nordiccomputer.com

Climate Report

October 2022 – September 2023

Nordic Computer

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Introduction

We are thrilled to present our inaugural Climate Report, a testament to our unwavering commitment to environmental responsibility and corporate stewardship. Aligned with the EU's Corporate Sustainability Reporting Directive (CRSD) and compliant with European Sustainability Reporting Standard E1 (ESRS) our report encapsulates the essence of our sustainable practices. Despite the fact that the ESRS framework will not encompass Nordic Computer directly, we are committed to following the standard that will be relevant for a large share of our corporate customers in the EU. Thereby, we aim to show foresight and relevance in assisting our customers on their respective journeys towards increased sustainability.

In a world dominated by rapid technological advancements, our focus on extending the useful lifetime of IT hardware in the form of servers, storage, and networking equipment in data centers, sets us on a distinctive path. This endeavor is not just a corporate goal; it is a conscientious decision to reshape the ecological footprint of the IT industry.

As we delve into the contents of this report, you will discover the strides we have made in reducing waste, lowering energy consumption, and fostering a circular economy within the realm of IT infrastructure. Our commitment to ESRS E1 reflects our dedication to transparency, accountability, and continuous improvement.

Thank you for joining us on this transformative journey. Together, we pave the way for a sustainable future—one where technology not only empowers progress but does so responsibly and with an enduring respect for our planet.

Sincerely,

Lars Juhl Frandsen
CEO & Partner

Nordic Computer

1 General disclosures (ESRS 2)

1.1 Scope

This Climate Report for Nordic Computer A/S covers the fiscal year October 2022 to September 2023. The report has been prepared in accordance with the EU Corporate Sustainability Reporting Directive (CSRD) and the underlying European Sustainability Reporting Standards (ESRS). The directive comes into effect from January 2024.

Nordic Computer is not obliged to report according to CSRD. It is a voluntary choice, driven by company values, to support transparency, comparability and climate action. As a company based on a circular business model promoting reuse and life extension of professional IT equipment, it is an inherent part of the company DNA to work for lowering the impacts of the IT industry.

1.1.1. Geographical and organizational scope

The report covers the parent company Nordic Computer A/S (VAT DK27524958) and all its direct activities. The Swedish subsidiary NC Datacenter Services AB and all its activities, as well as activities carried out by partners abroad, are outside scope.

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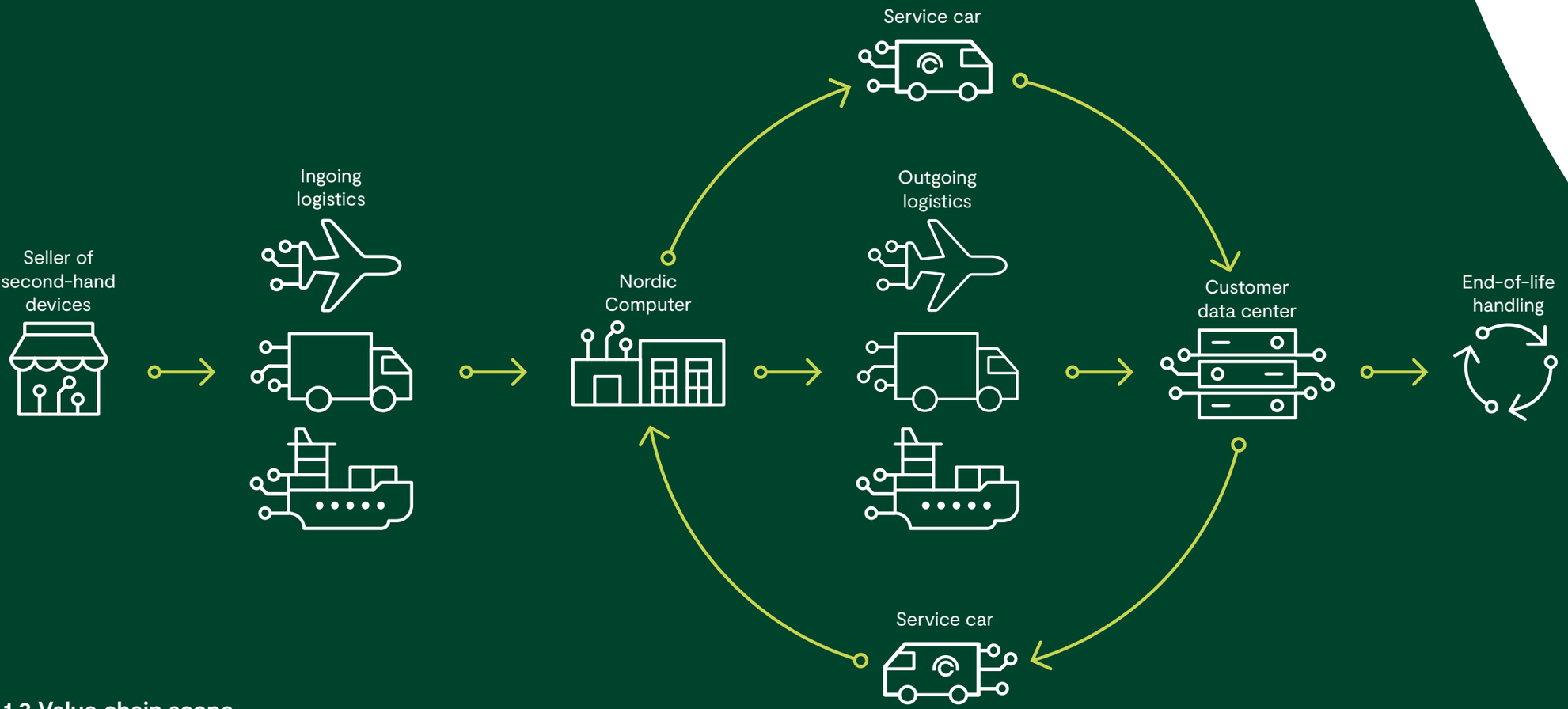
1.1.2 Materiality and ESRS scope

Impact materiality is the topic of this report, while financial materiality is out of scope. The relevant topical ESRS standard for this Climate Report is E1 Climate Change. The cross-cutting standards 1 General requirements and 2 General disclosures are also within scope to the extent they are relevant for the ESRS E1 scope covered. Table 1 contains an overview of the ESRS E1 and ESRS 2 disclosure requirements covered in this report.

Table 1: ESRS disclosure requirements covered by this report

Disclosure requirements	Page(s)
ESRS E1 Climate change	
E1-1 – Transition plan for climate change mitigation	19-20
E1-2 – Policies related to climate change mitigation and adaptation	21
E1-3 – Actions and resources in relation to climate change policies	22-23
E1-4 – Targets related to climate change mitigation and adaptation	16-18
E1-5 – Energy consumption and mix	12-15
E1-6 – Gross scopes 1, 2, 3 and total GHG emissions	11
ESRS 2 General disclosures	
BP-1 – General basis for preparation of sustainability statements	4, 6, 7
BP-2 – Disclosures in relation to specific circumstances	8-9
IRO-1 – Description of the process to identify and assess material impacts, risks and opportunities	10
IRO-2 – Disclosure Requirements in ESRS covered by the undertaking's sustainability statement	5, 8
SBM-3 – Material impacts, risks and opportunities and their interaction with strategy and business model	10



1.1.3 Value chain scope

The upstream and downstream value chain is within scope as illustrated.

Upstream this includes the international purchase of second-hand IT equipment for test and resale, the transport of the devices to Nordic Computer's facilities in Denmark, the purchase of packaging and tools, office and IT equipment, software licenses and cloud services, insurances, employee education, travel and accommodation, purchases for the cantina, leasing of cars, rent, maintenance and cleaning of the facilities, and transport of IT devices to customers.

Employee commuting to and from work is not within scope.

The downstream value chain covers, electricity consumption of the devices during the use phase at the customers' sites, and the final end-of-life handling of devices. E-waste and other waste categories directly from Nordic Computer are also part of the downstream value chain.

At customers' sites only the electricity consumption of the devices themselves is included. Energy consumed by cooling equipment or facilities is not included.

1.1.4 Omissions and exemptions

Nordic Computer has not made use of the option to omit information in this report due to IPR, know-how, results of innovation, impending developments, or matters in the course of negotiation. As Nordic Computer is not obliged to disclose its revenue in its financial statement, revenue will not be disclosed in this report either. All revenue-based intensity measures are thus left outside scope. This is relevant for E1-5 Energy consumption and mix and E1-6 Gross scopes 1, 2, 3 and total GHG emissions.

The following ESRS E1 disclosure requirements are outside scope:

ESRS E1 disclosure requirements outside scope	Reason
E1-7 – GHG removals and GHG mitigation projects financed through carbon credits	Not material as Nordic Computer does not make use of carbon credits
E1-8 – Internal carbon pricing	Not material as Nordic Computer does not make use of carbon pricing schemes
E1-9 – Anticipated financial effects from material physical and transition risks and potential climate-related opportunities	Financial materiality is outside scope of this Climate Report

1.2 Assessments and estimations

1.2.1 Material information

This report follows the general scientific consensus that the primary measure of climate impact is the yearly amount of greenhouse gasses (GHG) released into the atmosphere. Throughout the value chain of Nordic Computer GHG are emitted, mainly due to the use of energy generated from the burning of fossil fuels. Fossil fuels propel transport on land, at sea, and in the air, it is used for the electricity consumed by equipment sold to customers, and it is used for the electricity and heating supplied to Nordic Computer's facilities. Furthermore, all supplies to Nordic Computer, whether it be packaging material, food supplies for the cantina or insurances, as well as all waste handling also give rise to emissions.

In this report, energy is measured in megawatt-hours (MWh) and GHG emissions are measured in metric tons of CO_2 equivalents (tCO_2eq).

The emissions described above differ in orders of magnitude. Some contributions are way below the uncertainty level of others. To keep focus on what matters the most, a threshold of 10 tCO2eq has been applied to determine contributions that are material. Contributions that are not material will not be reported individually, but summed up in one single contribution to facilitate comparison.

1.2.2 Estimates and uncertainties

Emissions related to the production, transport, use, and end-of-life handling of the second-hand IT equipment that Nordic Computer purchases, tests, sells, and services for their customers, constitute a special challenge. Not only do almost all of these emissions happen outside Nordic Computer's direct operations, which makes data collection difficult, the second-hand nature of the devices also needs to be taken properly into account.

Transport is the least challenging. The major logistic companies provide detailed impact reports, while emissions caused by minor transport providers have been estimated based on cost and appropriate emission factors.

Emissions caused by the electricity consumption of devices sold to customers is more of a challenge. First, customers do not measure electricity consumption for units provided by Nordic Computer separately. Second, the vast number of customers make direct data collection impractical if not plain unrealistic. Third, some of these emissions occur in the future. Hence an estimate has been applied.

The basis for the estimate is a complete list of units sold in the reporting period. The list contains information about the unit type (server, solid-state disk, network switch, etc.) and the destination country for each unit. Three qualified assumptions are applied:

1. The electricity consumed in a year by all units of a given type, can be estimated as the number of units of the given type, times the average yearly electricity consumption for that unit type.
2. All units of a given type will be in operation for an assumed period of time. This assumption is completely analogous to the assumption applied by OEMs when they calculate the life-cycle emissions.
3. The emissions caused by all units sold to a specific country can be estimated as the electricity consumed by these units, times the carbon intensity for that country.

Further details can be found in appendix *A.1 Estimation of use-phase emissions*.

What is left is the production and end-of-life handling of devices. The fact that all devices are second-hand devices that have already been in operation for a first use phase, calls for a different approach than if the devices were brand new. According to academic studies [1], the impacts from production and end-of-life handling of second-hand items need to be discounted by a factor that is often called replacement rate (RR).

The RR factor is a number between 0 and 1 that describes the extent to which the second-hand equipment is a replacement for brand-new equivalents. If a second-hand unit completely eliminates the production and end-of-life handling of a corresponding new unit RR is 1. Contrary, RR is 0 in a situation where a second-hand unit is purely additional and does not replace anything.

In order to determine the value of RR, it is often expressed as the product of two other factors. The first factor is the probability (P) that a second-hand unit replaces a new unit at the time of acquisition, while the second factor is the ratio (R) of the periods for the first and second use-phases. The latter describes the extent to which a second-hand device last as long in the use phase as a brand-new device.

All units delivered by Nordic Computer are incorporated into operational environments in data centers where they are required due to operational needs. Data centers have no interest in buying, installing and maintaining second-hand devices if they are not needed. In other words, it is always the case that a second-hand unit replaces a new unit at time of acquisition, which means P equals 1.

Establishing the value of R is more challenging as concrete data are lacking. In general, it would be natural to expect that a second-hand item is worn and therefore likely to have a shorter use phase than a corresponding new item. However, that kind of logic does not apply here, as it ignores the fact that a huge amount of professional IT-equipment is replaced prematurely for non-technical reasons. For some types of units, the use-phase period for second-hand equipment can easily be twice as long as the use-phase for the brand-new equivalents.

Based on a number of more detailed arguments (see *A.2 Use-phase period of second-hand devices*) there is no substantial reason to believe that Nordic Computer's customers expect to, and actually do, operate the devices for shorter periods than data centers buying new devices. Consequently, in this report R is assumed to have a value of 1. However, this assumption is a source of uncertainty and is subject to be investigated further going forward.

As both P and R equals 1, so does the replacement rate. This means that a second-hand unit delivered by Nordic Computer fully eliminates the emissions from production and end-of-life handling of a new corresponding unit. Emissions from production and end-of-life handling are thus not included in the calculated emissions in this report.

1.2.3 Process of identification of climate impact

Per definition, 1 tCO_2eq has the same climate impact irrespective of the nature of the GHG, the source of it, and location of the source. It does not matter if 1 tCO_2eq is emitted during a flight take-off in Australia or it is released during electricity production in Denmark, the GHG enters the same atmosphere and the climate impact is the same. Evaluation of the severity of impacts, the likelihood that they occur, and the following prioritization, is thus reduced to a matter of the amount of GHG that is, or will be, released.

Knowledge about the relative amount of GHG emitted in different parts of the value chain is thus key for Nordic Computer to be able to address the challenge. Previously, Nordic Computer has made efforts to establish this overview, like the completion of Klimakompasset [2] for the fiscal year 2019-2020. Reporting in accordance with ESRS E1 is the next step in building up and maintaining this knowledge.

Focus on reducing impacts is built into daily operations. All employees have been through an educational program on the triple bottom line; People, Profit and Planet. In this way, the challenge to come up with innovative ways to curb emissions is distributed widely in the organization. Larger decisions are always evaluated against the triple bottom line on a kaizen board amongst a group of relevant employees. This is also true for decisions made on management level.

The ownership of this process is well-established at management and board level. Management is the driver of the process in both communication and action, and they regularly meet to establish and evaluate the bigger picture in relation to Nordic Computer's climate impact and ways to reduce it. This approach has led to a number of changes over the last couple of years. More details can be found in *2.4 Transition plan*.

1.2.4 Impact overview

The big picture of the climate impact of Nordic Computer is the following: The dominant impacts, by far, belong to scope 3 and are thus happening in the value chain outside Nordic Computer's own operations. Specifically, the shipment of second-hand devices from sellers to Nordic Computer and further on to customers, as well as the electricity consumed by sold units, are the major causes of climate impact.

2 Climate change (ESRS E1)

2.1 Energy

As a retailer of second-hand IT equipment, Nordic Computer belongs to NACE category G (Nomenclature of Economic Activities [3]), which is a high climate impact sector as defined by Commission Delegated Regulation (EU) 2022/1288. Accordingly, the consumption of fossil fuel sources is disaggregated in Table 2.

The company-leased ICE vehicles are the only source of emissions from crude oil and petroleum products. The remaining energy consumption consists of district heating and electricity for Nordic Computers facilities.

Table 2: Energy consumed in Nordic Computer's own operations

Energy consumption and mix	Base year 2019/2020	2022/2023
(1) Fuel consumption from coal and coal products [MWh]	0	0
(2) Fuel consumption from crude oil and petroleum products [MWh]	264	200
(3) Fuel consumption from natural gas [MWh]	0	0
(4) Fuel consumption from other fossil sources [MWh]	0	0
(5) Consumption of purchased or acquired electricity, heat, steam, and cooling from fossil sources [MWh]	704	529
(6) Total fossil energy consumption [MWh] (sum of lines 1 to 5)	967	729
Share of fossil sources in total energy consumption [%]	100	100
(7) Consumption from nuclear sources [MWh]	0	0
Share of consumption from nuclear sources in total energy consumption [%]	0	0
(8) Fuel consumption for renewable sources, including biomass (also comprising industrial and municipal waste of biologic origin, biogas, renewable hydrogen, etc.) [MWh]	0	0
(9) Consumption of purchased or acquired electricity, heat, steam, and cooling from renewable sources [MWh]	0	0
(10) The consumption of self-generated non-fuel renewable energy [MWh]	0	0
(11) Total renewable energy consumption [MWh] (sum of lines 8 to 10)	0	0
Share of renewable sources in total energy consumption [%]	0	0
Total energy consumption [MWh] (sum of lines 6, and 11)	**967**	**729**

2.2 Emissions

2.2.1 Emission factors

With a few exceptions the emission factors used in the following are from Klimakompasset [2]. Most of these are taken directly from EXIOBASE, or modified slightly to fit into a Danish context. For instance, the emission factors for diesel and petrol have been modified to account for the bio-fuel content in Denmark. The input for these modifications is often provided by the DEFRA database.

The exceptions are emission factors for electricity and heat. In these cases, emission factors reported by the utilities are used. These represent the specific situation for the local district heating network and the western electricity zone in Denmark, called DK1.

For the base fiscal year, emission factors for 2020 have been used, while the latest available emissions factors (2021) have been used for the year 2022-2023.

The emission factors for aviation includes the radiative forcing index (RFI).

A list of all emission factors is available in *A.4 Emission factors*.

2.2.2 Scope 1

The only source of scope 1 emissions in Nordic Computer is the diesel and petrol used in company cars. As the volume of fuel has not been registered, estimates have been calculated based average fuel prices for the fiscal years [9].

Table 3: Fuel consumed by company cars

	Base year 2019-2020		Reporting year 2022-2023	
	Average fuel price without VAT [DKK/l]	Volume of fuel [l]	Average fuel price without VAT [DKK/l]	Volume of fuel [l]
Diesel [liter]	8.25	24772	11.65	16031
Petrol [liter]	–	–	12.39	3112

2.2.3 Scope 2

Nordic Computer is supplied with energy in the form of electricity and district heating for its facilities. Measured values have been achieved from the utilities. Between the base year and the reporting year, two major changes have happened: Nordic Computer's facilities have been expanded, which mainly is relevant for the supply of heating, and a data center has been closed down, which is relevant for the consumption of electricity.

Table 4: District heating and electricity supplied to facilities

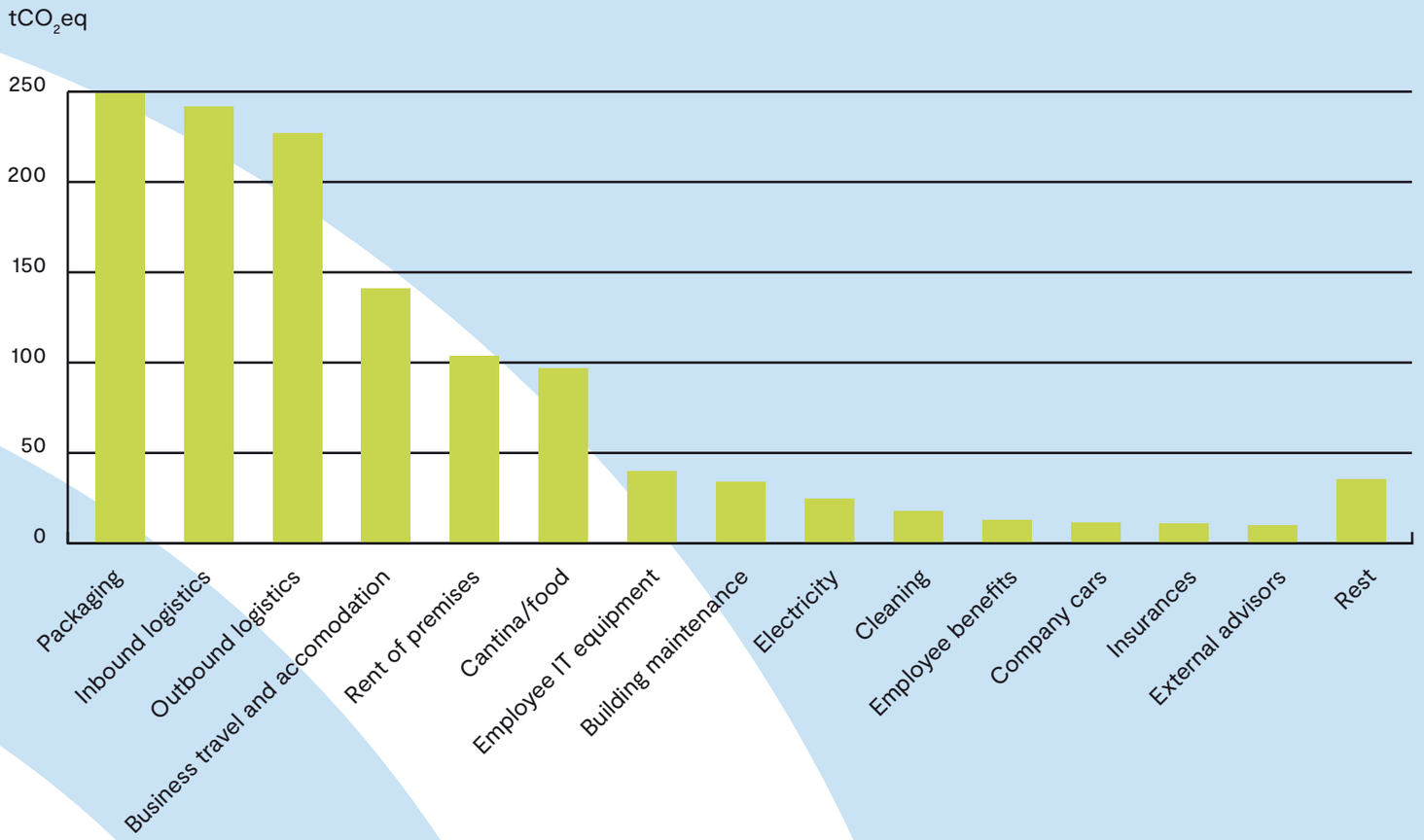
	Base year 2019-2020	Reporting year 2022-2023
District heating [MWh]	125	129
Electricity [MWh]	579	401

The consumption of heat has gone marginally up, while the consumption of electricity has been reduced significantly

2.2.4 Scope 3

The scope 3 emissions are completely dominated by the contributions from sold devices operating at customers' sites. Estimates carried out as described in *A.1. Estimation of use-phase emissions* are two orders of magnitude larger than any other emissions – see also Table 5 (next page). The remaining scope 3 emissions are dominated by packaging materials, inbound and outbound logistics, business travel and accommodation, rent of premises, and the cantina.

Figure 1: Drill down of all scope 3 contributions except the contribution from operations of sold devices for reporting year 2022-2023



The column labelled Rest is a sum of individual contributions smaller than 10 tCO_2eq. It covers emissions from purchases of hand tools, office supplies, courses and conferences, data expenses, building maintenance, heat, waste and water.

Most of these scope 3 contributions have been calculated from monetary values. The exceptions are inbound and outbound logistics, electricity, heat and waste. For the latter three, physical data have been gathered from the utilities and the recycling company. For logistics, the larger companies have delivered emission reports, while monetary measures have been used for the smaller players.

The results for scope 1, 2 and 3 are summarized in Table 5, and the relative distributions of scopes 1 and 2, and upstream and downstream scope 3 are shown in Figure 2 on page 15.

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Table 5: Scope 1, 2, 3 and total emissions

	Base year 2019-2020	2022-2023	2022-2023 / base year	Target 2030
Scope 1 GHG emissions	**tCO_2eq**	**tCO_2eq**	**%**	**%**
Gross Scope 1 GHG emissions	62	47	76%	50%
Percentage of Scope 1 GHG emissions from regulated emission trading schemes	0	0	-	-
Scope 2 GHG emissions				
Gross location-based Scope 2 GHG emissions	105	79	75%	50%
Gross market-based Scope 2 GHG emissions	0	0	-	-
Significant scope 3 GHG emissions				
Total Gross indirect (Scope 3) GHG emissions	$20.9 \cdot 10^3$	$21.3 \cdot 10^3$	101%	50%
1 Purchased goods and services	395	472	119%	-
2 Capital goods	10	34	340%	-
3 Fuel and energy-related activities (not included in Scope 1 or Scope 2)	53	39	74%	-
4 Upstream transportation and distribution	752	470	63%	50%
5 Waste generated in operations	1	0.4	40%	-
6 Business traveling	54	141	261%	-
7 Employee commuting	Out of scope*	Out of scope*	Out of scope*	Out of scope*
8 Upstream leased assets	70	104	149%	-
9 Downstream transportation	0	0	-	-
10 Processing of sold products	0	0	-	-
11 Use of sold products	$19.6 \cdot 10^3$	$20.0 \cdot 10^3$	102%	50%
12 End-of-life treatment of sold products	0**	0**	-	-
13 Downstream leased assets	0	0	-	-
14 Franchises	0	0	-	-
15 Investments	0	0	-	-
Total GHG emissions				
Total GHG emissions (location-based)	$21.1 \cdot 10^3$	$21.4 \cdot 10^3$	101%	50%
Total GHG emissions (market-based)	$21.0 \cdot 10^3$	$21.3 \cdot 10^3$	-	-

*See 1.1.3 Value chain scope on page 6, **See 1.2.2 Estimates and uncertainties on page 8.

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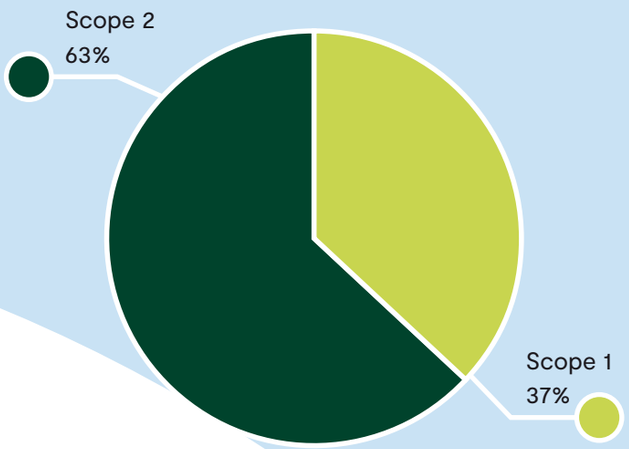
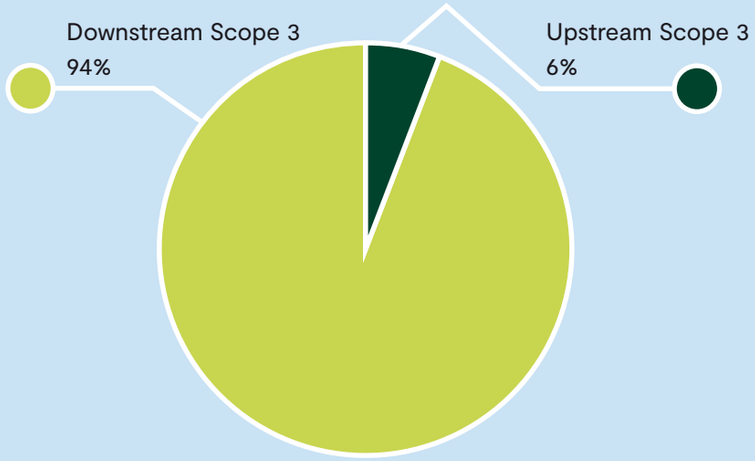
Figure 2: Relative distribution of scopes 1 and 2 emissions, and relative distribution of upstream and downstream scope 3 emissions for reporting year 2022-2023



Relative distribution of scopes 1 and 2 emissions



Relative distribution of upstream and downstream scope 3 emissions

2.2.5 Biogenic emissions

Emissions from known combustion or bio-degradation of biomass are not included in scopes 1, 2, and 3 above in accordance with the GHG Protocol. These biogenic emissions are coming from biofuel mixed into diesel and petrol used for the company cars. One logistic partner has also specified biogenic emissions from road transport.

Table 6: Biogenic emissions from combustion of biofuel mixed into diesel and petrol for reporting year 2022-2023

Biogenic emissions [tCO_2eq]		
From diesel for company car	**From petrol for company car**	**From logistic partners road transport**
2.7	0.48	0.03

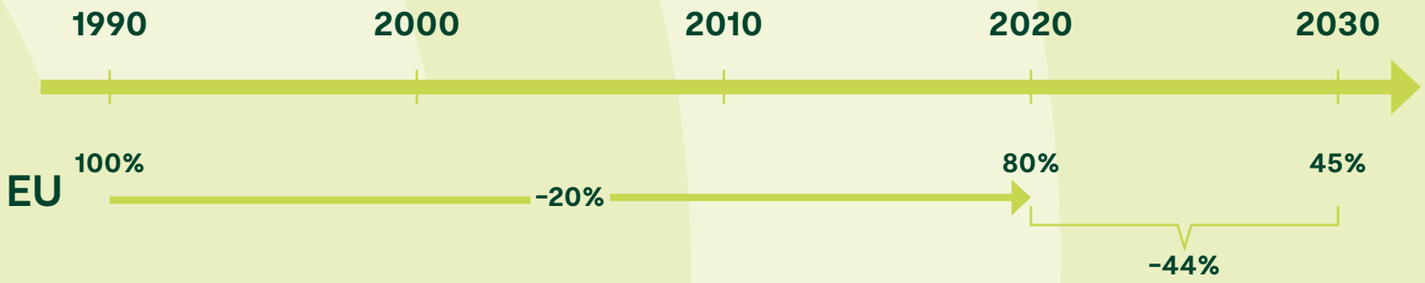
2.3 Emission reduction targets

Two primary sources have inspired the target setting of Nordic Computer. As the main part of Nordic Computer's value chain lies abroad, but inside Europe, EU's overall reduction targets qualifies as a relevant measuring stick. The other source is the SBTi[1]-approved reduction targets and pathway defined by the International Telecommunication Union (ITU) for the ICT industry.

EU has defined a target of 55% reduction of emissions in 2030 compared to 1990 levels [4], with an intermediate target of 20% reduction in 2020, and a remaining reduction of 35% between 2020 and 2030. If 2020 is defined as a base year, this corresponds to a reduction of 44% from 2020 to 2030 – see Figure 5.

[1] *Science Based Targets initiative*

Figure 3: EU's target of reducing emissions with 55% in 2030 relative to 1990, with an intermediate target of 20% reduction in 2020, corresponds to a reduction of 44%, when 2020 is used as base year.



"The 1.5°C-aligned and SBTi-approved target set by ITU [5] corresponds to an emission reduction of 45% from 2020 to 2030 – almost the same as the EU target. Any target as ambitious as these will qualify for a 1.5°C -compatible pathway.

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Going towards 2030 Nordic Computer expects an increased interest in reusing and extending the lifetime of data center equipment. Several factors will drive this development, one being the ambitions to reduce climate impact. At the same time, there will be more data center equipment in operation than ever before, which increases both the market size for lifetime extension in the service industry, as well as the number of available second-hand units in the market for the retail business. In other words, Nordic Computer is looking into a growing market.

This poses a challenge in relation to cutting absolute emissions. However, there are developments that pull in the other direction. The very ambitious plans for decarbonization of electricity and electrification of transport will help reduce the climate impact of transporting and operating the equipment.

Exactly how these opposing developments will balance out, only time will show. But if there has ever been a time for bold ambitions, it is now. Nordic Computer raises the bar and defines the following targets.

Table 7: 2030 targets for Nordic Computer

Emission reduction targets for Nordic Computer			
Base year: Fiscal year October 2019 → September 2020		Target year: Fiscal year October 2029 → September 2030	
	Baseline value [tCO_2eq]	Reduction factor	Target value [tCO_2eq]
Scope 1	62	50%	31
Scope 2	105	50%	53
Scope 3	$20.9 \cdot 10^3$	50%	$10.5 \cdot 10^3$
All scopes 1+2+3	$21.1 \cdot 10^3$	50%	$10.6 \cdot 10^3$

The 50% reduction target is applied separately on each of the scopes 1, 2 and 3. But it also applies separately for the two major scope 3 contributions, upstream transportation and distribution and use of sold products, as shown in Table 5.

Fiscal year 2019-2020 has been chosen as base year. Compared to the previous and following fiscal years this year is not an outlier – neither in relation to turnover or to any specific major events in the company or the value chain. However, the corona pandemic breakout happened during this period, and as a consequence employees started to work from home and business travel diminished. This reduced the scope 3 emissions from the cantina and from business travel considerably, which should be kept in mind when comparing emissions from later years to base year emissions.

As the dominant climate impacts in Nordic Computer's value chain happen in scope 3, outside Nordic Computer's own operations, it is evident that emission reductions will have to take place in close collaboration with the most relevant external stakeholders. These are suppliers of logistic services for freight, and customers, utilities, authorities and the political level when it comes to decarbonization of the electricity grid. This is described in Nordic Computer's internal *Climate policy*.

In addition, Nordic Computer will be able to use other internal policies to continue efforts to reduce overall environmental impacts. Obviously, this will affect scope 1 and 2, but scope 3 will also be affected. For instance, Nordic Computer's *Policy for logistics and handling* defines ways to reduce the amount of packaging materials, selection of slow freight options when time is not critical, and better utilization of capacity in every single shipment. Another example is the *Purchase policy* that defines a short freight distance as a priority in purchase, as well as selection of suppliers based on their ability and willingness to collaborate on reducing emissions. More details on policies are covered in *2.5 Policies*.

2.4 Transition plan

The business model of Nordic Computer is centered around maximizing utilization of existing equipment in data centers by selling tested second-hand devices and components, and by providing service and spare parts for devices, including those that are more than 3 to 5 years old. As already discussed in *1.2.2 Estimates and uncertainties* on page 8, a second-hand unit is part of an IT setup in a data center because of an operational need. Keeping an existing device in operation for longer is thus an effective way to displace the need for production of a new device.

This is important, as the production of an IT unit is an extremely resource- and energy-intensive process resulting in GHG emissions that are much larger than emissions from transport and handling of a second-hand unit. Nordic Computer's existing business model thus makes good sense from an overall climate perspective, and Nordic Computer is not excluded from EU Paris-aligned benchmarks.

With a target of a 50% reduction in emissions from 2020 to 2030 Nordic Computer is more ambitious than EU and ITU with their 1.5°C-compatible 45% reduction targets as described in *2.3 Emission reduction targets*. Nevertheless, Nordic Computer is already well underway with great results. Not only have emissions from scope 1 and 2 been reduced with about 25% since 2020, the scope 3 emissions from inbound and outbound logistics have also been reduced considerably despite an increased number of sold units.

For scope 1, reductions have been achieved by an increased focus on the need for driving, resulting in a shorter total distance travelled by company cars. This will continue to be in focus going forward. Switching from ICE vehicles to EVs when cars are replaced, is also a lever to reduce emissions in scope 1.

So far, reduction of scope 2 emissions has primarily happened through a reduction in the consumption of electricity. Reductions in the use of district heating and electricity may still be possible, although minimum requirements in relations to storage and test conditions for equipment will make this increasingly difficult. But the planned decarbonization of both electricity and district heating will continue to reduce scope 2 emissions going towards 2030. According to Denmark's Climate and Energy Outlook 2020, the renewables share of electricity consumption is expected to exceed 100% from 2027, while renewables share of district heating is expected to reach 79% in 2030 [6].

The latter demonstrates the huge effect of a combined effort in companies, municipalities, regions, countries and on the overall EU level. In March 2023, the EU agreed to increase its binding target to a minimum of 42.5% renewable energy in the overall EU energy mix by 2030 [7]. With the electricity grid being the easiest part of the total energy system to decarbonize, this will lead to rapidly decreasing carbon intensities in EU in general. This is crucially important for decreasing Nordic Computer's scope 3 emissions, as the dominant part is due to the electricity consumed by devices sold to customers.

Freight is the other hurdle in relation to scope 3. The ongoing electrification of transport will help reducing the emissions – especially from road transport within Europe. E-fuels for air transport is also expected to make some landmarks before 2030, although this is much more uncertain. But Nordic Computer is not a bystander when it comes to freight emissions. By maximizing the utilization of the capacity of individual shipments, actively choosing the freight operator, the mode of transport, and the allowed transit times Nordic Computer has already demonstrated a significant reduction of the scope 3 emissions from freight. These efforts will continue going forward.

Nordic computer does not own its facilities and the only major source of locked-in emissions is the stock of second-hand devices and components. These will give rise to emissions when sold and put into operation. A crude estimate of the size of those emission is presented in *A.3 Estimation of locked-in emissions on stock*. The decreasing carbon intensity will reduce these locked-in emissions over time.

Time and efforts are Nordic Computer's primary investment in reducing climate impact. Apart from being almost a sport for employees, the initiatives often go hand in hand with cost reductions. For instance, becoming aware of shipments that are not urgent allows Nordic Computer to select slower modes of transport. This not only lowers the emissions but also the cost.

This transition plan is approved by management and the board of Nordic Computer.

2.5 Policies

Nordic Computer has three policies related to climate change mitigation and energy efficiency. Climate change adaptation and deployment of renewable energy are topics not yet covered. All policies are owned by the CEO who is ultimately responsible for the implementation and maintenance of the policies. In daily operation, the implementation of a policy, or part of a policy, is delegated to the manager who is responsible for the business area covered.

2.5.1 Climate policy

Climate policy covers all climate mitigation activities in the value chain of Nordic Computer. Relevant topics are delegated to be covered in details in *Policy for logistics and handling* and *Purchase policy*. This leaves the subjects of energy efficiency in own operations, training of employees, and collaboration with external stakeholders, other than logistic companies and sellers of equipment, to be covered in full in *Climate policy*.

The Importance of increased energy efficiency has been an important subject on the public agenda for decades, probably as a consequence of the oil crisis in back the 1970's. This makes the awareness high among Nordic Computer's employees. Nevertheless, it is important that energy efficiency reviews take place regularly. This is described in *Climate Policy*. In these reviews, participants take a critical look at the overall picture of where energy is consumed or wasted in the company in order to spot potential for improving the energy efficiency. The section on training of employees defines the expectations in relation to creating and maintaining awareness about climate change mitigation in the organization. It emphasizes the importance of introducing new employees to Nordic Computer's mitigation targets and efforts, and the continuous strive to reduce emissions internally as well as in the value chain. The importance of management demonstrating an unambiguous prioritization of mitigation activities is emphasized, as well as informal and dynamic knowledge sharing among employees.

Reducing scope 3 emissions from electricity consumed by sold devices requires a reduction of the carbon intensity. Fortunately, this is exactly where the ambition level is very high, at least in the EU. However, real change requires more than promises, which is why *Climate policy* emphasizes that Nordic Computer should not waste an opportunity to confirm and emphasize towards authorities, utilities and the political level just how important it is, that the decarbonization ambitions are actually met or surpassed.

2.5.2 Policy for logistics and handling

The scope for *Policy for logistics and handling* is all activities related to the selection of logistic companies, ordering of shipments, packing, sending, receiving and unpacking items. The selection of preferred logistic partners in Nordic Computer is a compromise amongst a number of criteria. One of these criteria is the climate profile of the shipments offered, along with the flexibility to choose longer delivery times with a reduced climate impact. The latter should be used whenever urgency is not an issue.
The policy also describes how optimization of packaging can reduce the amount of packaging material used at the same time as the utilized capacity in each shipment is maximized. The latter will reduce the overall number of shipments and thereby the climate impact. Reuse of packaging materials is also a priority that reduces waste and the need for new materials, which also contributes to lower climate impacts.

2.5.3 Purchase policy

Purchase policy encompasses all purchases within Nordic Computer. Not unlike many other companies, the purchase department has a big impact on the total emissions of Nordic Computer. It is the purchase department that decides which items to buy, where to buy them and how they reach Nordic Computer. This is covered in general in *Purchase policy*. However, the purchase of second-hand devices is given special attention in the policy, as the accumulated impact of all other purchases vanish in comparison. While the freight itself is covered in *Policy for logistics and handling*, the location of a device at time of purchase is not. As slow shipments and short distances result in lower emissions, *Purchase policy* defines nearby locations as a priority to reduce the distance and allowing for a lower freight speed.

2.6 Actions

This section describes the major climate-related initiatives Nordic Computer has implemented since the base fiscal year 2019-2020, as well as the planned activities in order to reach the defined targets in 2030.

2.6.1 Implemented actions

Employee training: Employees in Nordic Computer have participated in a company-wide training course on the triple bottom line, also known as 3P or People, Profit and Planet. The basic idea is to cultivate the company mindset that all decisions must be based on an evaluation of the impacts on people, the environment and the climate, on par with a traditional economic judgement. As an integrated part of the training course, employees were taught to use kaizen boards as a tool to facilitate such multidimensional decisions. The effect of this initiative is very hard to measure, but it adds to the foundation for all other initiatives.

Slow freight: By deliberately choosing slow freight options when urgency is not an issue, Nordic Computer has been able to reduce scope 3 emissions related to freight. As simple as this might seem, it requires changes in internal procedures and a confrontation of habits in the market. The challenge is to know when a shipment is not urgent as the default mode of operation is to expect that everything is urgent. Questions have to be posed, and surprised customers will have to actually consider whether a shipment is urgent or not.

Maximum utilization of freight capacity: A way to reduce the number of shipments is to include more in each shipment. As volume scales as radius to the third power, while surface area only scales as radius to the second power, this also allows for an improvement of the ratio between goods and packaging material. The major challenges to implement this have been a need for better planning of shipments and the development of new ways to package larger shipments without compromising on the protection of the units. Nordic Computer has made successful improvements in relation to both of these challenges.

Despite the low-tech nature of the two freight initiatives above, the surprising result is that Nordic Computer has managed to reduce the scope 3 emissions from freight with 37% since the base fiscal year. This has happened simultaneously with an 10% increase in the number of units shipped.

Closure of hosting center: Until 2022 Nordic Computer operated a hosting center as a legacy of earlier activities. The center did not require much attention, but utilization of the hosting capacity was low and the electricity consumption for running the center and the associated cooling was considerable. Consequently, it was decided to close the center.

Switching off test equipment: Professional IT equipment is designed to be operating continuously. The software setup consists of layers of software running on top of each other. This means that the start-up procedures can require quite some interaction with a sequence of complicated steps that have to be carried out over a number of devices. The rule is continuous operation while start up is an exception nothing like flicking a switch. Nevertheless, Nordic Computer has been evaluating the options to lower the power consumption in the test center. The result is that part of the test setup that is not used on a daily basis, is switched off when not in use.

These two electricity-saving actions have led to a reduction of the electricity consumption by around 30% corresponding to a reduction in scope 2 emissions by 25%.

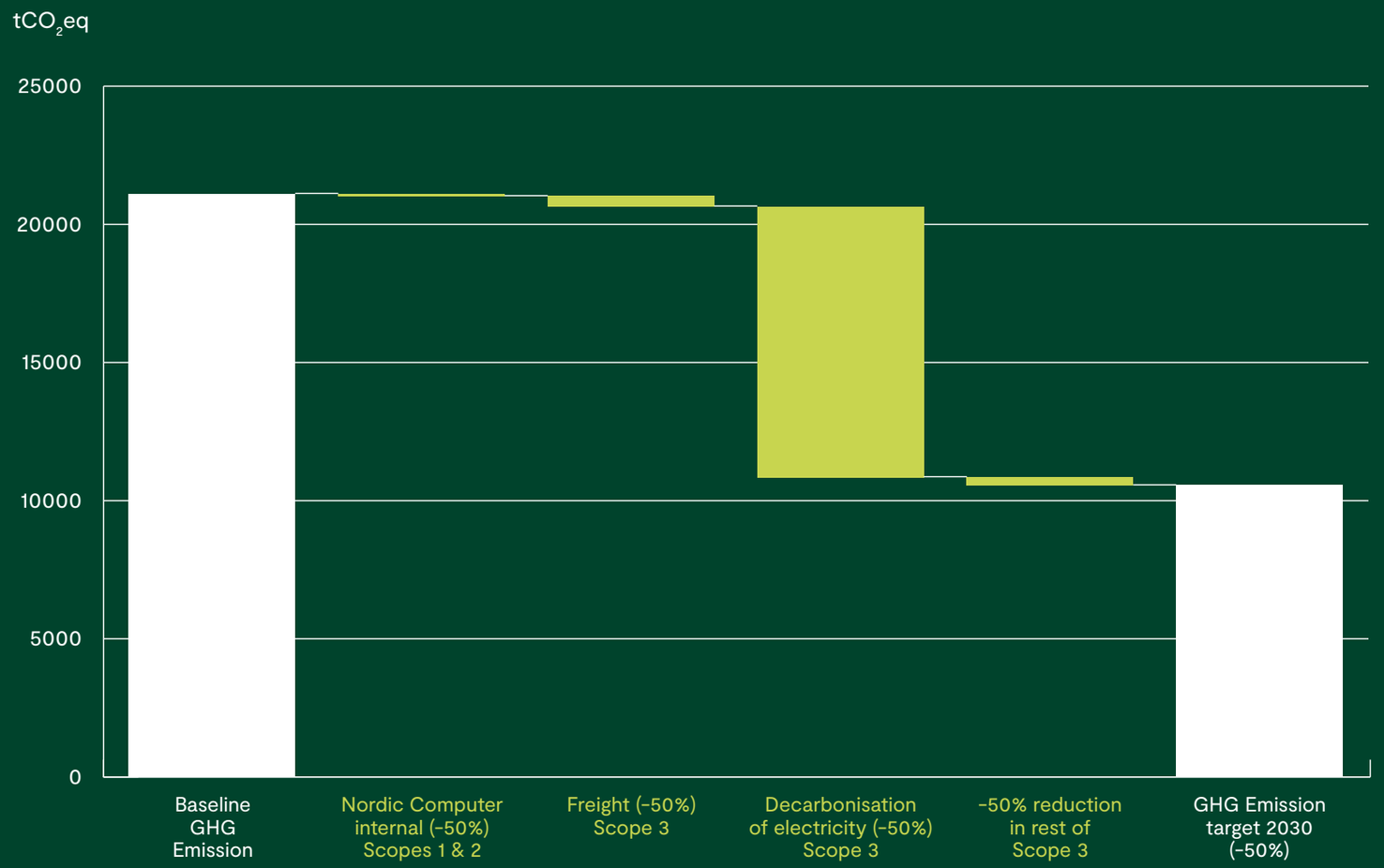
2.6.2 Planned actions

Figure 4 depicts the path towards the 50% reduction target in 2030. It is evident that whatever Nordic Computer does internally, and in collaboration with its suppliers, reaching the 2030 target is ultimately depending on a reduction of the carbon intensity of the electricity used in their customers' data centers.

This does not mean that Nordic Computer will adopt a wait-and-see attitude. As all emission reductions matter, Nordic Computer will continue the strive to reduce its internal scope 1 and 2 emissions and its scope 3 emissions through suppliers. This is a continuously ongoing process with lots of small steps.

Decision to phase out ICE vehicles: In the coming year, a plan for phasing out ICE vehicles in the company will be decided upon. For most of the cars, this is a non-issue and these will most likely not be replaced by ICE cars again, when the time comes. For the service business, it is crucial that their cars are available uninterruptedly and can reach all customers in one go. It is expected that the alternatives to ICE cars will provide that ability in the years to come.

Figure 4: Emission reduction target for 2030 along with the distribution of reductions to reach the target



Appendix

A.1 Estimation of use-phase emissions

For a specific device, it is possible to calculate the use-phase emission given the typical annual energy consumption (TEC) of the device, the associated carbon intensity of the electricity at location of use, and the period the device will be operating.

Summing up these scope 3 contributions from all devices sold in a specific year will provide the total climate impact of sold products in that year (category 11 in Table 5). It is worth emphasizing that the calculation has to include the use-phase emissions for the entire use phase of a device, not only for the year it was sold.

Some OEMs provide data for TEC, but for many devices it is not part of standard specifications. Instead, a qualified estimate on an average value for each device type is applied. For some devices types, like servers, TEC is often published. This qualifies the determination of the average. For other device types, the average has to rely on power ratings of devices and knowledge about typical use cases.

The destination country for each sold device is known, which implies that the carbon intensity can be looked up for the given year [8]. If data for the relevant year were not yet available, data for the latest year available have been used.

As argued in *1.2.2 Estimates and uncertainties* and in *A.2 Use-phase period of second-hand devices*, the use-phase period for a second-hand device is comparable to the initial use-phase period of a new device. Since OEMs typically assume a use-phase period between 3 and 5 years for a new device, a 4-year use-phase period has been assumed in these calculations.

With these assumptions and estimates the following results have been obtained.

Table 8: Estimate of emissions from customers' use of sold products

	Base fiscal year 2019-2020	Fiscal year 2022-2023
Emissions from use of sold products [tCO_2eq]	19.600	20.000

While the numbers turn out to be relatively close, they cover over a number of changes from base to reporting year. The number of sold devices were 10% higher in 2022-2023 and for some device types sale has shifted towards higher-consumption devices, like higher capacity memory modules. At the same time the carbon intensity has decreased in general.

A.2 Use-phase period of second-hand devices

More as a rule than an exception professional IT equipment is replaced prematurely for non-technical reasons. Often new equipment is coming with an attached service agreement that runs out after three to five years. If it is possible to extend the service agreement at all, it is extremely expensive to do so. As a consequence, many operators replace equipment when the service contract runs out. In addition, other factors like habits, a desire to have the latest new equipment, and early replacement seen as a mitigation of the risk of failures, probably also play an important role. The result is, that a lot of perfect functioning equipment is either scrapped or enters the second-hand market.

There are four primary drivers for Nordic Computer's customers to buy second-hand IT equipment. They are, in no specific order:

1. Climate impact – customers want to lower their impact
2. Price – second-hand equipment is cheaper
3. Better service – one service partner instead of a number of service contracts with different OEMs
4. Fit into existing setup – an older device is needed as it has to fit into an existing setup

None of these drivers incentivize shorter use-phase periods than for a new device, very much on the contrary. A customer prioritizing a low climate impact will be keen to keep existing equipment running for as long as possible. If low cost is a driver, it doesn't make sense to change often. And if a customer has a service contract with Nordic Computer, it is most likely because stability, convenience, easy access to spare parts, and a quick service response is a priority over new devices. Finally, a customer buying second-hand equipment to keep an existing setup running is already prioritizing lifetime extension of an existing setup.

The general picture is that new equipment typically enters the second-hand market after 3 to 5 years. Operators of second-hand equipment do not have the same urge to replace equipment just to have it replaced. In conclusion, second-hand equipment will often have a use-phase period as long as for a new device.

A.3 Estimation of locked-in emissions on stock

The only locked-in emissions for Nordic Computer are caused by the devices on stock that are going to emit GHG during their later use phase. A crude estimate of the size of the locked-in emissions will thus follow the same approach as described in *A.1 Estimation of use-phase emissions*. The only differences, apart from a different set of devices, is that assumptions will have to be made about the time of sale and the destination countries.

To make things simple, it is assumed that all devices on stock are sold instantaneously and that the destination countries follow the same distribution as the devices sold in the given year. The easiest way to do the latter in practice, is to calculate the weighted average of the emission factor for a given device type from the distribution of sold products. This average is then used for all devices of the given type on stock.

This approach results in estimated locked-in emissions of $19.5 \cdot 10^3$ tCO_2eq.

A.4 Emission factors

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Topic	Scope 1	Scope 2	Scope 3	Biogenic	Year	Source
Fuels and transport						
Petrol (car & van)	2.17 $kgCO_2eq/l$		0.597 $kgCO_2eq/l$	0.152 $kgCO_2eq/l$	2020	Klimakompasset
Petrol (car & van)	2.17 $kgCO_2eq/l$		0.584 $kgCO_2eq/l$	0.152 $kgCO_2eq/l$	2021	Klimakompasset
Diesel (car & van)	2.51 $kgCO_2eq/l$		0.613 $kgCO_2eq/l$	0.172 $kgCO_2eq/l$	2020	Klimakompasset
Diesel (car & van)	2.51 $kgCO_2eq/l$		0.609 $kgCO_2eq/l$	0.171 $kgCO_2eq/l$	2021	Klimakompasset
Diesel (truck)			0.0663 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Diesel (truck)			0.1673 $kgCO_2eq/t*km$	0.0076 $kgCO_2eq/t*km$	2020	Klimakompasset
Diesel (truck)			0.1659 $kgCO_2eq/t*km$	0.0075 $kgCO_2eq/t*km$	2021	Klimakompasset
Aviation, jet fuel (incl. RFI)			0.2474 $kgCO_2eq/DKK$		2020	Klimakompasset
Aviation, jet fuel (incl. RFI)			1.130 $kgCO_2eq/t*km$		2020	DEFRA (2021)
Ship, marine fuel oil			0.526 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Ship, marine fuel oil			0.0198 $kgCO_2eq/t*km$		2020	DEFRA (2021)
Train			0.113 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Energy						
Electricity		154.3 $kgCO_2eq/MW$			2020	Energinet
Electricity			61.9 $kgCO_2eq/MW$		2020	Klimakompasset
Electricity		162.5 $kgCO_2eq/MW$			2022	Energinet
Electricity			62.6 $kgCO_2eq/MW$		2021	Klimakompasset
District heating		122.5 $kgCO_2eq/MW$			2020	Aalborg Forsyning
District heating			18 $kgCO_2eq/MW$		2020	Klimakompasset
District heating		110.07 $kgCO_2eq/MW$			2022	Aalborg Forsyning
District heating			18 $kgCO_2eq/MW$		2021	Klimakompasset
Travel, education and events						
Training courses and education			0.0625 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Hotel and restaurant			0.0813 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Transport vehicles, general			0.100 $kgCO_2eq/DKK$		2020	Klimakompasset
Events, team building			0.0324 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)

A.4 Emission factors

Continued from previous page

Topic	Scope 1	Scope 2	Scope 3	Biogenic	Year	Source
Materials						
Wood (new)			0.124 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Paper and cardboard (recycled)			0.0247 $kgCO_2eq/DKK$		2020	Klimakompasset
Paper and cardboard (new)			0.0605 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Plastic: Nylon, PC (new)			0.484 $kgCO_2eq/DKK$		2020	Klimakompasset
Textile			0.0920 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Steel and iron (new)			0.667 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Metal components			0.2100 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Supplies						
Office electronics			0.0625 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Office supplies			0.0813 $kgCO_2eq/DKK$		2020	Klimakompasset
Food, general			0.100 $kgCO_2eq/DKK$		2020	Klimakompasset
IT services / software			0.0324 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Premises						
Rent of premises			0.0405 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Water consumption			0.0550 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Cleaning			0.0372 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Building maintenance			0.0823 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Administration						
Insurances			0.0187 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
External consultancy			0.0372 $kgCO_2eq/DKK$		2020	EXIOBASE v3.3.16b2 (2020)
Waste						
Electronics, landfilled			0.0765 $kgCO_2eq/kg$		2020	EXIOBASE v3.3.16b2 (2020)
Lead, landfill			0.0765 $kgCO_2eq/kg$		2020	EXIOBASE v3.3.16b2 (2020)
Steel and iron, landfill			0.0765 $kgCO_2eq/kg$		2020	EXIOBASE v3.3.16b2 (2020)

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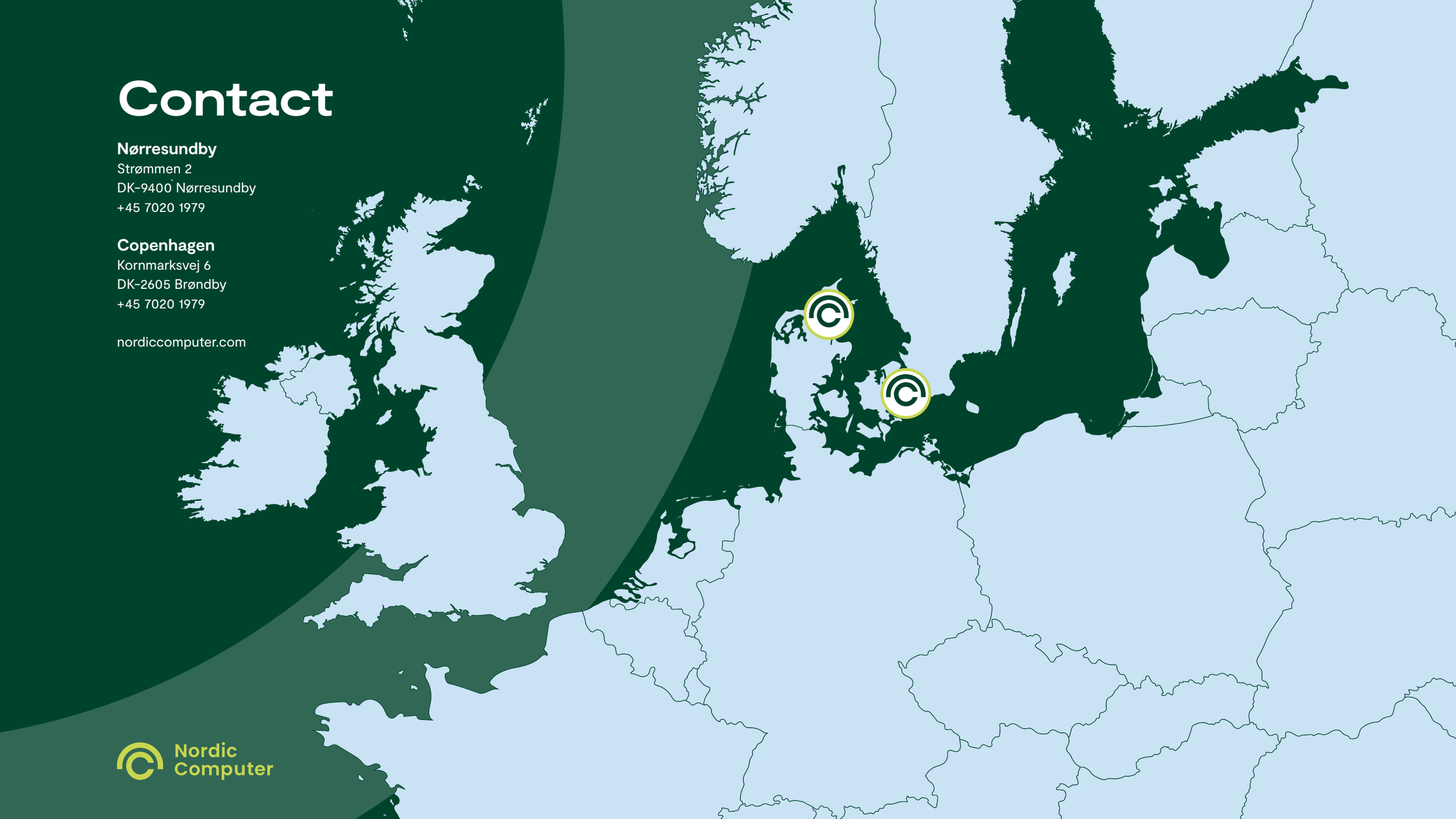

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