

## > Appendices

### APPENDIX 7: ENVIRONMENTAL FIGURES

- 1 As outlined in the Combined Independent Auditor's Report (see page 184-192 of our Integrated Annual Report 2018), this Appendix is part of the assurance scope of EY's assurance procedures over KPN's 2018 sustainability information.
- 2 Scoping and calculation methodology of the reported items is specified in Appendix 3 (page 200-211 of our Integrated Annual Report 2018).
- 3 Coverage of all figures according to materiality assessment (98% of operational costs).

**Table 1: Energy consumption (in PJ)**

	2010 (base year)	2015	2016	2017	target 2018 compared to base year	2018 <sup>1</sup>
The Netherlands	4.03	3.46	3.36	3.22	-	<b>3.23</b>
KPN non-NL entities	0.22	0.02	0.02	0.01	-	-
<b>KPN Group</b>	<b>4.24</b>	<b>3.48</b>	<b>3.38</b>	<b>3.23</b>	<b>-22%</b>	<b>3.23</b>
Energy directly consumed		0.54	0.50	0.49	-	<b>0.45</b>
Energy indirectly consumed		2.94	2.88	2.74	-	<b>2.78</b>
<b>KPN Group</b>	<b>4.24</b>	<b>3.48</b>	<b>3.38</b>	<b>3.23</b>	<b>-22%</b>	<b>3.23</b>

<sup>1</sup> Energy consumed decreased by 24% compared to base year, so we met our target of 22% decrease.

**Table 2: Electricity consumption (in GWh)**

	2010 (base year)		2015		2016		2017		2018	
	NL	KPN Group	NL	KPN Group	NL	KPN Group	NL	KPN Group	NL	KPN Group
Offices	62	65	35	38	34	36	28	29	28	28
Network	658	661	577	580	569	572	547	550	555	555
Data centers	135	135	148	148	148	148	142	142	150	150
Retail	7	7	5	5	5	5	5	5	5	5
<b>Total</b>	<b>863</b>	<b>868</b>	<b>765</b>	<b>770</b>	<b>756</b>	<b>761</b>	<b>723</b>	<b>726</b>	<b>738</b>	<b>738</b>

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

	Unit	2010 (base year)	2015	2016	2017	target 2018 compared to base year	2018 <sup>1</sup>	target 2019 compared to base year	target as from 2025
KPN the Netherlands	1,000 liter	16,716	10,854	10,191	9,492	-44%	9,412	-45%	100% inflow of fossil free cars

**Table 4: Other Energy consumption KPN Group**

	Unit	2015	2016	2017	2018
Natural gas	1,000 m <sup>3</sup>	4,617	3,856	4,469	3,498
Heating purchased	GJ	52,382	39,594	32,279	29,653
Cooling purchased	GJ	113,139	102,980	95,139	94,571
Diesel for emergency power generators	1,000 liter	158	242	192	184

**Table 5: CO<sub>2</sub>e emissions own operations Scope 1 and 2 (in kTon)**

Market based <sup>1</sup>		2010 (base year)	2015	2016	2017	2018	target 2050
KPN the Netherlands	Scope 1	594	0.0	0.0	0.0	0.0	0.0
	Scope 2	79.3	0.0	0.0	0.0	0.0	0.0
	<b>total</b>	<b>138.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
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
	<b>total</b>	<b>25.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
KPN Group	Scope 1	63.5	0.0	0.0	0.0	0.0	0.0
	Scope 2	100.2	0.0	0.0	0.0	0.0	0.0
	<b>total</b>	<b>163.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

<sup>1</sup> These CO<sub>2</sub>e-values are our market based emissions. In the table on page 69 both location based and market based emissions are published.

**Table 6: Energy efficiency and Carbon intensity indicators**

	2010	2011	2012	2013	2014	2015	2016	2017	target 2018	2018	target 2019	target 2020
Ton CO <sub>2</sub> e per Gb/s KPN Netherlands (2010=100) <sup>1</sup>	100.0	31.3	16.3	9.9	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GWh per Gb/s Network Netherlands (2010 =100) <sup>1</sup>	100.0	78.3	53.4	35.4	22.2	14.6	11.2	7.8	5.8	5.6	5.8	-
PUE improvement data centers (baseline = 2010)	0%	5%	9%	10%	11%	13%	15%	15%	15.5%	12.2%	13%	19%

<sup>1</sup> We improved our methodology, so we restated 2011-2017

**Table 7: CO<sub>2</sub>e emissions Scope 3 (in kTon) KPN the Netherlands**

	2014 base year	2015 <sup>1</sup>	2016 <sup>1</sup>	2017	2018	Target 2019 compared to base year	target 2025 compared to base year	target 2040 compared to base year
CAT1 Purchased goods and services	468.9	458.2	459.8	478.0	452.4	-	-	-
CAT2 Capital goods	237.5	198.6	200.0	162.7	174.9	-	-	-
CAT3 Fuel and energy related activities	93.0	128.3	40.7	26.9	9.7	-	-	-
CAT4 Upstream transportation and distribution	0.0	0.0	0.0	0.0	0.0	-	-	-
CAT5 Waste generated in operations	0.3	0.1	0.0	0.1	0.5	-	-	-
CAT6 Business travel	3.2	3.0	3.3	3.5	3.1	-	-	-
CAT7 Employee commuting	1.7	16.0	16.6	15.5	15.9	-	-	-
CAT8 Leased assets	0.0	0.0	0.0	0.0	0.0	-	-	-
CAT9 Downstream transportation and distribution	23.0	22.3	14.9	19.6	18.3	-	-	-
CAT10 Processing of sold products	0.0	0.0	0.0	0.0	0.0	-	-	-
CAT11 Use of sold products	3.7	3.4	3.1	2.8	2.3	-	-	-
CAT12 End-of-life	0.0	0.0	0.0	0.0	0.0	-	-	-
CAT13 Downstream leased assets	128.0	144.9	14.7	14.6	135.0	-	-	-
CAT14 Franchises	0.0	0.0	0.0	0.0	0.0	-	-	-
CAT15 Investments	0.0	0.0	0.0	0.0	0.0	-	-	-
<b>Total CO<sub>2</sub>e emissions</b>	<b>975.3</b>	<b>974.9</b>	<b>885.5</b>	<b>855.9</b>	<b>812.1</b>	<b>-17%</b>	<b>-20%</b>	<b>-50%</b>
<b>Total upstream CO<sub>2</sub>e emissions</b>	<b>820.6</b>	<b>804.3</b>	<b>720.5</b>	<b>686.6</b>	<b>656.6</b>	-	-	-
<b>Total downstream CO<sub>2</sub>e emissions</b>	<b>154.7</b>	<b>170.6</b>	<b>165.1</b>	<b>169.3</b>	<b>155.6</b>	-	-	-

<sup>1</sup> Our emissions in the value chain decreased by 16.7% compared to base year

## > Appendices

**Table 8: Estimated avoided energy consumption and CO<sub>2</sub>e emissions by usage of KPN products and services**

Estimated avoided energy consumption (in PJ)	2015	2016	2017	2018	target 2019	target 2020
Teleworking (enabled by KPN connectivity) <sup>1</sup>	1.340	1.428	1.434	2.144	-	-
KPN Audioconferencing	0.135	0.140	0.130	0.135	-	-
KPN Colocation (Housing)	0.095	0.111	0.123	0.120	-	-
KPN Hosting <sup>2</sup>	0.036	0.041	0.035	0.030	-	-
Dematerialization	0.076	0.076	0.130	0.131	-	-
KPN iTV Cloud solution	0.015	0.017	0.018	0.018	-	-
KPN Video Conferencing	0.004	0.004	0.056	0.053	-	-
<b>Total estimated avoided energy consumption</b>	<b>1.701</b>	<b>1.817</b>	<b>1.926</b>	<b>2.631</b>	-	-
<b>Energy consumption KPN</b>	<b>3.481</b>	<b>3.382</b>	<b>3.232</b>	<b>3.234</b>	-	-
<b>% avoided energy consumption compared to energy consumption KPN</b>	<b>49%</b>	<b>54%</b>	<b>60%</b>	<b>81%</b>	<b>82%</b>	<b>85%</b>

Estimated avoided CO <sub>2</sub> e -emissions (in kTon)	2015	2016	2017	2018	target 2019	target 2020
Teleworking (enabled by KPN connectivity) <sup>1</sup>	106.9	114.7	114.5	172.3	-	-
KPN Audioconferencing	10.3	10.7	10.0	10.2	-	-
KPN Colocation (Housing)	10.8	12.7	14.1	13.8	-	-
KPN Hosting <sup>2</sup>	4.1	4.7	4.0	3.5	-	-
Dematerialization	7.4	7.4	10.3	10.4	-	-
KPN iTV Cloud solution	2.1	2.3	2.5	2.5	-	-
KPN Video Conferencing	0.3	0.3	4.2	3.8	-	-
<b>Total estimated avoided carbon emissions</b>	<b>141.9</b>	<b>152.8</b>	<b>159.5</b>	<b>216.4</b>	-	-

1 In 2018 we updated our Teleworking calculation methodology using more accurate data from CBS on the number of Teleworkers in the Netherlands. This has resulted in a estimated avoided energy consumption of 2,144 PJ and this relates to 81% avoided energy consumption. When this updated calculation methodology is applied to the previous years the percentages avoided energy consumption are 57% for 2015, 62% for 2016 and 77% for 2017. If the previous method would have been used for 2018 the avoided energy consumption of Teleworking would have been 1,554 PJ and this relates to 63%. For further information on the calculation methodology see Appendix 3.

2 The previously reported avoided energy consumption and CO<sub>2</sub>e-emissions of the service KPN Managed workspaces are hosting related and are integrated in KPN Hosting.

**Table 9: Other environmental impacts KPN Group**

	Unit	2015	2016	2017	2018*	Target 2019
<b>Materials usage</b>						
Cable length <sup>12</sup>	1,000 km	354	359	364	367	-
Paper consumption	Tons	1,635	1,042	505	459	-
% FSC or PEFC	%	99.9%	100%	100%	100%	-
<b>Coolants</b>						
Coolants usage (eg. R407C and R417A)	kg	1,180	1,029	889	982	-
<b>Water</b>						
Water consumption offices and shops	1,000 m <sup>3</sup>	109	89	76	66	70
Water consumption operations <sup>3</sup>	1,000 m <sup>3</sup>	251	206	215	182	200

1 Including tubes used for cables.

2 Excluding Reggefiber.

3 Our water management aims to minimize usage of water. The usage of water in operations (e.g. cooling systems) is dependent on weather conditions.

4 In 2018 target for water was 200 for operations and 70 for offices so we realized our target.

**Table 10: Circular information on reuse, recycling and disposal**

		2015	2016	2017	2018	2019 target
<b>Totals</b>						
Total volume non-hazardous materials & waste	ton	6,627	6,494	5,410	6,557	–
Total volume hazardous materials & waste	ton	199	275	57	105	–
Total volume	ton	6,826	6,769	5,466	6,663 <sup>1</sup>	–
Volume in scope for % Reuse & Recycling <sup>2</sup>	%	40%	41%	100%	100%	–
% Reuse	%	8%	12%	6%	7%	–
% Recycling	%	39%	34%	59%	68%	–
% Reuse and recycling <sup>2</sup>	%	47%	46%	65%	75%	77%
% Incineration	%	50%	51%	34%	24%	–
% Landfill	%	3%	3%	1%	1%	–
<b>Offices and shops</b>						
Non-hazardous materials & waste	ton	1,667	1,848	1,643	1,496	–
Hazardous materials & waste	ton	3	7	4	1	–
Total volume	ton	1,670	1,856	1,647	1,497	–
Volume in scope for % Reuse & Recycling (this cluster)	%	100%	100%	100%	100%	–
% Reuse <sup>3</sup>	%	–	–	2%	8%	–
% Recycling	%	34%	35%	38%	44%	–
% Reuse and recycling	%	34%	35%	40%	52%	–
% Incineration	%	66%	65%	60%	48%	–
% Landfill	%	0%	0%	0%	0%	–
<b>Network and Datacenters<sup>4</sup></b>						
Non-hazardous materials & waste	ton	4,215	3,957	3,005	4,244	–
Hazardous materials & waste	ton	196	268	53	105	–
Total volume	ton	4,411	4,225	3,058	4,349	–
Total volume in scope for % Reuse & Recycling	ton	309	248	3,058	4,349	–
Volume in scope for % Reuse & Recycling (this cluster)	%	7%	6%	100%	100%	–
% Reuse <sup>3</sup>	%	–	–	–	3%	–
% Recycling	%	24%	24%	73%	78%	–
% Reuse and Recycling	%	24%	24%	73%	81%	–
% Incineration	%	60%	59%	26%	18%	–
% Landfill	%	16%	17%	1%	1%	–
<b>Collected Modems and TV set-top boxes</b>						
Non-hazardous materials & waste	ton	732	674	760	811	–
Hazardous materials & waste	ton	0	0	0	0	–
Total volume	ton	732	674	760	811	–
Volume in scope for % Reuse & Recycling (this cluster)	%	100%	100%	100%	100%	–

## > Appendices

		2015	2016	2017	2018	2019 target
% Reuse	%	28%	47%	41%	29%	–
% Recycling	%	56% <sup>5</sup>	38%	47%	57%	–
% Reuse and recycling	%	84%	85%	88%	86%	–
% Incineration	%	13%	10%	12%	14%	–
% Landfill	%	3%	5%	0%	0%	–
% Collected modems and TV set-top boxes <sup>6</sup>	%	62%	74%	69%	67%	70%

### Collected mobile phones

Non-hazardous materials & waste	ton	13	14	1	6	–
Hazardous materials & waste	ton	0	0	0	0	–
Total volume	ton	13	14	1	6	–
Volume in scope for % Reuse & Recycling (this cluster)	%	100%	100%	100%	100%	–
% Reuse	%	70%	77%	70%	91%	–
% Recycling	%	30%	23%	24%	7%	–
% Reuse and recycling	%	100%	100%	94%	98%	–
% Incineration	%	0%	0%	6%	2%	–
% Landfill	%	0%	0%	0%	0%	–
% Collected mobile phones <sup>7</sup>	%	28%	9%	1%	1%	–

1 2018 shows a higher volume due to higher outflow from network Lifecycle Management projects (decommissioning). The relative share of hazardous materials and waste is in the same range in 2018 as compared to 2017. For 2019 we aim to realize at least the same percentage of hazardous waste relative to the overall volume processed. We will carefully monitor the development of the volume of hazardous waste with regard to our ambition to become close to 100% circular in 2025.

2 As of 2018 we use an all inclusive scope for total KPN for the calculation of the percentages reuse, recycling, incineration and landfill. All categories are now included. To make the % Reuse & Recycling 2017 comparable to the figure of 2018 the all inclusive scope is also applied to the 2017 figures, which results in a % Reuse & Recycling of 65% (compared to the reported 53% in IAR 2017).

3 As from 2018 we have started to report the reused and/or refurbished volumes for network and datacenters, and as from 2017 for Offices & Shops.

4 Previous year two categories were reported for Network and Datacenters. They are now integrated into one category with totalized volumes for 2015-2017 and percentages recycling, incineration and landfill are recalculated.

5 The previously reported percentage recycling for 2015 (60%) was not the correct value, which is 56%

6 We improved the calculation method and extended the scope of flows included. On a like for like basis a best estimate of the 2017 performance is 69%.

7 All collected mobile phones compared to the total number put on market. No target, because the majority of this category is customer owned.