

> Appendices

Appendix 6: Environmental figures

- 1 As outlined in the Combined Independent Auditor's Report (see page 131-138 of our Integrated Annual Report 2017), this Appendix is part of the assurance scope of EY's assurance procedures over KPN's 2017 sustainability information.
- 2 Scoping and calculation methodology of the reported items is specified In Appendix 3 (page 146-157 of our Integrated Annual Report 2017).
- 3 Coverage of all figures according to materiality assessment (98% of operational costs).

Table 1: Energy consumption (in PJ)

	2010 (base year)	2014	2015	2016	target 2017 compared to base year	2017 ¹	target 2018 compared to base year	target 2020 compared to base year	target 2030 compared to base year
The Netherlands	4.03	3.48	3.46	3.36		3.22			
KPN non-NL entities	0.22	0.02	0.02	0.02		0.01			
KPN Group	4.24	3.50	3.48	3.38	-21%	3.23	-22%	-25%	-55%
Energy directly consumed		0.56	0.54	0.50		0.49			
Energy indirectly consumed		2.94	2.94	2.88		2.74			
KPN Group	4.24	3.50	3.48	3.38	-21%	3.23	-22%	-25%	-55%

1 KPN Group figure represents an 24% decrease compared to base year, so we overscored our target of a 21% decrease.

Table 2: Electricity consumption (in GWh)

	2010 (base year)		2014		2015		2016		2017 ¹		target 2018 compared to base year	target 2020 compared to base year	target 2030 compared to base year
	KPN NL	KPN Group	KPN NL	KPN Group	KPN NL	KPN Group	KPN NL	KPN Group	KPN NL	KPN Group	KPN NL	KPN NL	KPN NL
Offices	62	65	35	38	35	38	34	36	28	29			
Network	658	661	580	583	577	580	569	572	547	550		-24%	-60%
Data centers	135	135	143	143	148	148	148	148	142	142			
Retail	7	7	7	7	5	5	5	5	5	5			
Total	863	868	766	771	765	770	756	761	723	726			

1 In 2017, electricity reduction in the Netherlands compared to base year was 16%, so we overscored our target of a 14% decrease.

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

	Unit	2010	2014	2015	2016	2017 ¹	target 2018 compared to base year	target as from 2025
KPN The Netherlands	1,000 liter	16,716	11,074	10,854	10,191	9,492	-44%	100% new cars without CO ₂ emissions from 2025

1 This figure represents a decrease of 43% compared to base year, so we overscored our target of 40%.

Table 4: Other Energy consumption KPN Group

	Unit	2014	2015	2016	2017
Natural gas	1,000 m3	5,119	4,617	3,856	4,469
Heating purchased	GJ	47,861	52,382	39,594	32,279
Cooling purchased	GJ	119,667	113,139	102,980	95,139
Diesel for emergency power generators	1,000 liter	46	158	242	192

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

		2010 (base year)	2014	2015	2016	2017	target 2050
KPN The Netherlands	Scope 1	59.4	11.8	0.0	0.0	0.0	0.0
	Scope 2	79.3	0.0	0.0	0.0	0.0	0.0
	total	138.7	11.8	0.0	0.0	0.0	0.0
KPN non-NL entities	Scope 1	4.1	0.0	0.0	0.0	0.0	0.0
	Scope 2	20.9	0.0	0.0	0.0	0.0	0.0
	total	25.0	0.0	0.0	0.0	0.0	0.0
KPN Group	Scope 1	63.5	11.8	0.0	0.0	0.0	0.0
	Scope 2	100.2	0.0	0.0	0.0	0.0	0.0
	total	163.7	11.8	0.0	0.0	0.0	0.0

Table 6: Energy efficiency and Carbon intensity indicators

	2010	2011	2012	2013	2014	2015	2016	target 2017	2017	target 2018	target 2020
Ton CO ₂ per Gb/s KPN Netherlands (2010=100)	100.0	30.5	16.0	9.8	2.3	0.0	0.0	0.0	0.0	0.0	0.0
GWh per Gb/s Network Netherlands (2010 =100)	100.0	76.4	52.4	35.0	24.3	16.3	10.9	7.8	7.9	5.8	-
PUE improvement data centers (baseline = 2010)	0%	5%	9%	10%	11%	13%	15%	15.5%	15%	15.5%	19%

> Appendices

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

	2014 base year ^{1,2}	2015 ^{1,2}	2016 ^{1,2}	2017	target 2025 compared to base year	target 2040 compared to base year
CAT1 Purchased goods and services	468.9	458.2	459.8	478.1		
CAT2 Capital goods	237.5	198.6	200.0	162.7		
CAT3 Fuel and energy related activities	93.0	128.3	40.7	26.9		
CAT4 Upstream transportation and distribution	0.0	0.0	0.0	0.0		
CAT5 Waste generated in operations	0.3	0.1	0.0	0.1		
CAT6 Business travel	3.2	3.0	3.3	3.5		
CAT7 Employee commuting	17.7	16.0	16.6	15.5		
CAT8 Leased assets	0.0	0.0	0.0	0.0		
CAT9 Downstream transportation and distribution	23.0	22.3	14.9	19.6		
CAT10 Processing of sold products	0.0	0.0	0.0	0.0		
CAT11 Use of sold products	3.7	3.4	3.1	2.8		
CAT12 End-of-life	0.0	0.0	0.0	0.0		
CAT13 Downstream leased assets	128.0	144.9	147.1	146.8		
CAT14 Franchises	0.0	0.0	0.0	0.0		
CAT15 Investments	0.0	0.0	0.0	0.0		
Total CO₂ emissions	975.3	974.9	885.5	856.0	-20%	-50%
Total upstream CO₂ emissions	820.6	804.3	720.5	686.8		
Total downstream CO₂ emissions	154.7	170.6	165.1	169.3		

1 The Scope 3 calculation 2014 until 2016 does not include Reggefiber (2014 - 2016), but covers > 98% of FTE/Opex

2 As described in Appendix 3, we restated figures for 2014, 2015 and 2016.

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

Estimated avoided energy consumption (in PJ)	2014	2015	2016	2017 ¹	target 2018	target 2020
Teleworking (enabled by KPN connectivity)	1.365	1.340	1.428	1.434		
KPN Audioconferencing	0.185	0.135	0.140	0.130		
KPN Colocation (Housing)	0.076	0.095	0.111	0.123		
KPN Hosting	0.036	0.033	0.038	0.032		
Dematerialization		0.076	0.076	0.130		
iTV Cloud solution		0.015	0.017	0.018		
Managed workspaces (KPN Werkplek)		0.003	0.003	0.003		
KPN Video Conferencing		0.004	0.004	0.056		
Total estimated avoided energy consumption	1.662	1.701	1.817	1.926		
Energy consumption KPN	3.503	3.481	3.382	3.232		
% avoided energy consumption compared to energy consumption KPN	47%	49%	54%	60%	64%	80%

Estimated avoided CO ₂ -emissions (in kTon)	2014	2015 ²	2016 ²	2017	target 2018	target 2020
Teleworking (enabled by KPN connectivity)		106.9	114.7	114.5		
KPN Audioconferencing		10.3	10.7	10.0		
KPN Colocation (Housing)		10.8	12.7	14.1		
KPN Hosting		3.8	4.4	3.6		
Dematerialization		7.4	7.4	10.3		
iTV Cloud solution		2.1	2.3	2.5		
Managed workspaces (KPN Werkplek)		0.4	0.4	0.3		
KPN Video Conferencing		0.3	0.3	4.2		
Total estimated avoided carbon emissions		141.9	152.8	159.5		

1 Target estimated avoided energy consumption was 56% so we overscored our target.

2 Estimated avoided emissions in 2015 and 2016 were restated due to more recent grid-mix factor.

Table 9: Other environmental impacts KPN Group

	Unit	2014 ²	2015	2016	2017	Target 2018
Cable length ^{1,2}	1,000 km	351	354	359	364	-
Paper consumption	Tons	3,717	1,635	1,042	505	-
% FSC or PEFC	%	99.9%	99.9%	100%	100%	-
Coolants usage (e.g. R407C and R417A)	kg	774	1,180	1,029	889	-
Water consumption offices and shops	1,000 m ³	83	109	89	76	70
Water consumption operations	1,000 m ³	205	251	206	215	200

1 Including tubes used for cables.

2 Excluding Reggefiber.

> Appendices

Table 10: Circular information on reuse, recycling and disposal

		2014	2015	2016	2017	2018 target	2025 target
Totals¹							
% Reuse	%	12%	8%	12%	13%		
% Recycling	%	35%	39%	34%	40%		
% Reuse and recycling	%	47%	47%	46%	53%	55%	~100%
% Incineration	%	52%	50%	51%	47%		
% Landfill	%	1%	3%	3%	0%		
Offices and shops							
Non-hazardous materials & waste > Reuse ²	ton				32.6		
> Recycling	ton	7271	573.2	635.8	618.2		
> Incineration	ton	1,425.0	1,093.9	1,211.6	984.6		
> Landfill	ton	0.0	0.0	0.9	7.8		
Hazardous materials & waste > Recycling	ton	7.0	2.1	4.8	2.7		
> Incineration	ton	2.2	1.2	2.5	0.9		
> Landfill	ton	0.0	0.0	0.1	0.0		
Total volume ³	ton	2,161.3	1,670.4	1,855.7	1,646.9		
% Reuse ²	%				2%		
% Recycling	%	34%	34%	35%	38%		
% Reuse and recycling	%	34%	34%	35%	40%		
% Incineration	%	66%	66%	65%	60%		
% Landfill	%	0%	0%	0%	0%		
Network and Data centers - regular⁴							
Non-hazardous materials & waste > Reuse ²	ton				0.0		
> Recycling	ton		74.3	60.2	76.0		
> Incineration	ton		183.7	144.8	135.3		
> Landfill	ton		50.3	42.9	1.1		
Hazardous materials & waste > Recycling	ton		0.3	0.0	0.1		
> Incineration	ton		0.2	0.0	0.0		
> Landfill	ton		0.0	0.0	0.0		
Total volume	ton		308.8	247.9	212.5		
% Reuse ²	%				0%		
% Recycling	%		24%	24%	36%		
% Reuse and Recycling	%		24%	24%	36%		
% Incineration	%		60%	59%	63%		
% Landfill	%		16%	17%	1%		
Network and Datacenters - LCM projects⁵							
Non-hazardous materials & waste > Reuse ²	ton						
> Recycling	ton	1,631.2	3,382.9	2,750.3	2,108.5		
> Incineration	ton	686.1	523.8	780.7	665.9		
> Landfill	ton	269.2	0.2	178.2	18.8		
Hazardous materials & waste > Recycling	ton	16.9	123.2	166.2	50.7		
> Incineration	ton	10.1	68.7	98.8	2.1		
> Landfill	ton	0.7	3.2	2.9			
Total volume	ton	2,614.1	4,102.1	3,977.2	2,845.9		

		2014	2015	2016	2017	2018 target	2025 target
% Reuse ²	%				0%		
% Recycling	%	63%	85%	73%	76%		
% Reuse and recycling	%	63%	85%	73%	76%		
% Incineration	%	27%	15%	22%	23%		
% Landfill	%	10%	0%	5%	1%		
Collected Modems and TV set-top boxes							
Non-hazardous materials & waste > Reuse	ton	335.9	206.4	320.9	313.4		
> Recycling	ton	287.1	409.0	253.4	355.1		
> Incineration	ton	72.2	96.3	68.1	89.5		
> Landfill	ton	24.6	19.9	32.0	1.5		
Hazardous materials & waste > Recycling	ton	0.3	0.0	0.0	0.0		
> Incineration	ton	0.2	0.0	0.0	0.0		
> Landfill	ton	0.0	0.0	0.0	0.0		
Total volume	ton	720.3	731.6	674.5	759.5		
% Reuse	%	47%	28%	48%	41%		
% Recycling	%	40%	60%	38%	47%		
% Reuse and recycling	%	87%	84%	85%	88%		
% Incineration	%	10%	13%	10%	12%		
% Landfill	%	3%	3%	5%	0%		
% Collected modems and TV set-top boxes ⁶	%		62%	74%	85%	85%	~100%
Collected mobile phones⁷							
Non-hazardous materials & waste > Reuse	ton	5.1	9.3	10.8	0.9		
> Recycling	ton	2.2	4.0	3.2	0.3		
> Incineration	ton	0.0	0.0	0.0	0.1		
> Landfill	ton	0.0	0.0	0.0	0.0		
Hazardous materials & waste > Recycling	ton	0.0	0.0	0.0	0.0		
> Incineration	ton	0.0	0.0	0.0	0.0		
- Landfill	ton	0.0	0.0	0.0	0.0		
Total volume	ton	7.3	13.3	14.0	1.3		
% Reuse	%	70%	70%	77%	70%		
% Recycling	%	30%	30%	23%	24%		
% Reuse and recycling	%	100%	100%	100%	94%		
% Incineration	%	0%	0%	0%	6%		
% Landfill	%	0%	0%	0%	0%		
% Collected mobile phones ⁸	%	34%	28%	9%	1%		

1 All categories, excluding Network and Data centers - LCM Projects and Collected mobile phones.

2 Reuse volumes are part of our circular project which started in 2017 to identify the volumes and report them separately.

3 Total volumes 2014 and 2016 are restated. In Appendix 7 in Annual Report 2016 these volumes were abusively too low (2 ton 2014 and 6 ton 2016)

4 All regular operational waste streams from network and data centers. In 2014 these volumes were integrated in category LCM.

5 Life Cycle Management projects in Network and datacenters with main focus on removing obsolete equipment, dismantling legacy networks and abandon/dismantle buildings.

6 Actual received versus total expected received because of swaps, defects or other reasons. The target for 2017 was 80% so we exceeded our target.

7 Breakdown volumes per category are based on best estimates.

8 All collected mobile phones compared to the total number sold. No target, because the majority of this category is customer owned.

Additional information on Incineration and Hazardous waste & materials:

- Incineration

Results in generation of electricity and heat

- Hazardous waste & materials:

Offices

e.g. TL lamps, LED lamps, toner cartridges and contents of chemoboxes

Networks & Data centers regular:

e.g. TL lamps, LED lamps and toner cartridges

Network and data centers-LCM Projects:

e.g. removed batteries used for emergency power and removed coolants from cooling machines