Appendices

Appendix 10: Environmental figures

Note

As outlined in the Combined Independent Auditor's Report and assurance report (p. 186), this Appendix is part of the assurance scope of EY's assurance procedures over KPN's 2023 sustainability information. The targets KPN has set related to resource use and circular economy, are not required by legislation. However, these targets are set in order to avoid resource depletion, circulate products and materials (at their highest value) and eliminate waste and pollution.

Scope and calculation methodologies

Scope and calculation of reported emissions

The report includes reporting on CO_2e emissions in the chapter Our performance: Environmental performance (p. 50) and this Appendix. Avoided emissions enabled for KPN customers using our ICT services is estimated at 311 kTon CO_2e and 110 tons of PM_{10}. KPN enables teleworking to its customers by providing an internet connection. See Appendix 10 for further information on our methodology to measure direct emissions (scope 1), indirect emissions (scope 2), value chain emissions (scope 3) and estimated avoided emissions enabled for KPN customers. Scope 1 and 2 are reported in line with the GHG Protocol. Scope 3 is as much as possible based on the information available in line with the GHG Protocol.

We identified in 2023 that the Scope 3 emissions were not completely reported in previous years for category 11 and 13 for the B2B business as no reliable data is available. For returned products sold (category 12) the estimated emissions are included in CAT 1 and 9 based on the spend method as reliable process based data is not available. Emissions of not collected products are not included as reliable data is not available. Scope 3 emissions from Investments (category 15) have not been reported for equity investments smaller or equal to 50% as Scope 1 and 2 emissions and EEIO data of most of these investments are not available. In 2023 we updated the reporting criteria to reflect this. We are working on improving the data quality of reported scope 3 emissions.

KPN uses the operational control approach when reporting CO_2e emissions. Carbon dioxide (CO_2e) is the most relevant GHG for KPN. Where available, CH_4 and N_2O are taken into consideration in the GHG emissions information. KPN applies the CO_2e emission factors from co2emissiefactoren.nl as published in the year of reporting. The term 'CO_2e emissions' is used to refer to the GHG emissions reported on. These are stated in CO_2e equivalents.

Scope 1 – Direct emissions

- Fuel consumption of the lease vehicle fleet (employees' passenger vehicles and commercial vehicles)
- Heating of buildings (gas)
- Consumption of coolants for air conditioning and/or cooling
- Fuel consumption of emergency power generators

Scope 2 – Indirect emissions

- Electricity consumption of the fixed and mobile networks, data centers, offices and shops
- District heating
- District cooling

The accuracy of the electricity consumption data is a key factor in the reliability of the CO_2e emissions calculations. In the data-collection process, a number of factors affect the accuracy of the collected data. In general, data originating from direct measurements and recordings or invoices, including measurements from third parties, are the most accurate.

The net Scope 2 emissions are market-based and calculated based on the well-to-wheel (WTW) CO_2e emissions factors for renewable electricity. For renewables (wind, biomass, solar), the WTW values are all zero. The CO_2e emissions of the well-to-tank (WTT) phase are accounted for in our Scope 3 emissions (category 3 – fuel and energy-related activities). Both the location-based and market-based Scope 2 emissions can be found in Our performance: Environmental performance (p. 50).

Electricity providers estimate the consumption for part of our network operations - as monthly meter readings are not always conducted - so there is some uncertainty around the accuracy and completeness of our energy consumption. To improve the accuracy, transparency and reliability of our energy data, we are migrating to remote readable meters, reviewing administrative processes and updating profiles with our electricity providers.

Scope 3 – Other indirect emissions:

- Emissions in the upstream value chain (during the production phase of products, services and equipment at suppliers)
- Emissions in the downstream value chain (during the use phase, including recycling and disposal of the products, services and equipment)

The results are presented in Our performance: Environmental performance (p. 50). We have used two main methodologies to calculate Scope 3 emissions: the spend-based method, which takes procurement data and calculates the emissions within an environmentally extended input output (EEIO) model to

Appendices

assess the emissions, and the process-based method, which uses quantity-based data to evaluate the emissions associated with specific activities, e.g. kWh of energy usage or quantity of materials purchased to manufacture goods. In both cases, we used actual data covering January to December.

CO_2e emissions of CAT5 waste could not be calculated with the spend-based approach. Spend on waste services is integrated with spend of service partners. Hence, the CO_2e emissions are not disclosed separately, but included in CAT1 and CAT2. B2B downstream emissions are not yet included in the reported CAT 11 and 13 figures.

Scope 3 emissions restated

Each year, all parameters used in the Scope 3 calculations are checked whether new values are available or not. We updated the spend definition from purchase order data to invoice data, refined the allocation to spend based categories and restated for these effects. We have corrected the application of industry specific emission factors. Also we learned our participation Reggefiber was not properly included in the calculations, which has been corrected whereby the figures of Reggefiber are included as of the beginning of base year 2014. We identified in 2023 that the Scope 3 emissions were not completely reported in previous years for category 11 and 13 for the B2B business as no reliable data is available. For returned products sold (category 12) the estimated emissions are included in CAT 1 and 9 based on the spend method as reliable process based data is not available. Emissions of not collected products are not included as reliable data is not available. Scope 3 emissions from Investments (category 15) have not been reported for equity investments smaller or equal to 50% as Scope 1 and 2 emissions and EEIO data of most of these investments are not available. In 2023 we updated the reporting criteria to reflect this. We are working on improving the data quality of reported scope 3 emissions.

In July 2023 the GSMA, in cooperation with GeSI and ITU, published the Scope 3 Guidance for Telecom Operators. Our conclusion for this reporting year was that no material changes were required.

We updated the coverage to 99% of all KPN business units and subsidiaries (based on Opex/Capex) by including Inspark Holding, Inspark B.V. and Solcon B.V. Given ongoing updates of external guidelines we anticipate further enhancements will remain relevant in future reporting years.

We determined that the differences with previously reported Scope 3 emissions are considered significant enough to make restatements. For example, the Scope 3 emissions over 2022 are 30% higher than the emissions previously reported. We have restated all three previous years, including the base year 2014 and 2015. Please refer to table 7 for the Scope 3 emissions and the effect of the restatement.

The following table describes the calculation of emission methods and coverage.

Scope CO_2e	Standard	Coverage	Approach	Reported	Assurance	Sources and additional information
Scope 1	GHG Protocol Scope 1 Guidance	98% of all KPN business units and subsidiaries (Opex/FTE)	Operational control approach	Gross and Net Scope 1 emissions	Reasonable	co2emissiefactoren.nl January 2023 Gold standard and REDD+ forest compensation projects
Scope 2	GHG Protocol Scope 2 Guidance	98% of all KPN business units and subsidiaries (Opex/FTE)	Operational control approach	Market- and Location-based Scope 2 emissions	Reasonable	co2emissiefactoren.nl January 2023 100% renewable electricity (wind farms)
Scope 3 Cat: 1, 2, 9	GHG Protocol Scope 3 Guidance	99% of all KPN business units and subsidiaries (Opex/Capex)	Spend-based (Environmentally Extended Input Output data (EEIO) approach)	Scope 3 emissions	Limited	UK DEFRA 2011 (Indirect emissions from the supply chain) and CBS Statline The EEIO-factors are corrected for inflation.
Scope 3 Cat: 3, 6, 7, 11, 13	GHG Protocol Scope 3 Guidance	99% of all KPN business units and subsidiaries (Opex/Capex)	Process- and activity-based	Scope 3 emissions	Limited	co2emissiefactoren.nl January 2023 Emissions Cat 11 and 13 of used electricity by B2C customers with location based scope 2 factor (grid mix). B2B customer emissions not yet included and are being assessed.

Appendices

Estimated avoided emissions enabled for KPN customers

The estimated avoided emissions enabled for KPN customers are based on specific calculations. The results are presented in Our performance: Environmental performance (p. 50) and in Table 9 in this Appendix.

Estimated avoided emissions	KPN methodology	Source external information
Avoided travel through teleworking enabled by KPN network	The avoided CO_2e emissions enabled for KPN customers are estimated based on the following main assumptions • Market share of broadband subscribers (limited change vs previous year) • % Teleworkers: 41.8% (previous year: 41%) • Average working hours at home per week per teleworker: 7.4 (previous year: 15.5) • % Travel with car: 69.8% (previous year: 52.7%)	Publicly available statistics and reports from Statistics Netherlands (CBS), Kennisinstituut voor Mobiliteitsbeleid (KIM), ECN, Netbeheer Nederland, Milieu Centraal, RVO, Telecompaper and other sources
PM_{10} emissions	The avoided PM_{10} emissions enabled for KPN customers are estimated based on the following main assumptions. • Particulate matter per car kilometer: 0.00002 kg/km (previous year: Ecoinvent 3.0 - 0.00043 kg/km. CBS – 0.00002 kg/km) • Particulate matter per public transport kilometer : 0.00010 kg/km (previous year: Ecoinvent 3.0 - 0.00028 kg/km. CBS – 0.00010 kg/km) • Particulate matter per kWh: 0.00025 kg/kWh • Particulate matter per kWh off-shore wind: 0.00005 kg/kWh • Particulate matter per m3 – heating: 0.00170 kg/m3	Ecoinvent 3.0. CBS (restate 2020-2022 and update 2023)

All parameters are reviewed on annual basis by KPN for updates. In case of changes or new services are introduced in estimation methods, we involve external consultants. In the PM_{10} calculation for 2023, we made a more accurate estimation of car and public transport by using CBS sources, and restated PM_{10} of 2020-2022.

For the parameters saved on office space and the extra electricity and gas consumption at home when working at home (rebound effect), the values used in the teleworking savings calculation are based on averages. We use the average between the lowest and highest reported value in reports and research. Cost savings are based on the average fuel, electricity and gas prices published by Statistics Netherlands (CBS) and Milieu Centraal.

With this metric we aim to present the impact of teleworking, which will vary from year to year. The KPI is partially dependent on assumptions which can not be influenced by KPN, such as % teleworkers, average working hours at home and % travel by car. Therefore, we have chosen not to set a target for this metric, but follow year on year trends.

Scope and calculations for KPI % reuse and recycling

The KPI % reuse and recycling covers the outflow of KPN materials and waste destined to be reused, recycled, incinerated or landfilled. This means the scope includes, but is not limited to:

- Regular waste streams from KPN offices and operations
- Obsolete (end-of-use) equipment and inventory coming from KPN operations, offices and shops
- Obsolete (end-of-use) customer-premises equipment and mobile phones that are collected via KPN return programs and processed by KPN or on KPN's behalf

The scope therefore does not include obsolete (end-of-use) customer-premises equipment, mobile phones and related packaging that are not collected via KPN return programs. In this case, the customer is responsible for disposing of this in accordance with the law, regulations and local waste-collection procedures.

The outflow of materials and waste is reported in table 10. The following disposal methods are reported with reference to GRI-306-2: reuse (i), recycling (ii, iii), incineration (iv, v) and landfill (vii). The other disposal methods, i.e. deep well injection (vi), on-site storage (viii) and other (ix), do not apply. The waste disposal method is mostly determined by selected service partners and their waste-disposal contractor, which are challenged on methods and performance. As part of our circular ambitions, we promote reuse over recycling and incineration with energy recovery over landfill to minimize ecological impacts. Service partners report the waste volumes (tons) on a monthly or quarterly basis. These volumes are allocated to the four types of disposal method based on processing rates (%) from direct information or public information. The KPI % reuse and recycling is then calculated by dividing the tons reuse and recycling by the total volume. We restated the values in table 10 for 2020-2022 due to incomplete data in fiber roll-out domain.

Appendices

Scope and calculations for Circular Transition Indicator

The scope of the KPN Circularity Indicator for 2023 for consumer market is as follows:

- Residential: KPN owned customer premise equipment for TV (set-top boxes, remote controls, Digitenne) and internet (modems, routers, media converters)
- Mobile: SIM-cards
- Packaging: KPN specific packaging added to the consumer market products by KPN (logistics partners).

KPN's Circular Transition Indicator is based on the methodology of the Circular Transition Indicator (CTI) framework of the World Business Council for Sustainable Development (WBCSD). The calculations include the inflow, and outflow indicators under the "close the loop" indicator set, and the recovery type indicator under the "optimize the loop" indicator set of the CTI framework. The outflow indicator of the CTI framework is adapted by only using the actual recovery rate to determine the outflow circularity and the aggregated circularity performance. The potential recovery is used for internal reference and used in calculating the aggregate circularity performance.

This metric currently covers approximately 70% of the spend on new products of the consumer market segment in 2023, excluding mobile handsets and one-off promotional products.

Collected equipment

The return rate for modems, Digitenne tuners and TV set-top boxes is based on the total number of returns (numerator) and the total number send and delivered to customers minus the delta installed base of internet and tv (denominator) in the reporting year.

Scope and calculations for B2B services prepared for circularity

The scope of this metric is set to B2B services in target portfolio which include hardware (i.c. customer premise equipment and SIM-cards) owned by KPN or a third party on behalf of KPN. The metric consists of substantiating the following three pillars:

1. Contract - circular clauses in vendor contracts: the Supplier Code of Conduct, circular requirements for products and requirements on outflow of obsolete equipment, products and waste for service providers.
2. Process - circular process flows with product collection (where viable) and sustainable reuse and recycling.
3. Measuring - measuring (circular) inflow and (circular) outflow of the hardware. The measures follows the same principles as described above ("calculations for Circular Transition Indicator").

Appendices

Environmental figures

Table 1: Energy consumption (in PJ)

	2023	2022	2021	2020	2010 (base year)
The Netherlands	1.869	2.036	2.156	2.444	3.662
KPN non-NL Entities	-	-	-	-	0.217
KPN Group	**1.869**	**2.036**	**2.156**	**2.444**	**3.879**
Energy directly consumed	0.169	0.207	0.199	0.246	-
Energy indirectly consumed	1.700	1.829	1.958	2.199	-
KPN Group	**1.869**	**2.036**	**2.156**	**2.444**	**3.879**
% Reduction compared to base year	**-52%**	**-48%**	**-44%**	**-37%**	

Table 2: Electricity consumption (in GWh)

	Target 2030 Compared to base year	Target 2024 Compared to base year	2023	2022	2021	2020	2010
Network			426	456	480	548	697
Offices & Shops			20	22	22	24	72
KPN Group	**400**	**445**	**446**	**478**	**502**	**573**	**769**
% Reduction compared to base year	**-48%**	**-42%**	**-42%**	**-38%**	**-35%**	**-26%**	

Table 3: Fuel consumption, lease vehicle fleet

	Unit	2023	2022	2021	2020	2010 base year
Petrol, diesel and LPG	1,000 liter	2,054	3,110	3,389	4,311	16,597
% Reduction compared to base year		**-88%**	**-81%**	**-80%**	**-74%**	
CNG	kg	339	392	312	198	0
Electric	MWh	7,032	3,847	2,399	1,891	0

Table 4: Other Energy consumption

	Unit	2023	2022	2021	2020
Natural gas	1,000 m3	1,770	2,089	2,361	2,746
Heating purchased	GJ	17,114	24,466	28,068	23,531
Cooling purchased	GJ	76,429	84,041	97,711	97,191
Diesel for emergency power generators	1,000 liter	70	91	107	140

Appendices

Table 5: CO_2e emissions own operations Scope 1 and 2 (in kTon)[1]

	Target 2024-2050	2023	2022	2021	2020	2010 base year
Scope 1 KPN NL	0	0	0	0	0	58.8
Scope 2 KPN NL	0	0	0	0	0	35.9
KPN non-NL entities	0	0	0	0	0	25.0
KPN Group	**0**	**0**	**0**	**0**	**0**	**119.7**

1 The reported emissions in the table are net scope 1 and scope 2 market based. In the table in section CO_2e emission and energy management (p. 52) both net and gross scope 1 emissions are reported as well as the location and market based scope 2 emissions

Table 6: Energy efficiency and Carbon intensity indicators target

	target 2024	2023	2022	2021	2020	2010
Ton CO2 per Gb/s KPN Netherlands (2010=100)	0	0	0	0	0	100
GWh per Gb/s Network Netherlands (2010 =100)[1]	2.1	2.3	2.7	3.0	3.9	100

1 2020-2022 figures have been restated as a result of more accurate network traffic data

Appendices

Table 7: CO_2e emissions Scope 3 (in kTon) KPN the Netherlands[1]

	Target 2040 compared to base year	Target 2030 compared to base year	Target 2024 compared to base year	2023	2022	2021	2020	2015[2]	2014 base year
CAT1 Purchased goods and services				378.1	360.0	365.2	359.4	475.2	524.1
CAT2 Capital goods				209.1	201.7	227.7	235.3	228.1	268.9
CAT3 Fuel and energy related activities				8.6	9.5	10.2	11.6	130.1	95.3
CAT4 Upstream transportation and distribution				-	-	-	-	-	-
CAT5 Waste generated in operations				0.0	-	0.0	0.0	0.1	0.2
CAT6 Business travel				3.2	0.9	0.6	0.9	3.0	3.2
CAT7 Employee commuting				2.1	0.8	1.0	2.9	16.7	19.8
CAT8 Leased assets				-	-	-	-	-	-
CAT9 Downstream transportation and distribution				12.3	13.7	16.7	18.2	16.6	18.7
CAT10 Processing of sold products				-	-	-	-	-	-
CAT11 Use of sold products				19.7	23.7	23.0	21.8	4.5	4.1
CAT12 End–of–life				-	-	-	-	-	-
CAT13 Downstream leased assets				126.4	160.2	179.7	180.7	138.3	156.1
CAT14 Franchises				-	-	-	-	-	-
CAT15 Investments				-	-	-	-	-	-
Total CO2e emissions	**net-zero**	**599.0**	**759.4**	**759.4**	**770.6**	**824.0**	**830.7**	**1,012.5**	**1,090.3**
Total upstream CO2e emissions				**601.0**	**572.9**	**604.6**	**610.0**	**853.1**	**911.5**
Total downstream CO2e emissions				**158.4**	**197.6**	**219.4**	**220.6**	**159.4**	**178.9**
% Reduction compared to base year 2014	**net-zero**	**-45%**	**-30%**	**-30%**	**-29%**	**-24%**	**-24%**	**-7%**	
% Reduction compared to 2015	net-zero	-41%	-25%	-25%	-24%	-19%	-18%		
Previously reported total CO2e emissions					593.9	658.2	682.6	850.0	941.3
Impact of restatement compared to previously reported total CO2e emissions					30%	25%	22%	19%	16%

1 Figures 2014 base year and subsequent years have been restated, see section "Scope 3 emissions restated" in this Appendix 10

2 2015 is included as part of validation of our net-zero target by the Science Based Target Initiative

Table 8: Other environmental impacts KPN Group

	Unit	Target 2024	2023	2022	2021	2020
Materials usage						
Cable length	1,000 km		~691	~679	~660	~618
Paper consumption	Tons		216	186	233	201
% FSC or PEFC	%		100%	100%	100%	100%
Coolants (e.g. R407C and R417A)	kg		399	518	538	661
Water consumption						
Offices and shops	1,000 m^3		26.5	39.6	38.7	49.2
Operations	1,000 m^3		76.8	57.3	33.6	34.7
KPN Group	**1,000 m^3**	**100.0**	**103.2**	**96.9**	**72.3**	**83.9**

Appendices

Table 9: Estimated avoided energy consumption and CO_2e emissions enabled for KPN customers by usage of KPN

	Target 2024	Result 2023	Result 2022	Result 2021	Result 2020
Estimated avoided energy consumption (in PJ)					
Teleworking (enabled by KPN connectivity)[1]		3.830	3.432	6.345	9.494
Dematerialisation[2]		0.000	0.000	0.202	0.170
KPN Audioconferencing[3]		0.000	0.000	0.009	0.077
KPN Videoconferencing[3]		0.000	0.000	0.001	0.027
KPN Hosting services[2]		0.001	0.009	0.014	0.020
KPN iTV Cloud solution		0.016	0.015	0.016	0.014
Total estimated avoided energy consumption		**3.847**	**3.455**	**6.588**	**9.802**
Total energy consumption KPN		1.869	2.036	2.156	2.444
% Avoided energy consumption compared to energy consumption KPN[1]	Discontinued	**206%**	**170%**	**306%**	**401%**
Estimated avoided CO_2e-emissions (in kTon)		**2023**	**2022**	**2021**	**2020**
Teleworking (enabled by KPN connectivity)[1]		308.6	307.3	499.9	728.0
Dematerialisation[2]		0.0	0.0	13.5	11.9
KPN Audioconferencing[3]		0.0	0.0	0.6	5.3
KPN Videoconferencing[3]		0.0	0.0	0.1	1.8
KPN Hosting services		0.0	1.1	1.7	2.6
KPN iTV Cloud solution		1.9	2.3	2.4	2.4
Total estimated avoided carbon emissions		**310.6**	**310.7**	**518.2**	**751.9**
Avoided Particulate matter emissions (PM_{10}) in tons		**2023**	**2022**	**2021**	**2020**
Total avoided PM_{10} emissions[4]		110	26	79	140

1 Increased due to higher % travel with car (52.7 to 69.8%), higher % teleworkers (41 to 41.8%), higher commuting distance (33.1 to 35.2), and larger working population (9.4 mln to 9.7 mln). Large increase is compensated by lower average amount of working hours at home per week for teleworkers (16h to 7h), and lower % broadband connections.

2 The impact of KPN on dematerialisation has been evaluated and deemed outdated. Examples were decrease in usage of newspapers, CD's, and DVDs. The remaining impact of KPN on dematerialisation is minimal, and therefore the amount since 2022 has been set at 0.

3 KPN's Audioconferencing and video conferencing services are terminated in 2022, due to substitions. Examples are Microsoft Teams, Zoom, and Skype.

4 2020-2022 figures have been restated as result of updating CBS source for particulate matter per car kilometer and public transport.

Appendices

Table 10: Circular information on reuse, recycling and disposal[1]

Total outflow		Target 2024	Result 2023	Result 2022	Result 2021	Result 2020
Total volume non-hazardous materials & waste	**ton**		**12,737**	**11,340**	**10,667**	**10,042**
Reuse	ton		1,481	1,000	1,011	1,018
Recycling	ton		9,651	8,796	8,111	7,272
Incineration	ton		1,407	1,360	1,377	1,597
Landfill	ton		198	184	168	155
Total volume hazardous materials & waste	**ton**		**374**	**919**	**576**	**379**
Reuse	ton		-	5	10	1
Recycling	ton		326	821	474	307
Incineration	ton		43	67	72	62
Landfill	ton		5	26	19	9
Total volume	**ton**		**13,111**	**12,259**	**11,243**	**10,421**
% Reuse	%		11%	8%	9%	10%
% Recycling	%		76%	78%	76%	73%
% Reuse and Recycling	**%**	**86%**	**87%**	**87%**	**85%**	**83%**
% Incineration	%		11%	12%	13%	16%
% Landfill	%		2%	2%	2%	2%
Collected equipment						
Modems and TV settop boxes	%		**87%**	**87%**[2]	**89%**[2]	**86%**
Mobile phones	%		8%	4%	4%	4%

1 Restated values for waste 2020-2022 due to incomplete data in fiber roll-out domain

2 We improved the data quality and refined our assumptions. As a result 2021-2022 figures have been restated