0,6	0,6	0,6

Key figures calculated from total scope 1, 2 and 2 emissions including procurement of goods and services from 2018-2019.

Key figures	2018	2019
Total emissions [tons CO ₂ -eq]	12.684	12.535
Amount of employees	1.760	1.786
Tons CO₂-eq/employee	7,2	7,0
Office square meters [m ²]	46.158	43.498
Tons CO₂-eq/m²	0,275	0,288