

Environment

Quantities and emissions

QUANTITIES AND EMISSIONS OF SF₆

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Quantity of SF ₆	kg	610,939.6	588,113.3	567,563.0	22,826.3	3.9
- in operating equipment	kg	565,664.1	543,780.8	518,474.4	21,883.3	4.0
- in cylinders	kg	45,275.5	44,332.5	49,088.6	943.0	2.1
SF ₆ leakage rate	%	0.47	0.39	0.44	0.08	19.9
SF ₆ greenhouse gas emissions	kg	2,866.9	2,302.2	2,488.4	564.7	24.5

TOTAL DIRECT AND INDIRECT GREENHOUSE GAS EMISSIONS ⁽¹⁾

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Leakages of SF ₆	CO ₂ in tonnes	67,371.4	54,101.9	58,478.3	13,269.5	24.5
Leakages of refrigerant gases (R22, R407C, R410A)	CO ₂ in tonnes	489.4	478.5	488.3	10.9	2.3
Petrol for motor vehicles	CO ₂ in tonnes	39.9	37.7	31.5	2.2	5.8
Diesel for motor vehicles	CO ₂ in tonnes	6,269.0	5,730.6	5,958.8	538.4	9.4
Jet fuel for helicopters	CO ₂ in tonnes	582.2	499.5	506.9	82.7	16.6
Natural gas for heating	CO ₂ in tonnes	419.9	458.8	561.9	-38.9	-8.5
Fuel oil for heating and generators	CO ₂ in tonnes	621.3	684.6	773.7	-63.3	-9.2
Total direct emissions	CO₂ in tonnes	75,792.9	61,991.7	66,799.4	13,801.2	22.3
<i>Indirect CO₂ emissions in tonnes</i>						
Electricity	CO ₂ in tonnes	72,489.3	74,715.5	70,325.6	-2,226.2	-3.0

⁽¹⁾ The conversion of direct energy consumption and leakages of SF₆ (sulphur hexafluoride) and refrigerant gases into CO₂ equivalent emissions has been carried out using the parameters indicated in the IPCC Fifth Assessment Report (AR5) and the Greenhouse Gas Protocol (GHG) Initiative. The conversion of indirect electricity consumption is carried out taking into account the share of total Italian electricity production represented by thermoelectric production in 2017. Allocation for the purposes of the production mix was based on the December 2017 issue of the "Monthly Report on the Electricity System", available on the website at www.terna.it.

CARBON INTENSITY

TONNES OF EQUIVALENT CO ₂ / REVENUE	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Ratio of total emissions (direct and indirect) to revenue	CO ₂ in tonnes / (€m)	66.0	65.0	65.9	1.0	1.5

REFRIGERANT GASES - QUANTITIES AND EMISSIONS

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Quantity of R22	kg	59	73	250	-14	-19.2
Leakages of R22	kg	0	0	0	-	-
Quantity of R407C	kg	2,770	2,846	2,677	-76	-2.7
Leakages of R407C	kg	174	205	187	-31	-15.0
Quantity of R410A	kg	8,613	7,870	7,848	743	9.4
Leakages of R410A	kg	107	76	96	31	41.4
Quantity of other refrigerant gases	kg	1,715	1,688	896	27	1.6

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INDIRECT CO₂ EMISSIONS FOR AIR TRAVEL BY EMPLOYEES ⁽¹⁾

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Total emissions	CO ₂ in tonnes	2,699	1,379	1,297	1,320	96

⁽¹⁾ The conversion factors indicated in the Greenhouse Gas Protocol Initiative were used to quantify the CO₂ resulting from air travel by employees. The increase in 2017 is primarily linked to intercontinental flights and relates to the expansion of operations in South America.

QUANTITIES AND EMISSIONS FOR MOTOR VEHICLES ⁽¹⁾

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Total motor vehicles	no.	1,344	1,323	1,514	21	2
Nitrogen oxide (NOx) emissions ⁽²⁾	kg	7,631	8,260	8,980	-629	-8

⁽¹⁾ The table shows the vehicles in Terna's fleet that, in the period in question, were refuelled on at least one occasion, based on claims for fuel expenses. Consumption data for fleet vehicles is shown in the following tables.

⁽²⁾ The figure is calculated on the basis of the data provided by motor manufacturers and included in registration certificates, as well as on estimates of the mileage covered by the vehicles. The figure shown in the table for 2017 refers to 85.3% of the Company's operating vehicles (85.4% in 2016 and 68.2% in 2015).

Consumption**DIRECT AND INDIRECT ENERGY CONSUMPTION BY PRIMARY SOURCE**

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Petrol for motor vehicles ^{(1) (2)}	tonnes	13	12	10	1	6
Diesel for motor vehicles ⁽¹⁾	tonnes	1,955	1,787	1,858	168	9
Jet fuel for helicopters	tonnes	184	158	160	26	17
Natural gas for heating	000's of m ³	187	205	257	-17	-9
Fuel oil for generators and heating	tonnes	194	213	241	-20	-9
Electricity	GWh	195.5	195.1	191.1	0.4	0.2

⁽¹⁾ Only the consumption of operating vehicles is taken into account.

⁽²⁾ The increase in petrol consumption is due to greater use of hybrid vehicles.

DIRECT AND INDIRECT ENERGY CONSUMPTION BY PRIMARY SOURCE - GIGAJOULES

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Petrol for motor vehicles ⁽¹⁾	GJ	577	545	455	32	6
Diesel for motor vehicles ⁽¹⁾	GJ	84,705	77,431	80,514	7,274	9
Jet fuel for helicopters	GJ	8,194	7,031	7,134	1,163	17
Natural gas for heating	GJ	7,490	8,184	10,022	-694	-8
Fuel oil for generators and heating	GJ	8,394	9,250	10,455	-856	-9
Total direct consumption	GJ	109,359	102,440	108,580	6,919	7
Electricity to power substations and offices ⁽²⁾	GJ	703,738	702,287	687,968	1,451	0.2

⁽¹⁾ Only the consumption of operating vehicles is taken into account.

⁽²⁾ Allocation for the purposes of the production mix was based on the December 2017 issue of the "Monthly Report on the Electricity System", available on the website at www.terna.it.

WATER CONSUMPTION

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	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Water withdrawal by source	m ³	171,074	162,272	171,264	8,345	5

PAPER CONSUMPTION

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	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Certified paper (100% recycled)	tonnes	50	60	63	-10	-17

MAIN MATERIALS PROVIDED BY SUPPLIERS

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	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Porcelain	tonnes	303	193	336	110	57
Polymers	tonnes	171	93	102	78	84
Copper	tonnes	1,870	461	1,380	1,409	306
Aluminium	tonnes	3,963	2,858	5,077	1,105	39
Steel	tonnes	6,933	13,253	13,275	-6,320	-48
Glass	tonnes	1,466	859	1,474	607	71
Dielectric oil	tonnes	812	227	682	585	258
SF ₆	tonnes	9	34	31	-25	-74

CONCENTRATION OF PCBs

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
PCB > 500 ppm	tonnes	0	0	0	-	-
50 ppm < PCB < 500 ppm	tonnes	0.05	0.18	0.46	-0.14	-75

Waste

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WASTE MANAGEMENT ⁽¹⁾

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Waste produced	tonnes	4,801.5	4,941.6	5,112.1	-140.1	-2.8
Waste recovered	tonnes	4,188.1	4,581.4	4,680.2	-393.3	-8.6
<i>Non-hazardous special waste</i>						
<i>Machinery, equipment, pylons, conductors and cables</i>						
- quantity produced	tonnes	1,818.6	2,526.8	1,338.8	-708.2	-28.0
- quantity sent for recovery	tonnes	1,764.9	2,509.6	1,348.6	-744.8	-29.7
<i>Packaging</i>						
- quantity produced	tonnes	356.4	317.7	248.2	38.7	12.2
- quantity sent for recovery	tonnes	354.3	321.2	239.6	33.1	10.3
<i>Other</i>						
- quantity produced	tonnes	375.8	254.6	618.3	121.2	47.6
- quantity sent for recovery	tonnes	236.9	190.0	449.0	46.9	24.7
Total non-hazardous special waste						
- quantity produced	tonnes	2,550.8	3,099.1	2,205.4	-548.3	-17.7
- quantity sent for recovery	tonnes	2,356.0	3,020.8	2,037.1	-664.8	-22.0
<i>Hazardous special waste</i>						
<i>Machinery, equipment, pylons, conductors and cables</i>						
- quantity produced	tonnes	1,608.6	1,044.4	1,956.9	564.2	54.0
- quantity sent for recovery	tonnes	1,351.2	1,028.4	1,932.8	322.7	31.4
<i>Oils</i>						
- quantity produced	tonnes	534.4	558.3	716.6	-23.9	-4.3
- quantity sent for recovery	tonnes	396.3	474.5	617.0	-78.2	-16.5
<i>Lead batteries</i>						
- quantity produced	tonnes	36.8	28.6	47.3	8.2	28.8
- quantity sent for recovery	tonnes	36.8	28.6	47.3	8.2	28.8
<i>Waste consisting of materials containing asbestos</i>						
- quantity produced	tonnes	0.0	0.0	0.0	0.0	-
<i>Other</i>						
- quantity produced	tonnes	70.9	211.2	183.7	-140.4	-66.4
- quantity sent for recovery	tonnes	47.8	29.1	45.9	18.7	64.2
Total hazardous special waste						
- quantity produced	tonnes	2,250.6	1,842.5	2,906.7	408.1	22.2
- quantity sent for recovery	tonnes	1,832.1	1,560.7	2,643.1	271.5	17.4

⁽¹⁾ Only special waste produced during production processes is included, not waste produced by services (urban waste). Effluents and waste from septic tanks, produced by substations not connected to the sewer network, are not included; the quantity for effluents and waste from septic tanks was 617 tonnes in 2017, 789 tonnes in 2016 and 680 tonnes in 2015. Waste sent for disposal may differ from the mere disparity between waste generated and recovered due to temporary waste storage. Specifically regarding 2017, the production of 240 tonnes of waste relating to the "machinery, equipment, pylons, conductors and cables" category - in line with Legislative Decree 152/2006 - is currently stored in an Infrastructure Unit's temporary storage facility.

Biodiversity

BIRD DETERRENTS ON THE NTG

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Lines involved	km	266	212	205	54	25
Total deterrents installed	no.	14,728	14,472	13,866	256	2

POWER LINES IN PROTECTED AREAS ⁽¹⁾

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	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
Lines impacting on protected areas	km	6,024	5,512	5,541	512	9
Lines with an impact as a percentage of total lines operated by Terna	%	10	10	10	-	-

⁽¹⁾ To calculate the percentage of lines impacting on protected areas, the Company has used "ATLARETE" data, which may contain immaterial differences compared with the data presented in the tables showing indicators of the number of lines. In particular, the data in the table do not include the assets purchased from RFI-Rete Ferroviaria Italiana.

Environmental costs

ENVIRONMENTAL COSTS - CAPITAL INVESTMENT AND OPERATING COSTS ⁽¹⁾

	Unit	2017	2016	2015	CHANGE 17-16	% CHANGE 17-16
CAPITAL INVESTMENT						
Environmental offsets	€m	8	15	1	-7	-47
Environmental impact studies	€m	4	2	5	2	110
Environmental activities - new plant	€m	5	4	6	1	20
Environmental activities - existing plant	€m	4	8	7	-4	-55
Demolitions	€m	1	1	1	0	-20
Total capital investment	€m	21	30	20	-9	-29
COSTS						
Cost of environmental activities	€m	24	19	19	5	27
Total operating costs	€m	24	19	19	5	27

⁽¹⁾ Details of the accounting method used are provided on page 161.