

Appendix 7. Environmental figures

Reporting criteria used in these tables:

- 1 As outlined in the Combined Independent Auditor's Report (see page 174-181 of our Integrated Annual Report 2016), this appendix is part of the assurance scope of EY's assurance procedures over KPN's 2016 sustainability information.
- 2 Scoping, level of assurance and calculation methodology of the reported items in tables 5, 7 and 8 is specified in Appendix 3 (page 190-199 of our Annual Report 2016)
- 3 Coverage of all figures according to materiality assessment (99% of operational costs / 99% of number fte) unless explicitly stated.

Table 1: Energy consumption (in PJ)

	2010 (base year)	2013	2014	2015	target 2016 compared to base year	target 2017 compared to base year	target 2020 compared to base year	target 2030 compared to base year
The Netherlands	4.028	3.669	3.484	3.462		3.363		
KPN non-NL Entities	0.217	0.019	0.019	0.019		0.019		
KPN Group (continuing operations)	4.245	3.689	3.503	3.481	-19%	3.382	-21%	-25%
Energy directly consumed		0.666	0.560	0.542		0.499		
Energy indirectly consumed		3.023	2.943	2.939		2.884		
Total energy consumed by KPN Group	4.245	3.689	3.503	3.481	-19%	3.382	-21%	-25%

1 KPN group figure represents an 20% decrease compared to base year, so we overscored our target

Table 2: Electricity consumption (in GWh)

	2010 (base year)		2013		2014		2015		2016 ¹	target 2017 Compared to base year	target 2020 Compared to base year	target 2030 Compared to base year
	NL	KPN Group	NL	KPN Group	NL	KPN Group	NL	KPN Group	NL	NL	NL	The Netherlands
Offices	62.4	64.7	40.1	42.7	35.1	37.7	35.1	37.6	33.9	36.4		
Network	657.7	660.7	596.1	599.0	580.4	583.3	576.9	579.7	569.1	572.0		-60%
Data centers	135.4	135.4	144.7	144.7	143.2	143.2	147.9	147.9	147.8	147.8		
Retail	7.4	7.4	7.6	7.6	6.8	6.8	5.3	5.3	5.3	5.3		
KPN Group (continuing operations)	862.9	868.2	788.6	794.0	765.6	771.0	765.1	770.5	756.1	761.5	-14%	-19%

1 In 2016 electricity reduction in The Netherlands compared to base year was 12% in 2016

Table 3: Fuel consumption, lease vehicle fleet (petrol, diesel and LPG)

	Unit	2010	2013	2014	2015	target 2016 compared to base year	target 2017 compared to base year	Target as from 2025
KPN the Netherlands	x 1,000 liter	16,716	13,247	11,074	10,854	-38%	10,191	-40%
								only new zero CO ₂ cars

1 This figure represents an 39% decrease compared to base year, so we overscored our target

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Table 4: Other Energy consumption KPN Group

	Unit	2013	2014	2015	2016
Natural gas	x 1,000 m3	5,876	5,119	4,617	3,856
Heating purchased	GJ	61,466	47,861	52,382	39,594
Cooling purchased	GJ	103,268	119,667	113,139	102,980
Diesel for emergency power generators	x 1,000 liter	155	46	158	242

Table 5: Net CO₂ emissions own operations Scope 1 and 2 (in kTon)

		2010 (base year)	2013	2014	2015	2016 Bruto ¹	2016 Net	target 2017	target 2050
KPN the Netherlands	scope 1	59.4	35.1	11.8	0	34.2	0	0	0
	scope 2	79.3	-	-	0	269.8	0	0	0
	total	138.7	35.1	11.8	0	304.0	0	0	0
KPN non-NL entities	scope 1	4.1	0.0	0.0	0	0.003	0	0	0
	scope 2	20.9	-	-	0	2.7	0	0	0
	total	25.0	0.0	0.0	0	2.7	0	0	0
KPN Group (continuing operations)	scope 1	63.5	35.1	11.8	0	34.2	0	0	0
	scope 2	100.2	-	-	0	272.5	0	0	0
	total	163.7	35.1	11.8	0	306.8	0	0	0

¹ Bruto emissions are calculated with NL emission factors instead of actual product based emissions

Table 6: Energy Efficiency and Carbon Intensity Indicators

	2010	2011	2012	2013	2014	2015	Target 2016	2016	Target 2017	Target 2020
Ton CO ₂ per Gb/s KPN Netherlands (2010=100)	100	30.49	16.03	9.77	2.35	0	0	0	0	0
GWh per Gb/s Network Netherlands (2010=100)	100	76.40	52.35	34.99	24.28	16.27	-	10.92	7.82	-
PUE improvement data centers (Baseline= 2010)		5.4%	9.0%	9.6%	11.4%	13.3%	13.3%	15.2%	15.5%	19.0%

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Table 7: CO₂-emissions scope 3 (in kTon) in the Netherlands

Scope 3 categories	2014 base year ¹	2015 ¹	2016 ^{1,2}	target 2025 compared to base year	target 2040 compared to base year
CAT1 Purchased goods and services	369.5	370.6	367.3		
CAT2 Capital goods	220.9	184.7	186.0		
CAT3 Fuel and energy related activities	93.0	128.3	40.7		
CAT4 Upstream Transportation and Distribution	-	-	-		
CAT5 Waste generated in operations	0.3	0.1	0.0		
CAT6 Business travel	3.2	3.0	3.3		
CAT7 Employee commuting	17.7	16.0	16.6		
CAT8 Leased assets	-	-	-		
CAT9 Downstream Transportation and Distribution	21.9	20.9	13.8		
CAT10 Processing of sold products	-	-	-		
CAT11 Use of sold products	3.7	3.0	2.7		
CAT12 End-of-life	-	-	-		
CAT13 Downstream leased assets	128.0	124.5	126.4		
CAT14 Franchises	-	-	-		
CAT15 Investments	-	-	-		
Total CO ₂ emissions	858.2	851.1	756.8	-20%	-50%
Total Upstream CO ₂ emissions	704.6	702.7	613.9		
Total Downstream CO ₂ emissions	153.6	148.4	142.9		

1 The scope 3 calculation does not include Reggefiber (2014 - 2016), but covers > 98% of fte/opex

2 Scope 3 figures 12% reduction compared to base year. 50% of this reduction is due to selection biomass with low emissions in the chain and corresponding scope 3 conversion factors. If we would have used these factors in 2014 and 2015 our CAT3 emissions would have been 40,5kTon in 2014 and 34,4 kTon in 2015. Total scope 3 reduction in 2016 compared to base year would have been 6%

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Table 8: Estimated avoided energy consumption and CO₂ emissions by usage of KPN products and services

	unit	2014 ¹	2015 ¹	2016	target 2017	target 2020
Estimated avoided energy consumption						
Teleworking (enabled by KPN connectivity)	PJ	1.365	1.340	1.428		
KPN Audioconferencing	PJ	0.185	0.135	0.140		
KPN Colocation (Housing)	PJ	0.076	0.095	0.111		
KPN Hosting	PJ	0.036	0.033	0.038		
Dematerialisation	PJ	-	0.076	0.076		
iTV Cloud solution	PJ	-	0.015	0.017		
KPN Workstations (KPN Werkplek)	PJ	-	0.003	0.003		
KPN Video Conferencing	PJ	-	0.004	0.004		
Total estimated avoided energy consumption	PJ	1.662	1.701	1.817		
Energy consumption KPN	PJ	3.503	3.481	3.382		
% avoided energy consumption compared to energy consumption KPN	%	47%	49%	54%	56%	>80%
Estimated avoided CO₂-emissions						
	unit	2014 ²	2015 ¹	2016	target 2017	target 2020
Teleworking (enabled by KPN connectivity)	kTon CO ₂ e	-	103.27	110.83	-	-
KPN Audioconferencing	kTon CO ₂ e	-	10.26	10.65	-	-
KPN Colocation (Housing)	kTon CO ₂ e	-	9.32	10.95	-	-
KPN Hosting	kTon CO ₂ e	-	3.23	3.76	-	-
KPN Workstations (KPN Werkplek)	kTon CO ₂ e	-	0.31	7.36	-	-
Dematerialisation	kTon CO ₂ e	-	7.36	2.01	-	-
iTV Cloud solution	kTon CO ₂ e	-	1.81	0.31	-	-
KPN Video Conferencing	kTon CO ₂ e	-	0.32	0.33	-	-
Total estimated avoided carbon emissions	kTon CO ₂ e	-	135.89	146.20		

1 The 2014 and 2015 figures of Teleworking are restated due to correction of an error and an updated model (for more information, see Appendix 3).

2 Estimated avoided CO₂-emissions were not disclosed in Annual Report 2014

Table 9: Other environmental impacts KPN Group

Materials usage	Unit	2013 ³	2014 ³	2016 ³	Target 2016	2016	Target 2017
Cable length ^{1,2}	1,000 km	347	351	354	-	359	-
Paper consumption	Tons	4.074	3.717	1.635	-	1.042	-
% FSC or PEFC	%	99%	99.9%	99.9%	-	100%	-
Coolants							-
Coolants usage (e.g. R407C and R417A)	kg	1095	774	1180	-	1029	-
Water							-
Water consumption offices and shops	1,000 m ³	103	83	109	105	89	80
Water consumption operations	1,000 m ³	220	205	251	245	206	200

1 Including tubes used for cables

2 Excluding Reggefiber (covering 98% of opex/fte)

3 In 2015 water consumption completed (including some consumption of previous years)

Table 10: Circular information on re-use, recycle and disposal

		2013	2014	2015	Target 2016	2016	Target 2017
Offices and shops							
Non-hazardous materials & waste							
- Recycling	ton	802.1	727.1	573.2		635.8	
- Disposal by incineration ¹	ton	1,572.6	1,425.0	1,093.9		1,211.6	
- Disposal by landfill	ton	0.2	0.0	0.0		0.9	
Hazardous materials & waste							
- Recycling	ton	13.2	7.0	2.1		4.8	
- Disposal by incineration ¹	ton	1.5	2.2	1.2		2.5	
- Disposal by landfill	ton	0.0	0.0	0.0		0.1	
Total non-hazardous and hazardous							
Total volume processed	ton	2,389.6	2,159.1	1,670.5		1,849.1	
% Re-use, Recycling & Incineration	%	100.00%	100.00%	100.00%		99.95%	90%
1 Hazardous waste & materials which are disposed consist of e.g. TL-lamps, LED lamps, toner cartridges and contents of chemoboxes							
Network and Data centers (2013 and 2014 integrated in incidental)							
Non-hazardous materials & waste							
- Recycling	ton			74.3		60.2	
- Disposal by incineration ¹	ton			183.7		144.8	
- Disposal by landfill	ton			50.3		42.9	
Hazardous materials & waste							
- Recycling	ton			0.3		0.0	
- Disposal by incineration ¹	ton			0.2		0.0	
- Disposal by landfill	ton			0.0		0.0	
Total non-hazardous and hazardous							
Total volume processed	ton			308.8		247.9	
% Re-use, Recycling & Incineration	%			83.72%		82.69%	
1 Hazardous waste & materials which are disposed consist of e.g. TL-lamps, LED lamps and toner cartridges							
Incidental (projects to remove obsolete equipment and abandon/dismantle buildings)							
Non-hazardous materials & waste							
- Recycling	ton	5,504.2	1,631.2	3,382.9		2,750.3	
- Disposal by incineration ¹	ton	494.6	686.1	523.8		780.7	
- Disposal by landfill	ton	84.9	269.2	0.2		178.2	
Hazardous materials & waste							
- Recycling	ton	57.2	16.9	123.2		166.2	
- Disposal by incineration ¹	ton	34.1	10.1	68.7		98.8	
- Disposal by landfill	ton	0.9	0.7	3.2		2.9	
Total non-hazardous and hazardous							
Total volume processed	ton	6,175.9	2,614.1	4,102.1		3,977.2	
% Re-use, Recycling & Incineration	%	98.61%	89.67%	99.92%		95.44%	
1 Hazardous waste & materials which are disposed consist of e.g. removed batteries used for emergency power and removed coolants from cooling machines							

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		2013	2014	2015	Target 2016	2016	Target 2017
Collected Modems and TV settop boxes							
Non-hazardous materials & waste							
- Re-use	ton	339.1	335.9	206.4		320.9	
- Recycling	ton	201.1	287.1	409.0		253.4	
- Disposal by incineration ¹	ton	54.1	72.2	96.3		68.1	
- Disposal by landfill ²	ton	25.4	24.6	19.9		32.0	
Hazardous materials & waste							
- Recycling	ton	0.5	0.3	0.0		0.0	
- Disposal by incineration ¹	ton	0.3	0.2	0.0		0.0	
- Disposal by landfill	ton	0.0	0.0	0.0		0.0	
Total non-hazardous and hazardous							
Total volume processed	ton	620.4	720.3	731.6		674.5	
% Re-use, Recycling & Incineration	%	95.91%	96.58%	97.28%		95.26%	
% Collected modems and TV settop boxes ³				62%	80%	74%	80%
Collected Mobile phones							
Non-hazardous materials & waste							
- Re-use ⁵	ton	10.4	5.1	9.3		10.8	
- Recycling ⁵	ton	16.7	2.2	4.0		3.2	
- Disposal by incineration ¹	ton	4.5	0.0	0.0		0.0	
- Disposal by landfill	ton	2.1	0.0	0.0		0.0	
Hazardous materials & waste							
- Recycling	ton	0.0	0.0	0.0		0.0	
- Disposal by incineration ¹	ton	0.0	0.0	0.0		0.0	
- Disposal by landfill	ton	0.0	0.0	0.0		0.0	
Total non-hazardous and hazardous							
Total volume processed	ton	33.8	7.3	13.3		14.0	
% Re-use, Recycling & Incineration	%	93.76%	100.00%	100.00%		100.00%	
% Collected mobile phones ⁴	%	21%	34%	28%	10%	9%	

1 Disposal by incineration: Disposal via incineration while generating (green or grey) energy

2 Value 2015 is restated. In 2015 19.9 tonnes was abusively reported as hazardous waste and materials in stead of non-hazardous

3 All collected modems and TV settop boxes compared to the number which we should have had received (because of order cancellation, assumed defect or subscription termination)

4 All collected mobile phones (KPN or customer owned) compared to the total number of mobile phones sold in 2016

5 For 2016, part of collected handsets are labelled as re-use or recycled based on market assumption. For earlier years, this is applicable for all collected handsets.