

## Observations

[ 1 ]	Limited by phase shifting transformer in Meeden
[ 2 ]	Limited by phase shifting transformer in Meeden
[ 3 ]	Transformer in Borssele
[ 4 ]	Former October 2005 in FR Avelin
[ 5 ]	Transducer
[ 6 ]	Installed in Verbois
[ 7 ]	Cross-border power station ( 220/130 )
[ 8 ]	Cross-border power station ( 220/130 )
[ 9 ]	Cross-border power station ( 220/130 )
[ 10 ]	Line property EnBW Netz in Germany partially on the same tower as line Asphard-Kühmoos or Sierentz-Laufenburg
[ 11 ]	DC link with three connections
[ 12 ]	Transforming station of Lucciana in Corsica
[ 13 ]	DC link with three connections
[ 14 ]	Transforming station of Lucciana in Corsica
[ 15 ]	Partially on the same tower as the Laufenbourg-Engstlatt line (No. 105.1)
[ 16 ]	Transducer
[ 17 ]	Transducer
[ 18 ]	On the same tower as line No. 81 Laufenbourg-Sierentz 380 kV
[ 19 ]	From Kühmoos to Laufenbourg on the same tower
[ 20 ]	Limited by measuring transducer at Laufenbourg
[ 21 ]	From Kühmoos to Laufenbourg on the same tower
[ 22 ]	On the same tower as line Sierentz-Laufenburg
[ 23 ]	On CH side 220 kV
[ 24 ]	Limited by switching devices in Austria
[ 25 ]	Disconnected till approx. 2010; afterwards line will be dismantled
[ 26 ]	Cable at Braunau
[ 27 ]	Cable at Braunau

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Circuit ID (Frontier point.Line.Circuit)	Connection between:						Voltage of the circuit		Conventional transmission capacity of the connection (thermal)*		Limited by the transformers or by the substations			
	From substation			to substation			Forecast	Present	Forecast	Present	of circuits		of lines	
	Country	Name	Operated by	Country	Name	Operated by					at	Voltage	Transmission capacity	Voltage
Nr.							kV	kV	MVA	MVA	MVA	kV	MVA	kV
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
11.1.1	DE	Diele	E.ON Netz	NL	Meeden	TenneT TSO B.V.		380		1382	1000 [1]			
11.1.2	DE	Diele	E.ON Netz	NL	Meeden	TenneT TSO B.V.		380		1382	1000 [2]			
13.1.1	DE	Siersdorf	RWE Transportnetz Strom	NL	Maasbracht	TenneT TSO B.V.		380		1645				
13.1.2	DE	Rommerskirchen	RWE Transportnetz Strom	NL	Maasbracht	TenneT TSO B.V.		380		1698				
15.1.1	DE	Gronau	RWE Transportnetz Strom	NL	Hengelo	TenneT TSO B.V.		380		1790				
15.1.2	DE	Gronau	RWE Transportnetz Strom	NL	Hengelo	TenneT TSO B.V.		380		1790				
25.1.1	BE	Gramme	Elia	NL	Maasbracht	TenneT TSO B.V.		380		1207				
25.1.2	BE	Meerhout	Elia	NL	Maasbracht	TenneT TSO B.V.		380		1270				
26.1.1	BE	Zandvliet	Elia	NL	Geertruidenberg	TenneT TSO B.V.		380		1476				
26.2.1	BE	Zandvliet	Elia	NL	Borssele	TenneT TSO B.V.		380		1476	450 [3]			
41.1.1	BE	Aubange	Elia	LU	Belval	SOTEL		220		358				
41.1.2	BE	Aubange	Elia	LU	Belval	SOTEL		220		358				
41.2.1	BE	Aubange	Elia	LU	Belval	SOTEL		150		157	100			
41.3.1	BE	Aubange	Elia	LU	Belval	SOTEL		150		157	100			
51.1.1	BE	Monceau	Elia	FR	Chooz	RTE		220		356	290	150		
51.2.1	BE	Avelgem	Elia	FR	Mastaing [4]	RTE		380		1207				
51.2.2	BE	Avelgem	Elia	FR	Avelin	RTE		380		1367				
51.3.1	BE	Achène	Elia	FR	Lonny	RTE		380		1207				
52.1.1	BE	Aubange	Elia	FR	Moulaine	RTE		220		286				
71.1.1	DE	Uchtelfangen	RWE Transportnetz Strom	FR	Vigy	RTE		380		1790				
71.1.2	DE	Uchtelfangen	RWE Transportnetz Strom	FR	Vigy	RTE		380		1790				
71.2.1	DE	Ensdorf	RWE Transportnetz Strom	FR	St-Avold	RTE		220		261				
72.1.1	DE	Eichstetten	EnBW Transportnetze	FR	Vogelgrün	RTE	380	220		338 [5]		220		
72.1.2	DE	Eichstetten	EnBW Transportnetze	FR	Muhlbach	RTE		380		1751				
81.1.1	CH	Bassecourt	swissgrid	FR	Sierentz	RTE		380		1186				
81.2.1	CH	Laufenburg	swissgrid	FR	Sierentz	RTE		380		1167				
81.3.1	CH	Bassecourt	swissgrid	FR	Mambellin	RTE		380		1046				
82.1.1	CH	Verbois	swissgrid	FR	Bois-Tollot	RTE		380		1211	800	220 [6]		
82.1.2	CH	Chamoson	swissgrid	FR	Bois-Tollot	RTE		380		1409	600			
82.2.1	CH	Verbois	swissgrid	FR	Génissiat	RTE		220		315				11 [7]
82.2.2	CH	Verbois	swissgrid	FR	Génissiat	RTE		220		315				11 [8]
82.3.1	CH	Verbois	EOS	FR	Chancy-Pougny	SFM C-P		130		52	42			11 [9]
82.4.1	CH	La Bâtiatz	swissgrid	FR	Vallorcine	RTE		220		266				
82.5.1	CH	Riddes	swissgrid	FR	Cornier	RTE		220		275				
82.6.1	CH	St.-Triphon	swissgrid	FR	Cornier	RTE		220		275				
83.1.1 [10]	CH/DE	Asphard	swissgrid/EnBW Transp.netze	FR	Sierentz	RTE		380		1167				
91.1.1	FR	Albertville	RTE	IT	Rondissone	Tema		380		1244				
91.1.2	FR	Albertville	RTE	IT	Rondissone	Tema		380		1244				
92.1.1	FR	Trinite Victor	RTE	IT	Camporosso	Tema		220		320				
93.1.1	FR	Villarodin	RTE	IT	Venaus	Tema		380		956				
94.1.1 [11]	FR	Lucciana	EDF	IT	Suvereto	Tema		220 [12]		300			50	
94.1.2 [13]	FR	Lucciana	EDF	IT	Suvereto	Tema		220 [14]		300			50	
95.1.1	FR	Bonifacio	EDF	IT	Santa Teresa	Tema		150		53				
102.1.1 [15]	CH	Laufenburg	EGL Grid	DE	Gurtweil	EnBW Transportnetze		220		485	457 [16]	220		
102.1.2	CH	Laufenburg	EGL Grid	DE	Gurtweil	EnBW Transportnetze		220		469	457 [17]	220		
102.2.1 [18]	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze		220		430				
102.3.1 [19]	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze	380	220		430		220		
102.3.2	CH	Laufenburg	swissgrid	DE	Kühmoos	EnBW Transportnetze		380		1620	1580			
102.4.1	CH	Laufenburg	swissgrid	DE	Kühmoos	EnBW Transportnetze		380		1620	1580			
102.4.2	CH	Laufenburg	swissgrid	DE	Kühmoos	RWE Transportnetz Strom		380		1620	1265 [20]			
102.5.1 [21]	CH	Laufenburg	swissgrid	DE	Tiengen	RWE Transportnetz Strom		380		1131				
103.1.1	CH	Bezau	swissgrid	DE	Tiengen	RWE Transportnetz Strom		380		1158				
103.1.2	CH	Bezau	swissgrid	DE	Tiengen	RWE Transportnetz Strom	380	220		335				
103.1.3	CH	Klingnau	AWAG	DE	Tiengen	RWE Transportnetz Strom	380	110		57	40			
104.1.1 [22]	CH	Asphard	swissgrid	DE	Kühmoos	EnBW Transportnetze		380		1340				
105.1.1	CH	Laufenburg	swissgrid	DE	Engstlatt	EnBW Transportnetze		380		1580				
107.1.1 [23]	CH	Laufenburg 220kV	swissgrid	DE	Laufenburg 110 kV	ED		110		200				
111.1.1	AT	Bürs	VIW	DE	Obermooweller	EnBW Transportnetze		380		1369				
111.1.2	AT	Bürs	VIW	DE	Obermooweller	EnBW Transportnetze		380		1369				
111.2.1	AT	Bürs	VIW	DE	Herbertingen	RWE Transportnetz Strom		220		389				
111.3.1	AT	Bürs	VIW	DE	Dellmensingen	RWE Transportnetz Strom		220		492	457 [24]			
111.4.1	AT	Rieden	VKW -Netz	DE	Lindau	VKW -Netz		110		84				
111.4.2	AT	Hörbranz	VKW -Netz	DE	Lindau	VKW -Netz		110		84				
111.5.1	AT	Vorderwald	VKW -Netz	DE	Weiler	VKW -Netz		110		141				
115.1.1	AT	Braunau	ÖBK	DE	Neuötting	E.ON Netz		110		90 [25]			82 [26]	
115.2.1	AT	Braunau	ÖBK	DE	Stammham	E.ON Netz		110		102			82 [27]	
115.4.1	AT	Antiesenhofen	Verbund - APG	DE	Eggfing	E.ON Netz		110		102				

\*The conventional transmission capacity of cross-frontier tie-lines is based upon parameters standardised within UCTE for the calculation of the thermal load capability of each line. For aerial lines these are : ambient temperature of + 35°C, wind velocity of 0,56 m/s at a right angle to the line as well as the voltage value stated in column 10 or 11. The conditions relevant to system operation in various countries at various time of the year can strongly differ from those above. Because the real allowable load capability of the line depends on many other factors, such as load flow distribution, upholding of voltage, real ambient conditions, limits of stability, n-1 security, etc., the conventional transmission capacity has no relevance from the point of view of system operation or economics but allows just a comparison of order of magnitude of the various lines. Adding together the conventional transmission capacity of several tie-lines does not allow to infer on the real total transmission capability and leads to irrelevant results from the point of view of system operation.

## Observations

[ 28 ]	Transducer at Ering
[ 29 ]	Transducer at Ering
[ 30 ]	Isolator in St. Peter
[ 31 ]	Isolator in St. Peter
[ 32 ]	No international interconnector
[ 33 ]	CFT blocker at St. Peter
[ 34 ]	No international interconnector
[ 35 ]	CFT blocker at St. Peter
[ 36 ]	Switching device at Oberbrunn
[ 37 ]	Switching device at Oberbrunn
[ 38 ]	Possible to lay a second circuit
[ 39 ]	Possible to lay a second circuit
[ 40 ]	New substation with 400kV near spanish frontier: replace Cantegrit
[ 41 ]	New substation with 225kV near Spanish frontier: replace Mouquerre
[ 42 ]	Limited by transformer in Enstedt
[ 43 ]	Limited by transformer in Kassø
[ 44 ]	Transducer at Kassø
[ 45 ]	Transducer at Kassø
[ 46 ]	Monopol
[ 47 ]	DC submarine and underground cable
[ 48 ]	DC submarine and underground cable
[ 49 ]	DC submarine and underground cable
[ 50 ]	Under water cable
[ 51 ]	Under water cable
[ 52 ]	Limited by high-frequency coil
[ 53 ]	Generator line in radial operation - interconnected operation impossible
[ 54 ]	Installed at Vianden
[ 55 ]	Generator line in radial operation - interconnected operation impossible
[ 56 ]	Installed at Vianden
[ 57 ]	Generator line in radial operation - interconnected operation impossible
[ 58 ]	Installed at Vianden

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Circuit ID (Frontier point.Line.Circuit)	Connection between:						Voltage of the circuit		Conventional transmission capacity of the connection (thermal)*		Limited by the transformers or by the substations			
	From substation			to substation			Forecast	Present	Forecast	Present	of circuits		of lines	
	Country	Name	Operated by	Country	Name	Operated by					at	Voltage	Transmission capacity	Voltage
Nr.							kV	kV	MVA	MVA	MVA	kV	MVA	kV
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
115.5.1	AT	St. Peter	Verbund - APG	DE	Altheim	E.ON Netz		220		301				
115.6.1	AT	St. Peter	Verbund - APG	DE	Simbach	E.ON Netz		220		301				
115.7.1	AT	St. Peter	Verbund - APG	DE	Ering	E.ON Netz		110		152	137		114 [28]	
115.7.2	AT	St. Peter	Verbund - APG	DE	Ering	E.ON Netz		110		152	137		114 [29]	
115.8.1	AT	St. Peter	Verbund - APG	DE	Eggfing	E.ON Netz		110		105				
115.9.1	AT	St. Peter	Verbund - APG	DE	Pirach	E.ON Netz		220		518	457 [30]			
115.10.1	AT	St. Peter	Verbund - APG	DE	Pleinting	E.ON Netz		220		518	457 [31]			
115.12.1	AT	Oberaudorf	ÖBK	DE	Rosenheim	E.ON Netz		110		93				
115.13.1	AT	Oberaudorf	ÖBK	DE	Kiefersfelden	E.ON Netz		110		102				
115.14.1	AT	Antiesenhofen	EAGOO-Netz	DE	Weidach	Thüga		110		130				
115.14.2	AT	Antiesenhofen	EAGOO-Netz	DE	Weidach	Thüga		110		130				
115.15.1	AT	Aigerding	Verbund - APG/EAGOO-Netz	DE	Passau	ÖBK		110		102				
115.16.1 [32]	AT	St. Peter	Verbund - APG	DE	Schärding	ÖBK		220		301			229 [33]	
115.16.2 [34]	AT	St. Peter	Verbund - APG	DE	Schärding	ÖBK		220		301			229 [35]	
115.17.1	AT	Kufstein	TIWAG-Netz	DE	Oberaudorf	E.ON Netz		110		90				
115.17.2	AT	Ebbs	TIWAG-Netz	DE	Oberaudorf	E.ON Netz		110		127				
116.1.1	AT	Westtirol	Verbund - APG	DE	Leupolz	RWE Transportnetz Strom		380		1316				
116.2.1	AT	Westtirol	Verbund - APG	DE	Memmingen	RWE Transportnetz Strom		220		762				
117.1.1	AT	Silz	TIWAG-Netz	DE	Oberbrunn	E.ON Netz		220		793	762 [36]			
117.1.2	AT	Silz	TIWAG-Netz	DE	Oberbrunn	E.ON Netz		220		793	762 [37]			
117.3.1	AT	Reutte	TIWAG-Netz	DE	Füssen	EW Reutte		110		127				
117.3.2	AT	Reutte	TIWAG-Netz	DE	Füssen	EW Reutte		110		127				
121.1.1	CH	All'Acqua	swissgrid	IT	Ponte	Terna		220		278				
121.2.1	CH	Gorduno	swissgrid	IT	Mese	Terna		220		278				
121.3.1	CH	Soazza	swissgrid	IT	Bulciago	Terna		380		1224				
121.4.1	CH	Lavorgo	swissgrid	IT	Musignano	Terna		380		1204				
122.1.1 [38]	CH	Campocologno	RE	IT	Poschiavino	Terna		150		103	42			
123.1.1	CH	Riddes	swissgrid	IT	Avisè	Terna		220		309				
123.2.1	CH	Riddes	swissgrid	IT	Valpelline	Terna		220		309				
123.3.1	CH	Serra	swissgrid	IT	Pallanzeno	Terna		220		278				
124.1.1	CH	Robbia	swissgrid	IT	Gorlago	Terna		380		1340				
124.1.2	CH	Robbia	swissgrid	IT	San Fiorano	Terna		380		1340				
132.1.1	AT	Lienz	Verbund - APG	IT	Soverzene	Terna		220		257				
141.1.1 [39]	AT	Meiningen	VKW-Netz	CH	Y-Rehag	swissgrid		220		501				
141.2.1	AT	Meiningen	VKW-Netz	CH	Winkeln	swissgrid		220		776				
142.1.1	AT	Westtirol	Verbund - APG	CH	Pradella	swissgrid		380		1340				
142.2.1	AT	Westtirol	Verbund - APG	CH	Pradella	swissgrid		380		1340				
151.1.1	ES	Hemani	REE	FR	Argia [40]	RTE		380		1136				
151.2.1	ES	Irún	REE	FR	Errondenia	RTE		132		56				
151.3.1	ES	Arkale	REE	FR	Argia [41]	RTE		220		340				
151.4.1	ES	Biescas	REE	FR	Pragnères	RTE		220		237				
152.1.1	ES	Benós	REE	FR	Lac d'Oo	RTE		110		63				
153.1.1	ES	Vic	REE	FR	Baixas	RTE		380		1105				
161.1.1 [42]	DE	Flensburg	E.ON Netz	DK_W	Ensted	Energinet.dk		220		332	305			
161.2.1	DE	Flensburg	E.ON Netz	DK_W	Kassø	Energinet.dk		220		332	305 [43]			
161.3.1	DE	Audorf	E.ON Netz	DK_W	Kassø	Energinet.dk		380		1078	658 [44]			
161.3.2	DE	Audorf	E.ON Netz	DK_W	Kassø	Energinet.dk		380		1078	658 [45]			
161.4.1	DE	Flensburg UW Nord	E.ON Netz	DK_W	Ensted	Energinet.dk		150		150				
162.1.1 [46]	DE	Bentwisch	VE Transmission	DK_E	Bjæverskov	Energinet.dk		400		600 [47]				
163.1.1	NO	Kristiansand	Statnett	DK_W	Tjele	Energinet.dk				250 [48]				
163.1.2	NO	Kristiansand	Statnett	DK_W	Tjele	Energinet.dk				250 [49]				
164.1.1	NO	Kristiansand	Statnett	DK_W	Tjele	Energinet.dk				350 [50]				
166.1.1	SE	Lindome	Svenska Kraftnät	DK_W	Vester Hassing	Energinet.dk				360 [51]				
171.1.1	AT	Bisamberg	Verbund - APG	CZ	Sokolnice	CEPS		220		251				
171.2.1	AT	Bisamberg	Verbund - APG	CZ	Sokolnice	CEPS		220		251				
172.1.1	AT	Dürrrohr	Verbund - APG	CZ	Slavetice	CEPS		380		1559	1386 [52]			
181.1.1	AT	Obersielach	Verbund - APG	SI	Podlog	ELES		220		351				
182.1.1	AT	Kainachtal	Verbund - APG	SI	Maribor	ELES		380		1514	450			
182.2.1	AT	Kainachtal	Verbund - APG	SI	Maribor	ELES		380		1514	450			
191.1.1	DE	Niederstedem	RWE Transportnetz Strom	LU	Vianden	SEO		220		490	460 [53,54]			
191.1.2	DE	Niederstedem	RWE Transportnetz Strom	LU	Vianden	SEO		220		490	230			
191.2.1	DE	Bauler	RWE Transportnetz Strom	LU	Vianden	SEO		220		730	345 [55,56]			
191.2.2	DE	Bauler	RWE Transportnetz Strom	LU	Vianden	SEO		220		730	230 [57,58]			
191.3.1	DE	Bauler	RWE Transportnetz Strom	LU	Flebour	CEGEDEL Net SA		220		490			260	
191.4.1	DE	Bauler	RWE Transportnetz Strom	LU	Roost	CEGEDEL Net SA		220		490			260	
192.1.1	DE	Trier	RWE Transportnetz Strom	LU	Heisdorf	CEGEDEL Net SA		220		490				
192.2.1	DE	Quint	RWE Transportnetz Strom	LU	Heisdorf	CEGEDEL Net SA		220		490				

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## Observations

[ 59 ]	The 400kV DC link between GR-IT is composed of an overhead line and a submarine cable
[ 60 ]	In Hungary 2 systems in parallel operation
[ 61 ]	DC submarine cable
[ 62 ]	Unit is MW instead of MVA
[ 63 ]	DC submarine cable
[ 64 ]	Unit is MW instead of MVA
[ 65 ]	Limited by the connected network
[ 66 ]	Nominal voltage in Croatia
[ 67 ]	Limited by the connected network
[ 68 ]	Nominal voltage in Croatia
[ 69 ]	Built for 750 kV
[ 70 ]	4500 MVA at 750 kV
[ 71 ]	The limitation is 750MW
[ 72 ]	Limited by the Albanian network
[ 73 ]	Capacity of current transformers at Bistrica
[ 74 ]	Limitating installations in CZ
[ 75 ]	Limitating installations in CZ
[ 76 ]	Disconnected in Yugoslavia
[ 77 ]	Destroyed line
[ 78 ]	Out of operation

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Circuit ID (Frontier point.Line.Circuit)	Connection between:						Voltage of the circuit		Conventional transmission capacity of the connection (thermal)*		Limited by the transformers or by the substations			
	From substation			to substation			Forecast	Present	Forecast	Present	of circuits		of lines	
	Country	Name	Operated by	Country	Name	Operated by					at	Voltage	Transmission capacity	Voltage
Nr.							kV	kV	MVA	MVA	MVA	kV	MVA	kV
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
201.1.1	IT	Redipuglia	Tema	SI	Divaca	ELES		380		1619				
201.2.1	IT	Padriciano	Tema	SI	Divaca	ELES		220		305				
205.1.1 [59]	IT	Galatina	Tema	GR	Arachthos	HTSO		380		500				
211.1.1	AT	Wien Süd-Ost	Verbund - APG	HU	Győr	MAVIR		220		209				
211.1.2	AT	Neusiedl	Verbund - APG	HU	Győr	MAVIR		220		209				
212.1.1 [60]	AT	Wien Süd-Ost	Verbund - APG	HU	Győr	MAVIR		380		1514				
221.1.1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [61]		1000 [62]				
221.2.1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [63]		1000 [64]				
231.1.1	ES	Las Conchas	REE	PT	Lindoso	REN		132		90				
232.1.1	ES	Aldeadávila	REE	PT	Bemposta	REN		220		374				
232.2.1	ES	Aldeadávila	REE	PT	Pocinho	REN		220		374				
232.3.1	ES	Saucelle	REE	PT	Pocinho	REN		220		346				
233.1.1	ES	Cedillo	REE	PT	Falagueira	REN		380		1300				
234.1.1	ES	Cartelle	REE	PT	Alto Lindoso	REN		380		1330				
234.1.2	ES	Cartelle	REE	PT	Alto Lindoso	REN		380		1330				
235.1.1	ES	Brovales	REE	PT	Alqueva	REN		400		1347				
241.1.1	MK	Dubrovo	MEPSO	GR	Thessaloniki	HTSO		400		1300				
242.1.1	MK	Bitola	MEPSO	GR	Meliti	HTSO		400		1300				
251.1.1	HU	Lenti	MAVIR	HR	Nedeljanec	HEP-OPS		120		79	50 [65]	110 [66]		
251.2.1	HU	Siklos	MAVIR	HR	Donji Miholjac	HEP-OPS		120		114	50 [67]	110 [68]		
251.3.1	HU	Hévíz	MAVIR	HR	Zerjavinec	HEP-OPS		400		1246				
251.3.2	HU	Hévíz	MAVIR	HR	Zerjavinec	HEP-OPS		400		1246				
261.1.1	RS	Djerdap	EMS	RO	Portile de Fier	TRANSELECTRICA		380		1135				
262.1.1	RS	Kikinda 1	EMS	RO	Jimbolia	TRANSELECTRICA		110		65				
263.1.1	RS	Kusijak	EMS	RO	Ostrovu Mare	TRANSELECTRICA		110		90				
264.1.1	RS	Sip	EMS	RO	Gura Vaii	TRANSELECTRICA		110		90				
271.1.1	BG	Sofija Zapad	NEK	RS	Niš	EMS		380		1309				
272.1.1	BG	Breznik	ESO EAD	RS	HE Vrla 1	EMS		110		97				
273.1.1	BG	Kula	ESO EAD	RS	Zajecar	EMS		110		90				
275.1.1	RO	Isaccea	TRANSELECTRICA	BG	Vama	ESO EAD	750	400 [69]	4500	2168 [70]			750[71]	
276.1.1	RO	Isalnita	TRANSELECTRICA	BG	Kozlodui	ESO EAD		220		330				
277.1.1	RO	Tántareni	TRANSELECTRICA	BG	Kozlodui	ESO EAD		400		1135		1000		
277.1.2	RO	Tántareni	TRANSELECTRICA	BG	Kozlodui	ESO EAD		400		1135				
278.1.1	RO	Isaccea	TRANSELECTRICA	BG	Dobrudja	ESO EAD		400		1565			830	
281.1.1	AL	Vau i Dejës	KESH	ME	Podgorica	EP CG		220		276				
282.1.1	AL	Fierza	KESH	RS	Prizren	EMS		220		270				
291.1.1	AL	Elbassan	KESH	GR	Kardia	HTSO		400		1300	250 [72]			
292.1.1	AL	Bistrica	KESH	GR	Mourtos	HTSO		150		120	40 [73]			
293.1.1	TR	Babaeski	TEIAS	GR	Didymoticho	HTSO		150		185				
301.1.1	BG	Blagoevgrad	ESO EAD	GR	Thessaloniki	HTSO		400		1300	700			
321.1.1	CZ	Hradec Zapad	CEPS	DE	Etzenricht	E.ON Netz		380		1363	1316 [74]			
321.1.2	CZ	Prestice	CEPS	DE	Etzenricht	E.ON Netz		380		1363	1579 [75]			
322.1.1	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	VE Transmission		380		1205				
322.1.2	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	VE Transmission		380		1205				
331.1.1	HU	Sándorfalva	MAVIR	RS	Subotica 3	EMS		380		1295	1050			
332.1.1	HU	Szeged	MAVIR	RS	Subotica	EMS		110		79 [76]	62			
341.1.1	BG	Skakavica	ESO EAD	MK	Kriva Palanka	MEPSO		110		123				
341.2.1	BG	Petric	ESO EAD	MK	Sušica	MEPSO		110		123				
351.1.1	HR	Melina	HEP-OPS	SI	Divaca	ELES		380		1264				
351.2.1	HR	Pehlin	HEP-OPS	SI	Divaca	ELES		220		366				
351.3.1	HR	Buje	HEP-OPS	SI	Koper	ELES		110		89				
351.4.1	HR	Matulji	HEP-OPS	SI	Ilirska Bistrica	ELES		110		53				
352.1.1	HR	Tumbri	HEP-OPS	SI	Krško	ELES		380		1316				
352.1.2	HR	Tumbri	HEP-OPS	SI	Krško	ELES		380		1316				
352.2.1	HR	Zerjavinec	HEP-OPS	SI	Cirkovce	ELES		220		297				
352.3.1	HR	Nedeljanec	HEP-OPS	SI	Formin	ELES		110		115				
361.1.1	BA	Mostar	NOS BiH	HR	Konjsko	HEP-OPS		400		1316				
361.2.1	BA	Mostar	NOS BiH	HR	Zakucac	HEP-OPS		220		311				
361.3.1	BA	Grahovo	NOS BiH	HR	Knin	HEP-OPS		110		90				
361.4.1	BA	Buško Blato	NOS BiH	HR	Kraljevac	HEP-OPS		110		115				
361.5.1	BA	Buško Blato	NOS BiH	HR	Peruca	HEP-OPS		110		90				
361.6.1	BA	Grude	NOS BiH	HR	Imotski	HEP-OPS		110		72				
361.7.1	BA	Kulen Vakuf	NOS BiH	HR	Gracac	HEP-OPS		110		120	101			
362.1.1	BA	Jajce	NOS BiH	HR	Mraclin	HEP-OPS		220		297 [77]				
362.2.1	BA	Prijedor	NOS BiH	HR	Meduric	HEP-OPS		220		297				
363.1.1	BA	Trebinje	NOS BiH	HR	Dubrovnik	HEP-OPS		220		460 [78]				
363.2.1	BA	Trebinje	NOS BiH	HR	Dubrovnik	HEP-OPS		220		460				

\*The conventional transmission capacity of cross-frontier tie-lines is based upon parameters standardised within UCTE for the calculation of the thermal load capability of each line. For arial lines these are : ambient temperature of + 35°C, wind velocity of 0,56 m/s at a right angle to the line as well as the voltage value stated in column 10 or 11. The conditions relevant to system operation in various countries at various time of the year can strongly differ from those above. Because the real allowable load capability of the line depends on many other factors, such as load flow distribution, upholding of voltage, real ambient conditions, limits of stability, n-1 security, etc., the conventional transmission capacity has no relevance from the point of view of system operation or economics but allows just a comparison of order of magnitude of the various lines. Adding together the conventional transmission capacity of several tie-lines does not allow to infer on the real total transmission capability and leads to irrelevant results from the point of view of system operation.

## Observations

[ 79 ]	Destroyed line and substation
[ 80 ]	Destroyed line
[ 81 ]	Destroyed line
[ 82 ]	New line 400 kV between CS (EMS) and BA (NOS) Ugljevik - Sremska Mitrovica is operational from EMS side
[ 83 ]	Line is destroyed, currently under construction
[ 84 ]	Line is destroyed, currently under construction
[ 85 ]	DC submarine cable
[ 86 ]	Monopol
[ 87 ]	Limited by the measuring transformer of current
[ 88 ]	Limited by the connections among equipments
[ 89 ]	Limited by the measuring transformer of current
[ 90 ]	Limited by the measuring transformer of current
[ 91 ]	Limited by rope
[ 92 ]	Limited by the wire
[ 93 ]	On Polish side 400 kV line (internal designation between VE-T and PSE Operator)
[ 94 ]	On Polish side 400 kV line (internal designation between VE-T and PSE Operator)
[ 95 ]	Submarine cable
[ 96 ]	Submarine cable
[ 97 ]	Limited by current transformer at Krosno
[ 98 ]	Limited by current transformer at Krosno
[ 99 ]	Out of operation
[ 100 ]	Limited by HF attenuator at UA side
[ 101 ]	Radial operation
[ 102 ]	Out of operation
[ 103 ]	Submarine cable
[ 104 ]	Limited by the choke coil
[ 105 ]	Limited by the choke coil
[ 106 ]	Limited by the measuring transformer of current
[ 107 ]	Out of operation
[ 108 ]	Limited by HF attenuator
[ 109 ]	Not in operation
[ 110 ]	Limitation 900 MW



Circuit ID (Frontier point.Line.Circuit)	Connection between:						Voltage of the circuit		Conventional transmission capacity of the connection (thermal)*		Limited by the transformers or by the substations			
	From substation			to substation			Forecast	Present	Forecast	Present	of circuits		of lines	
	Country	Name	Operated by	Country	Name	Operated by					at	Voltage	Transmission capacity	Voltage
Nr.							kV	kV	MVA	MVA	MVA	kV	MVA	kV
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
363.3.1	BA	Capljina	NOS BIH	HR	Opuzen	HEP-OPS		110		84				
363.4.1	BA	Neum	NOS BIH	HR	Opuzen	HEP-OPS		110		84				
363.5.1	BA	Neum	NOS BIH	HR	Ston	HEP-OPS		110		76				
363.6.1	BA	Trebinje	NOS BIH	HR	Komolac	HEP-OPS		110		84				
364.1.1	BA	Ugljevik	NOS BIH	HR	Ernestinovo	HEP-OPS		400		1264 [79]				
364.2.1	BA	Gradacac	NOS BIH	HR	Đakovo	HEP-OPS		220		229 [80]				
364.3.1	BA	Tuzla	NOS BIH	HR	Đakovo	HEP-OPS		220		229				
364.4.1	BA	Bosanski Brod	NOS BIH	HR	Slavonski Brod 2	HEP-OPS		110		115 [81]				
364.5.1	BA	Orasje	NOS BIH	HR	Županja	HEP-OPS		110		76				
371.1.1	HR	Ernestinovo	HEP-OPS	RS	Sremska Mitrovica	EMS		380		1264				
371.2.1	HR	Nijemci	HEP-OPS	RS	Šid	EMS		110		76				
371.3.1	HR	Beli Manastir	HEP-OPS	RS	Apatin	EMS		110		78				
381.1.1	BA	Trebinje	NOS BIH	ME	Podgorica	EP CG		380		1264				
381.2.1	BA	Trebinje	NOS BIH	ME	Perucica	EP CG		220		276				
381.3.1	BA	Trebinje	NOS BIH	ME	Herceg Novi	EP CG		110		90				
381.4.1	BA	Bileca	NOS BIH	ME	Vilusi	EP CG		110		84				
382.1.1	BA	Sarajevo 20	NOS BIH	ME	Piva	EP CG		220		366				
382.2.1	BA	Goražde	NOS BIH	ME	Piljevija	EP CG		110		90				
383.1.1	BA	Višegrad	NOS BIH	RS	Požega	EMS		220		311				
383.2.1	BA	Bijeljina	NOS BIH	RS	Lešnica	EMS		110		123				
383.3.1	BA	Zvornik	NOS BIH	RS	HE Zvornik	EMS		110		123				
383.4.1	BA	Višegrad	NOS BIH	RS	Potpec	EMS		110		90				
383.5.1	BA	Ugljevik	NOS BIH	RS	Sremska Mitrovica	EMS		380		1264 [82]				
384.1.1	ME	Ribarevine	EP CG	RS	Kosovo B	EMS		380		1264				
384.2.1	ME	Piljevija 2	EP CG	RS	Bajina Basta	EMS		220		350				
384.3.1	ME	Piljevija 2	EP CG	RS	Pozega	EMS		220		365				
384.4.1	ME	Piljevija 1	EP CG	RS	Zamrsten	EMS		110		70				
391.1.1	MK	Skopje 1	MEPSO	RS	Kosovo A	EMS		220		311 [83]				
391.2.1	MK	Skopje 1	MEPSO	RS	Kosovo A	EMS		220		311 [84]				
391.3.1	MK	Skopje 5	MEPSO	RS	Kosovo B	EMS		380		1218				
401.1.1 [85,86]	DE	Herrenwyk	E.ON Netz	SE	Kruseberg	Sydkraft/Vattenfall		450		600				
404.1.1	CZ	Nosovice	CEPS	SK	Varin	SEPS		400		1205		1386 [87]		
410.1.1	CZ	Liskovec	CEPS	SK	Pov. Bystrica	SEPS		220		221				
420.1.1	CZ	Sokolnice	CEPS	SK	Senica	SEPS		220		213				
424.1.1	CZ	Sokolnice	CEPS	SK	Krizovany	SEPS		400		1205		1323 [88]		
430.1.1	CZ	Sokolnice	CEPS	SK	Stupava	SEPS		400		1363		1386 [89]		
440.1.1	SK	V.Kapusany	SEPS	UA_W	Mukachevo	NPC Ukrenergo		400		1186		831 [90]		
443.1.1	CZ	Albrechtice	CEPS	PL	Dobrzeń	PSE-Operator S.A.		400		1088				
444.1.1	CZ	Nošovice	CEPS	PL	Wielopole	PSE-Operator S.A.		400		1088				
450.1.1	CZ	Liskovec	CEPS	PL	Kopanina	PSE-Operator S.A.		220		399				
460.1.1	CZ	Liskovec	CEPS	PL	Bujaków	PSE-Operator S.A.		220		399				
501.1.1	DE	Vierraden	VE Transmission	PL	Krajnik	PSE-Operator S.A.		220		390 [91]				
501.1.2	DE	Vierraden	VE Transmission	PL	Krajnik	PSE-Operator S.A.		220		402 [92]				
502.1.1	DE	Hagenwerder	VE Transmission	PL	Mikulowa	PSE-Operator S.A.		380 [93]		1302				
502.1.2	DE	Hagenwerder	VE Transmission	PL	Mikulowa	PSE-Operator S.A.		380 [94]		1302				
601.1.1 [95]	ES	Puerto de la Cruz	REE	MA	Melloussa 1	ONE		380		715				
601.1.2 [96]	ES	Puerto de la Cruz	REE	MA	Melloussa 2	ONE		380		715				
700.1.1	PL	Krosno Iskrzynia	PSE-Operator S.A.	SK	Lemešany	SEPS		400		1252		831 [97]		
700.1.2	PL	Krosno Iskrzynia	PSE-Operator S.A.	SK	Lemešany	SEPS		400		1252		831 [98]		
701.1.1	PL	Rzeszów	PSE-Operator S.A.	UA	Chmielnicka	NPC Ukrenergo		750		2676 [99]		1949 [100]		
702.1.1	PL	Zamość	PSE-Operator S.A.	UA	Dobrotwor	NPC Ukrenergo		220		309 [101]				
703.1.1	PL	Białystok	PSE-Operator S.A.	BY	Ros	Grodnoenergo		220		215 [102]				
704.1.1	PL	Ślupsk	PSE-Operator S.A.	SE	Stårnø	SvK		450		600 [103]				
710.1.1	HU	Győr	MAVIR	SK	Gabcikovo	SEPS		400		1330		1386 [104]		
711.1.1	HU	Göd	MAVIR	SK	Levice	SEPS		400		1330		1386 [105]		
720.1.1	HU	Albertirsa	MAVIR	UA_W	Zahidno Ukrainska	NPC Ukrenergo		750		4010		1400		
721.1.1	HU	Sajószöged	MAVIR	UA_W	Mukacevo	NPC Ukrenergo		400		1390		693 [106]		
722.1.1	HU	Kisvárd	MAVIR	UA_W	Mukacevo	NPC Ukrenergo		220		209		305		
722.1.2	HU	Tiszaók	MAVIR	UA_W	Mukacevo	NPC Ukrenergo		220		209		305		
730.1.1	HU	Sándorfalva	MAVIR	RO	Arad	TRANSELECTRICA		400		1135				
740.1.1	RO	Rosiori	TRANSELECTRICA	UA_W	Mukacevo	NPC Ukrenergo		400		1135				
741.1.1	RO	Isaccea	TRANSELECTRICA	UA_W	PivdennoUkrainska AES	NPC Ukrenergo		750		4500 [107]		2100 [108]		
750.1.1	RO	Stânca	TRANSELECTRICA	MD	Costesti	Moldenergo		110		238				
751.1.1	RO	Husi	TRANSELECTRICA	MD	Cioara	Moldenergo		110		75				
752.1.1	RO	Tutora	TRANSELECTRICA	MD	Ungheni	Moldenergo		110		88				
753.1.1	RO	Issaccea	TRANSELECTRICA	MD	Vulcanesti	Moldenergo		400		1043				
760.1.1	BG	Maritsa3	ESO EAD	TR	Babaeski	TEIAS		400		1309 [109]		900		
761.1.1	BG	Maritsa3	ESO EAD	TR	Hamitabat	TEIAS		400		1715		900 [110]		

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## Abbreviations used for grid operators

<b>Austria</b>	Verbund - APG TIWAG Netz AG VKW - Netz AG	Verbund - Austria Power Grid AG TIWAG Netz AG VKW - Netz AG	<b>Denmark East</b>	Energinet.dk	Energinet.dk
<b>Bosnia - Herzegovina</b>	ISO BiH	Nezavisni operator sustava u Bosni i Hercegovini	<b>Ukraine West</b>	NPC Ukrenergo	NPC Ukrenergo
<b>Belgium</b>	Elia	Elia System Operator SA/NV	<b>Albania</b>	KESH	Albanian Electroenergetic Corporation
<b>Bulgaria</b>	ESO EAD	Electroenergien Sistemen Operator EAD	<b>Belarus</b>	Grodnoenergo	Grodnoenergo
<b>Switzerland</b>	swissgrid	swissgrid ag	<b>Great Britain</b>	National Grid	The National Grid Company plc
	EPCG EPS	Elektroprivreda Crne Gore JP Elektromreža Srbije	<b>Morocco</b>	ONE	Office National de l'Electricité
<b>Czech Republic</b>	CEPS	CEPS a.s.	<b>Republic of Moldavia</b>	Moldenergo	Moldenergo
<b>Germany</b>	E.ON Netz EnBW Transportnetze RWE Transportnetz Strom VE Transmission	E.ON Netz GmbH EnBW Transportnetze AG RWE Transportnetz Strom GmbH Vattenfall Europe Transmission GmbH	<b>Norway</b>	Statnett	Statnett
<b>Denmark West</b>	Energinet.dk	Energinet.dk	<b>Republic of Turkey</b>	TEIAS	Türkiye Elektrik İletim A.S.
<b>Spain</b>	REE	Red Eléctrica de España S.A.	<b>Sweden</b>	SYDKRAFT VATTENFALL SvK	Sydkraft AB Vattenfall AB Svenska Kraftnät
<b>France</b>	RTE	RTE EDF Transport S.A.			
<b>Greece</b>	HTSO / DESMIE	Hellenic Transmission System Operator/ Diachiristis Elinikou Sistimatos Metaforas Ilectrikis Energias			
<b>Croatia</b>	HEP - OPS	HEP-Operator prijenosnog sustava d.o.o.			
<b>Hungary</b>	MAVIR ZRt.	MAVIR Magyar Villamosenergia-ipari Rendszerirányító Zártkörűen Működő Részvénytársaság			
<b>Italy</b>	Terna S.p.A.	Terna - Rete Elettrica Nazionale SpA			
<b>Luxembourg</b>	CEGEDEL Net S.A.	Compagnie Grand Ducale d'Electricité du Luxembourg			
<b>Montenegro</b>	EPCG	Elektroprivreda Crne Gore			
<b>FYROM</b>	MEPSO	Macadonian Transmission System Operator			
<b>The Netherlands</b>	TenneT TSO B.V.	TenneT TSO B.V.			
<b>Poland</b>	PSE-Operator	PSE-Operator S.A.			
<b>Portugal</b>	REN	Rede Eléctrica Nacional, S.A.			
<b>Romania</b>	TRANSELECTRICA	C.N. Transelectrica S.A.			
<b>Slovenia</b>	ELES	Elektro Slovenija			
<b>Serbia</b>	EMS	JP Elektromreža Srbije			
<b>Slovak Republic</b>	SEPS	Slovenska elektrizacna prenosova sustava, a.s.			

Circuit ID	From substation	To substation	Voltage [kV]	Thermal conventional transmission capacity [ MVA ]	Major Reason	Time whole year [min]	January [min]	February [min]	March [min]	April [min]	May [min]	June [min]	July [min]	August [min]	September [min]	October [min]	November [min]	December [min]
11.1.1	DE - Diele ( E.ON Netz )	NL - Meeden ( TenneT TSO B.V. )	380	1382	R1,R2,R3	47750			453		93	12398	6200		26	28580		
11.1.2	DE - Diele ( E.ON Netz )	NL - Meeden ( TenneT TSO B.V. )	380	1382	R1,R2	6401			24			6377						
13.1.1	DE - Siersdorf ( RWE Transportnetz Strom )	NL - Maasbracht ( TenneT TSO B.V. )	380	1645	R1,R10	6863		715		6148								
13.1.2	DE - Rommerskirchen ( RWE Transportnetz Strom )	NL - Maasbracht ( TenneT TSO B.V. )	380	1698	R10	524		524										
15.1.1	DE - Gronau ( RWE Transportnetz Strom )	NL - Hengelo ( TenneT TSO B.V. )	380	1790	R1,R10	35468	33567	98					1803					
15.1.2	DE - Gronau ( RWE Transportnetz Strom )	NL - Hengelo ( TenneT TSO B.V. )	380	1790	R1	3398							3398					
25.1.1	BE - Gramme ( Elia )	NL - Maasbracht ( TenneT TSO B.V. )	380	1207	R1,R6,R8	37781			18133	19648		0	0					
25.1.2	BE - Meerhout ( Elia )	NL - Maasbracht ( TenneT TSO B.V. )	380	1270	R1,R2,R3,R7	45412		299			34861		503					9749
26.1.1	BE - Zandvliet ( Elia )	NL - Geertruidenberg ( TenneT TSO B.V. )	380	1476	R1	649									649			
26.2.1	BE - Zandvliet ( Elia )	NL - Borssele ( TenneT TSO B.V. )	380	1476	R2	665												665
41.1.1	BE - Aubange ( Elia )	LU - Belval ( SOTEL )	220	358	R1	472				472								
41.1.2	BE - Aubange ( Elia )	LU - Belval ( SOTEL )	220	358	R1	6390				6390								
41.2.1	BE - Aubange ( Elia )	LU - Belval ( SOTEL )	150	157	R1,R10	2204								1709	177	318		
41.3.1	BE - Aubange ( Elia )	LU - Belval ( SOTEL )	150	157	R1	281								91	178	12		
51.1.1	BE - Monceau ( Elia )	FR - Chooz ( RTE )	220	356	R1,R3	36521	8718				27803							
51.2.1	BE - Avelgem ( Elia )	FR - Mastaing ( RTE )	380	1207	R1,R8	2516			2017	499		0						
51.2.2	BE - Avelgem ( Elia )	FR - Avelin ( RTE )	380	1367	R1	19891				3453						16438		
51.3.1	BE - Achene ( Elia )	FR - Lonny ( RTE )	380	1207	R1,R2,R9	6300		8		6292								
52.1.1	BE - Aubange ( Elia )	FR - Moulaine ( RTE )	220	286	R1	16444								16444				
71.1.1	DE - Uchtelfangen ( RWE Transportnetz Strom )	FR - Vigy ( RTE )	380	1790	R1	703		703										
71.1.2	DE - Uchtelfangen ( RWE Transportnetz Strom )	FR - Vigy ( RTE )	380	1790	R1	597		597										
71.2.1	DE - Ens Dorf ( RWE Transportnetz Strom )	FR - St-Avold ( RTE )	220	261	R1,R10	36201	585		13652						632		17280	4052
72.1.1	DE - Eichstetten ( EnBW Transportnetze )	FR - Vogelgrün ( RTE )	220	338	R1,R9	9847			6		6358			3476		7		
72.1.2	DE - Eichstetten ( EnBW Transportnetze )	FR - Muhlbach ( RTE )	380	1751	R1	6342					6329				13			
81.1.1	CH - Bassecourt ( swissgrid )	FR - Sierentz ( RTE )	380	1186	R1	21379	4808						178				16393	
81.2.1	CH - Laufenburg ( swissgrid )	FR - Sierentz ( RTE )	380	1167	R1	40322	13977	22498		3522		325						
81.3.1	CH - Bassecourt ( swissgrid )	FR - Mambelin ( RTE )	380	1046	R1	8803		2020			5		341				6437	
82.1.1	CH - Verbois ( swissgrid )	FR - Bois-Tollot ( RTE )	380	1211	R1,R9	6877	539				12						6326	
82.1.2	CH - Chamoson ( swissgrid )	FR - Bois-Tollot ( RTE )	380	1409	R1, R9	28593	547			113	17328	1047			9558			
82.2.1	CH - Verbois ( swissgrid )	FR - Génissiat ( RTE )	220	315	R1	12599									6284	6315		
82.2.2	CH - Verbois ( swissgrid )	FR - Génissiat ( RTE )	220	315	R1	57851									39889	17962		
82.5.1	CH - Riddes ( swissgrid )	FR - Cornier ( RTE )	220	275	R1,R2,R8	18266				16134			201				1717	214
82.6.1	CH - St.-Triphon ( swissgrid )	FR - Cornier ( RTE )	220	275	R1	6420											6420	
83.1.1	DE - Asphard ( swissgrid/EnBW Tr.Netze )	FR - Sierentz ( RTE )	380	1167	R1	35466										22646	12611	209
91.1.1	FR - Albertville ( RTE )	IT - Rondissone ( Terna )	380	1244	R1	2096								2096				
91.1.2	FR - Albertville ( RTE )	IT - Rondissone ( Terna )	380	1244	R1	2505								2505				
92.1.1	FR - Trinite Victor ( RTE )	IT - Camporosso ( Terna )	220	320	R1	18720									18720			
93.1.1	FR - Villarodin ( RTE )	IT - Venaus ( Terna )	380	956	R1	9181								9181				
94.1.1	FR - Lucciana ( EDF )	IT - Suvereto ( Terna )	220	300	R1	6720						6720						
102.1.1	CH - Laufenburg ( swissgrid )	DE - Gurtweil ( EnBW Transportnetze )	220	485	R1	3932					3246				686			
102.1.2	CH - Laufenburg ( swissgrid )	DE - Gurtweil ( EnBW Transportnetze )	220	469	R1	2011				2011								
102.2.1	CH - Laufenburg ( swissgrid )	DE - Kühmoos ( EnBW Transportnetze )	220	430	R1,R9	7007					7003			4				
102.3.1	CH - Laufenburg ( swissgrid )	DE - Kühmoos ( EnBW Transportnetze )	220	430	R1	7000					7000							
102.3.2	CH - Laufenburg ( swissgrid )	DE - Kühmoos ( EnBW Transportnetze )	380	1620	R1,R2	7269			3549	2021			1699					
102.4.1	CH - Laufenburg ( swissgrid )	DE - Kühmoos ( EnBW Transportnetze )	380	1620	R1	7244			3549	2018			1677					
102.4.2	CH - Laufenburg ( swissgrid )	DE - Kühmoos ( RWE Transportnetz Strom )	380	1620	R1,R2	3921			1998						1923			
102.5.1	CH - Laufenburg ( swissgrid )	DE - Tiengen ( RWE Transportnetz Strom )	380	1131	R1,R2	10695									10695			
103.1.1	CH - Beznau ( swissgrid )	DE - Tiengen ( RWE Transportnetz Strom )	380	1158	R1	16524							12525	3999				
103.1.2	CH - Beznau ( swissgrid )	DE - Tiengen ( RWE Transportnetz Strom )	220	335	R1	16951		105					12526	4320				
104.1.1	CH - Asphard ( swissgrid )	DE - Kühmoos ( EnBW Transportnetze )	380	1340	R1	2083											2083	
105.1.1	CH - Laufenburg ( swissgrid )	DE - Engstlatt ( EnBW Transportnetze )	380	1580	R1,R3,R9	18014			10351		499			1678	641	4163		682
111.1.1	AT - Bürs ( VIW )	DE - Obermoos ( EnBW Transportnetze )	380	1369	R1,R2,R7	1894				354			103		1203	234		
111.1.2	AT - Bürs ( VIW )	DE - Obermoos ( EnBW Transportnetze )	380	1369	R1,R2	3644	1788				1039				474	343		
111.2.1	AT - Bürs ( VIW )	DE - Herberlingen ( RWE Transportnetz Strom )	220	389	R1,R2	9873					220		9201				452	
111.3.1	AT - Bürs ( VIW )	DE - Dellmensingen ( RWE Transportnetz Strom )	220	492	R1	7205	419				562						6224	
115.5.1	AT - St. Peter ( Verbund-APG )	DE - Altheim ( E.ON Netz )	220	301	R1	15104	115						3782	5434	4180	1593		
115.6.1	AT - St. Peter ( Verbund-APG )	DE - Simbach ( E.ON Netz )	220	301	R1	440											440	
115.9.1	AT - St. Peter ( Verbund-APG )	DE - Pirach ( E.ON Netz )	220	518	R10	1037						1037						
115.10.1	AT - St. Peter ( Verbund-APG )	DE - Pleinting ( E.ON Netz )	220	518	R10	1061						1048					13	
116.1.1	AT - Westtirol ( Verbund-APG )	DE - Leupolz ( RWE Transportnetz Strom )	380	1316	R1	22630							2470	20160				
116.2.1	AT - Westtirol ( Verbund-APG )	DE - Memmingen ( RWE Transportnetz Strom )	220	762	R1,R7	16942	575						16367					
117.1.1	AT - Silz ( TIWAG-Netz )	DE - Oberbrunn ( E.ON Netz )	220	793	R1	274				59			215					
117.1.2	AT - Silz ( TIWAG-Netz )	DE - Oberbrunn ( E.ON Netz )	220	793	R1	3106	243		1028	89			546				1200	
121.1.1	CH - All'Acqua ( swissgrid )	IT - Ponte ( Terna )	220	278	R1,R2,R9	6222					1680	451	1188	681	1560	662		

Reasons: **R1 - Maintenance,** **R2 - Repair,** **R3 - New construction,**  
**R7 - Outside impacts (animals, trees, fire, avalanche,...),**

**R4 - Overload (also calculated),**  
**R8 - Very exceptional conditions (weather, natural disaster,...),**

**R5 - False operation,** **R6 - Failure in protection device or other element,**  
**R9 - Other reasons,** **R10 - Unknown reasons**



Circuit ID	From substation	To substation	Voltage [kV]	Thermal conventional transmission capacity [ MVA ]	Major Reason	Time whole year [min]	January [min]	February [min]	March [min]	April [min]	May [min]	June [min]	July [min]	August [min]	September [min]	October [min]	November [min]	December [min]
121.2.1	CH - Gorduno ( swissgrid )	IT - Mese ( Terna )	220	278	R1	5181									341	4840		
121.3.1	CH - Soazza ( swissgrid )	IT - Bulciago ( Terna )	380	1224	R6, R9	614									172		442	
121.4.1	CH - Lavorgo ( swissgrid )	IT - Musignano ( Terna )	380	1204	R1	6428								6428				
123.1.1	CH - Riddes ( swissgrid )	IT - Avise ( Terna )	220	309	R1	13080					13080							
123.2.1	CH - Riddes ( swissgrid )	IT - Valpelline ( Terna )	220	309	R1	662				662								
123.3.1	CH - Serra ( swissgrid )	IT - Pallanzeno ( Terna )	220	278	R1	16948				565					16383			
124.1.1	CH - Robbia ( swissgrid )	IT - Goriago ( Terna )	380	1340	R1	22192									22192			
124.1.2	CH - Robbia ( swissgrid )	IT - San Fiorano ( Terna )	380	1340	R1	244									244			
132.1.1	AT - Lienz ( Verbund-APG )	IT - Soverzene ( Terna )	220	257	R1	9420			1620						7800			
141.1.1	AT - Meiningen ( VKW-Netz )	CH - Y-Rehag ( swissgrid )	220	501	R1,R9	3827		1988	677						668		494	
141.2.1	AT - Meiningen ( VKW-Netz )	CH - Winkeln ( swissgrid )	220	776	R1,R9	1011		453	558									
142.1.1	AT - Westtirol ( Verbund-APG )	CH - Pradella ( swissgrid )	380	1340	R2,R9	4355							2039		2114	202		
142.2.1	AT - Westtirol ( Verbund-APG )	CH - Pradella ( swissgrid )	380	1340	R1,R2,R9	4365						2048			2114	203		
151.1.1	ES - Hernani ( REE )	FR - Argia ( RTE )	380	1136	R1	511					511							
151.3.1	ES - Arkale ( REE )	FR - Argia ( RTE )	220	340	R1,R6	421	33		388									
151.4.1	ES - Biescas ( REE )	FR - Pragnères ( RTE )	220	237	R1,R9	24361		1095			23266							
153.1.1	ES - Vic ( REE )	FR - Baixas ( RTE )	380	1105	R1,R2	737				465			272					
161.1.1	DE - Flensburg ( E.ON Netz )	DK_W - Ensted ( Energinet.dk )	220	332	R1,R4	1323					21		1052				250	
161.2.1	DE - Flensburg ( E.ON Netz )	DK_W - Kassø ( Energinet.dk )	220	332	R1,R4	20792					20			16829	3522		421	
161.3.1	DE - Audorf ( E.ON Netz )	DK_W - Kassø ( Energinet.dk )	380	1078	R1	2938	475										1287	1176
161.3.2	DE - Audorf ( E.ON Netz )	DK_W - Kassø ( Energinet.dk )	380	1078	R2	527	527											
163.1.1	NO - Kristiansand ( Statnett )	DK_W - Tjele ( Energinet.dk )	250	250	R3,R6,R7,R9	27051			340		112	26575				24		
163.1.2	NO - Kristiansand ( Statnett )	DK_W - Tjele ( Energinet.dk )	250	250	R2,R3,R5,R7	30342			340			26575			3361		66	
164.1.1	NO - Kristiansand ( Statnett )	DK_W - Tjele ( Energinet.dk )	350	350	R1,R2,R7,R8	180185	161		666			3618			43200	44700	43200	44640
165.1.1	SE - Stenkullen ( Svenska Kraftnät )	DK_W - Vester Hassing-Lindome ( Energinet.dk )	125	125	R1,R2,R6,R9	23655	2456	895	1171	7001		300					112	1180
166.1.1	SE - Lindome ( Svenska Kraftnät )	DK_W - Vester Hassing-Lindome ( Energinet.dk )	360	360	R1,R2,R6,R8,R9	17235	107	271	8516	6897	480	300				138		526
171.1.1	AT - Bisamberg ( Verbund-APG )	CZ - Sokolnice ( CEPS )	220	251	R1	6866			391	3218	3257							
171.2.1	AT - Bisamberg ( Verbund-APG )	CZ - Sokolnice ( CEPS )	220	251	R1	9320			155	5908	3257							
172.1.1	AT - Dürnröhr ( Verbund-APG )	CZ - Slavetice ( CEPS )	380	1559	R2	589										589		
182.1.1	AT - Kainachtal ( Verbund-APG )	SI - Maribor ( ELES )	380	1514	R9	541							541					
182.2.1	AT - Kainachtal ( Verbund-APG )	SI - Maribor ( ELES )	380	1514	R9	0												0
191.3.1	DE - Bauler ( RWE Transportnetz Strom )	LU - Flebour ( CEGEDEL Net SA )	220	490	R1	2740				831	1526							
191.4.1	DE - Bauler ( RWE Transportnetz Strom )	LU - Roost ( CEGEDEL Net SA )	220	490	R1	73690	6714	8223	19892			5551		4929		14827	13426	128
192.1.1	DE - Trier ( RWE Transportnetz Strom )	LU - Heisdorf ( CEGEDEL Net SA )	220	490	R1	2251						1399				852		
192.2.1	DE - Quint ( RWE Transportnetz Strom )	LU - Heisdorf ( CEGEDEL Net SA )	220	490	R1,R10	6140	484			2447	2449	180			580			
201.2.1	IT - Padriciano ( Terna )	SI - Divaca ( ELES )	220	305	R1,R8	36848					9			6720	30119			
205.1.1	IT - Galatina ( Terna )	GR - Arachthos ( HTSO )	380	500	R1,R2,R6,R10	69073			1570		160	17520	232	37920		10854	480	337
221.1.1	GB - Sellindge ( National Grid )	FR - Mandarins ( RTE )	270	1000	R1,R9,R10	7630			161	522	81	8	205		6516			137
221.2.1	GB - Sellindge ( National Grid )	FR - Mandarins ( RTE )	270	1000	R1,R2,R6,R10	15399	165	6138	81	104	60	56	13	42	334	8406		
231.1.1	ES - Las Conchas ( REE )	PT - Lindoso ( REN )	132	90	R3,R9	3974									3397	577		
232.3.1	ES - Saucelle ( REE )	PT - Pocinho ( REN )	220	346	R2	302		302										
233.1.1	ES - Cedillo ( REE )	PT - Falagueira ( REN )	380	1300	R1,R9	57339								2491	44640	9915		293
234.1.1	ES - Cartelle ( REE )	PT - Alto Lindoso ( REN )	380	1330	R2,R9	2265				277	1988							
234.1.2	ES - Cartelle ( REE )	PT - Alto Lindoso ( REN )	380	1330	R2	235				235								
235.1.1	ES - Brovales ( REE )	PT - Alqueva ( REN )	400	1347	R3,R9	1332		436		2							894	
241.1.1	MK - Dubrovo ( MEPSO )	GR - Thessaloniki ( HTSO )	400	1300	R1	8953												
242.1.1	MK - Bitola ( MEPSO )	GR - Meliti ( HTSO )	400	1300	R1,R3,R5,R10	178731		3830	44580	43199	44640	33778	37			2437	6230	
261.1.1	RS - Djerdap ( EMS )	RO - Portile de Fier ( TRANSELECTRICA )	400	1135	R1	4589								3878	711			
271.1.1	BG - Sofija Zapad ( ESO EAD )	RS - Nis ( EMS )	380	1309	R1	2781									2781			
277.1.1	RO - Tântăreni ( TRANSELECTRICA )	BG - Kozlodui ( ESO EAD )	400	1135	R1	1039								1039				
277.1.2	RO - Tântăreni ( TRANSELECTRICA )	BG - Kozlodui ( ESO EAD )	400	1135	R1	15098							7920	7178				
278.1.1	RO - Isaccea ( TRANSELECTRICA )	BG - Dobrudja ( ESO EAD )	400	1565	R1	28755			2262						19646	6847		
282.1.1	AL - Fierza ( KESH )	RS - Prizren ( EMS )	220	270	R1	8251					4920				3331			
291.1.1	AL - Elbassan ( KESH )	GR - Kardja ( HTSO )	400	1300	R1,R9,R10	13133				7832				97	139	4811		254
301.1.1	BG - Blagoevgrad ( ESO EAD )	GR - Thessaloniki ( HTSO )	400	1300	R1,R10	21343	122				17768			37	40			3376
321.1.1	CZ - Hradec Zapad ( CEPS )	DE - Etzenricht ( E.ON Netz )	400	1363	R1	5504	480			4830						194		
321.1.2	CZ - Prestice ( CEPS )	DE - Etzenricht ( E.ON Netz )	400	1363	R1,R7,R9	2233			2224					7	2			
322.1.1	CZ - Hradec Vychod ( CEPS )	DE - Röhrsdorf ( VE Transmission )	400	1205	R1	2737			1213					460			1064	
322.1.2	CZ - Hradec Vychod ( CEPS )	DE - Röhrsdorf ( VE Transmission )	400	1205	R1,R3,R9	42721		295	1695	1953				19781	17981			
331.1.1	HU - Sandorfalva ( MAVIR )	RS - Subotica 3 ( EMS )	380	1295	R2	45580			18220	27360								
341.1.1	BG - Skakavica ( ESO EAD )	MK - Kriva Palanka ( MEPSO )	110	123	R9	18660					18660							
341.2.1	BG - Petric ( ESO EAD )	MK - Sušica ( MEPSO )	110	157	R9	18660					18660							

Reasons: R1 - Maintenance, R2 - Repair, R3 - New construction, R7 - Outside impacts (animals, trees, fire, avalance,...),

R4 - Overload (also calculated), R8 - Very exceptional conditions (weather, natural disaster,...),

R5 - False operation, R6 - Failure in prodction device or other element, R9 - Other reasons, R10 - Unknown reasons



Circuit ID	From substation	To substation	Voltage [kV]	Thermal conventional transmission capacity [ MVA ]	Major Reason	Time whole year [min]	January [min]	February [min]	March [min]	April [min]	May [min]	June [min]	July [min]	August [min]	September [min]	October [min]	November [min]	December [min]
351.1.1	HR - Melina ( HEP-OPS )	SI - Divaca ( ELES )	400	1264	R9	24								6	18			
351.2.1	HR - Pehlin ( HEP-OPS )	SI - Divaca ( ELES )	220	366	R8	26					26							
351.3.1	HR - Buje ( HEP-OPS )	SI - Koper ( ELES )	110	89	R4,R8,R9	17				3	11			3				
352.1.2	HR - Tumbri ( HEP-OPS )	SI - Krško ( ELES )	400	1316	R9	355					355							
352.2.1	HR - Žerjavinec ( HEP-OPS )	SI - Cirkovce ( ELES )	220	297	R9	857												
371.1.1	HR - Ernestinovo ( HEP-OPS )	RS - Sremska Mitrovica ( EMS )	400	1264	R1	1483									857			
391.1.1	MK - Skopje 1 ( MEPSO )	RS - Kosovo A ( EMS )	220	311	R9,R10	525600	44640	40320	44580	43200	44640	43200	44640	44640	43200	44700	43200	44640
391.2.1	MK - Skopje 1 ( MEPSO )	RS - Kosovo A ( EMS )	220	311	R9,R10	482400	44640	40320	44580	43200	44640	43200	44640	44640	43200	44700	43200	1440
401.1.1	DE - Herrenwyk ( E.ON Netz )	SE - Kruseberg ( Sydkraft/Vattenfall )	450	600	R1,R6,R7	7246			25	687	79				6455			
404.1.1	CZ - Nosovice ( CEPS )	SK - Varin ( SEPS )	400	1205	R2	29386				322				16615	12449			
410.1.1	CZ - Liskovec ( CEPS )	SK - Pov. Bystrica ( SEPS )	220	221	R1,R2,R6	18268	833			244			365		9694	6801	331	
420.1.1	CZ - Sokolnice ( CEPS )	SK - Senica ( SEPS )	220	213	R1,R2	11598				440						6284		4874
424.1.1	CZ - Sokolnice ( CEPS )	SK - Krizovany ( SEPS )	400	1205	R1,R2,R9	11339		119	937			6506					2043	1734
430.1.1	CZ - Sokolnice ( CEPS )	SK - Stupava ( SEPS )	400	1363	R1,R2	69598	155					8264	44639	6948		5452	4140	
440.1.1	UA_W - Mukachevo ( NPC Ukrenergo )	SK - V.Kapusany ( SEPS )	400	1186	R1	18177			11878	1059	5240							
443.1.1	CZ - Albrechtice ( CEPS )	PL - Dobrzeń ( PSE-Operator S.A. )	400	1088	R1,R7	9885	262					9456				167		
444.1.1	CZ - Nosovice ( CEPS )	PL - Wielopole ( PSE-Operator S.A. )	400	1088	R1	20633						20633						
450.1.1	CZ - Liskovec ( CEPS )	PL - Kopanina ( PSE-Operator S.A. )	220	399	R1	11303						10788					516	
460.1.1	CZ - Liskovec ( CEPS )	PL - Bujaków ( PSE-Operator S.A. )	220	399	R1	11487						10971					516	
501.1.1	DE - Vierraden ( VE Transmission )	PL - Krajnik ( PSE-Operator S.A. )	220	390	R1,R6	1087									1018	69		
501.1.2	DE - Vierraden ( VE Transmission )	PL - Krajnik ( PSE-Operator S.A. )	220	402	R1,R6	1133									1090	43		
502.1.1	DE - Hagenwerder ( VE Transmission )	PL - Mikułowa ( PSE-Operator S.A. )	380	1302	R1,R7	2136							1897	239				
502.1.2	DE - Hagenwerder ( VE Transmission )	PL - Mikułowa ( PSE-Operator S.A. )	380	1302	R1,R8	1948	101						1847					
601.1.1	ES - Puerto de la Cruz ( REE )	MA - Melloussa 1 ( ONE )	380	715	R1,R2,R10	35316					965		613	1541		27457		4740
601.1.2	ES - Puerto de la Cruz ( REE )	MA - Melloussa 2 ( ONE )	380	715	R1,R2	6066							613	726				4727
700.1.1	PL - Krosno Iskrzynia ( PSE-Operator S.A. )	SK - Lemešany ( SEPS )	400	1252	R1,R2	17869								16317		414	693	445
700.1.2	PL - Krosno Iskrzynia ( PSE-Operator S.A. )	SK - Lemešany ( SEPS )	400	1252	R1,R2,R10	18302	501							16315		413		1073
702.1.1	PL - Zamość ( PSE-Operator S.A. )	UA - Dobrotvir ( NPC Ukrenergo )	220	309	R9,R10	272		90									182	
704.1.1	PL - Stupsk ( PSE-Operator S.A. )	SE - Stårnø ( SvK )	450	600	R1,R2,R8,R9	12390						15	66		6450			5859
710.1.1	HU - Gyöer ( MAVIR )	SK - Gabčíkovo ( SEPS )	400	1330	R2	5975								9	5966			
711.1.1	HU - Göd ( MAVIR )	SK - Levice ( SEPS )	400	1330	R1,R2	43216				36865						6351		
720.1.1	HU - Albertirsa ( MAVIR )	UA_W - Zahidno Ukrainka ( NPC Ukrenergo )	750	4010	R1,R9	53529				234	28490	21137		742	1781	1145		
721.1.1	HU - Sajószöged ( MAVIR )	UA_W - Mukacevo ( NPC Ukrenergo )	400	1390	R1	11268			6453				1065	3750				
722.1.1	HU - Kiszvárd ( MAVIR )	UA_W - Mukacevo ( NPC Ukrenergo )	220	209	R1	12485						6235	6250					
722.1.2	HU - Tiszalök ( MAVIR )	UA_W - Mukacevo ( NPC Ukrenergo )	220	209	R1	10913						6267					4646	
730.1.1	HU - Sandorfalva ( MAVIR )	RO - Arad ( TRANSELECTRICA )	400	1135	R1	72768		13966	25379			8156	25267					
740.1.1	RO - Rosiori ( TRANSELECTRICA )	UA_W - Mukacevo ( NPC Ukrenergo )	400	1135	R1,R9	13764		481	1233		38	691				11321		
741.1.1	RO - Isaccea ( TRANSELECTRICA )	UA_W - PivdennoUkrainska AES ( NPC Ukrenergo )	750	4500	R1	250								250				
753.1.1	RO - Isaccea ( TRANSELECTRICA )	MD - Vulcanesti ( Moldenergo )	400	1043	R1	16508											16508	

Reasons: **R1 - Maintenance,** **R2 - Repair,** **R3 - New construction,**  
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Country	Circuit length in km				Transformers 380/400kV ↔ 220kV	
					in the network	
	220 kV	of which cable	380 - 750 kV	of which cable	Number	Capacity GVA
AT <sup>1</sup>	3765	5	2474	56	13	4,0
BA	1507	0	766	0	7	3,0
BE	425	0	1325	0	6	n.a.
BG	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
CH	4845,3	22,7	1780,0	0	18	10,0
CZ	1909	0	3436	0	4	2,0
DE <sup>6</sup>	15900	30	19700	60	91	53,5
DK_W <sup>5</sup>	39	0	833	14	0	0,0
ES	16722	129	17172	55	101	54,0
FR	26322	905	21093	4	214	109,9
GR <sup>7</sup>	11376	232	4172	160	47	13,0
HR <sup>3</sup>	1145	0	1159	0	4	2,0
HU <sup>4</sup>	1188	0	2364	0	3	1,5
IT	11413	860	10618	466	55	23,2
LU	256,5	10,9	0	0	0	0,0
ME	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
MK <sup>2</sup>	70	0	397	0	0	0,0
NL <sup>5</sup>	683	6	2052	0,4	4	2,5
PL <sup>10</sup>	7919	0	5288	254	17	7,7
PT	3158	19	1588	0	8	3,6
RO <sup>11</sup>	4129	0	4781	0	22	9,0
RS	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
SI	328	0	508	0	3	1,2
SK	962	0	1752	0	3	1,4
<b>UCTE <sup>8</sup></b>	<b>114061,8</b>	<b>2219,6</b>	<b>103258,0</b>	<b>1069,4</b>	<b>620</b>	<b>301,5</b>
UA_W	594	0	590 <sup>9</sup>	0 <sup>9</sup>	6 <sup>9</sup>	2,3 <sup>9</sup>

<sup>1</sup> Values as of 31 December 2000

<sup>2</sup> Values as of 31 December 2003

<sup>3</sup> Values as of 31 December 2004

<sup>4</sup> Values as of 31 December 2005

<sup>5</sup> Values as of 31 December 2006

<sup>6</sup> Values transformers of power units as of 31 December 2005

<sup>7</sup> The 220 kV network correspond to 150 kV Greek network

<sup>8</sup> Except Bulgaria, Montenegro and Serbia

<sup>9</sup> Including 330 kV and 750 kV equipment

<sup>10</sup> Including 114 km circuit lengths 750 kV

<sup>11</sup> Including 155 km circuit lengths 750 kV



Country	Transformers 220kV ✕ < 220kV				Transformers 380/400kV ✕ < 220kV			
	of power units		in the network		of power units		in the network	
	Number	Capacity GVA	Number	Capacity GVA	Number	Capacity GVA	Number	Capacity GVA
AT <sup>1</sup>	64	7,0	67	12,0	17	11,0	3	1,2
BA	15	2,0	15	2,0	3	1,0	7	2,0
BE	n.a.	n.a.	25	n.a.	n.a.	n.a.	27	n.a.
BG	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
CH	104	4,5	143	21,3	8	4,3	3	0,6
CZ	5	0,9	20	4,0	33	9,2	43	12,1
DE <sup>6</sup>	111	31,0	394	74,4	100	62,0	211	60,3
DK_W <sup>5</sup>	0	0,0	2	0,7	4	1,6	20	6,5
ES	n.a.	n.a.	1	0,1	n.a.	n.a.	15	5,0
FR	229	29,2	797	83,7	103	86,4	58	13,8
GR <sup>7</sup>	94	8,0	435	18,0	18	6,0	0	0,0
HR <sup>3</sup>	7	1,3	21	3,2	2	0,3	7	2,4
HU <sup>4</sup>	0	0,0	26	4,2	0	0,0	24	6,0
IT	112	23,0	158	27,2	121	37,9	218	56,3
LU	11	1,8	21	2,8	0	0,0	0	0,0
ME	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
MK <sup>2</sup>	0	0,0	4	0,6	2	0,5	7	2,1
NL <sup>5</sup>	9	3,2	26	4,4	6	3,6	39	18,1
PL <sup>10</sup>	56	13,6	126	20,0	27	9,5	35	9,4
PT	64	4,2	71	8,9	19	4,4	20	5,4
RO <sup>11</sup>	0	0,0	87	17,7	0	0,0	22	5,5
RS	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
SI	0	0,0	15	1,5	0	0,0	6	1,8
SK	4	0,8	12	2,4	18	3,9	23	6,4
<b>UCTE <sup>8</sup></b>	<b>885</b>	<b>130,4</b>	<b>2466</b>	<b>309,1</b>	<b>481</b>	<b>241,6</b>	<b>788</b>	<b>214,9</b>
UA_W	7	1,8	13	1,9	5 <sup>9</sup>	1,3 <sup>9</sup>	1 <sup>9</sup>	1,0 <sup>9</sup>



Country	Name of line or equipment	Voltage in kV	Main characteristics
BE	Moncau - Thyle - Château	150	Single circuit , ca.21 km, AC cable
	Keerken - Lokeren - Vijgenstraat	150	Single circuit, ca.1,5 km , AC line
	Trivière - Villesur - Haine	150	Double circuit upgrade, 5 km, AC line
	Gouy	150/10	40 MVA transformator
	Monceau	220/150	400 MVA transformator; The double circuit upgrade from 150 kV to 220 kV of the line Jamiolle-Monceau ( commissioned in January 2006) together with the installation of a phase shifter in Monceau increases the simultaneous import capacity of Belgium. Consequently , the NTC-value from France to Belgium will increase by 300 MW for a reference grid situation in summer ( indicative non-binding figures ).
	Slijkens	150/11	50 MVA transformator
	Romsée	220/15	50 MVA transformator
	Mol	150/15	50 MVA transformator
DE	Transformer Wustermark	380/220	400 MVA
FR	Chaffard - Grande Ile 1&2	400	
	Montagny-les-Lanches	400	New substation
	Lagafière	225	New substation
	Richier	225	New substation
	Savigny	225	New substation
	Suisse	225	New substation
	Terres-Noires	225	New substation
	Trith-Saint-Léger	225	New substation
	6 New substations in RTE network	63	New substations
	203 km of new /refurbished circuits	400	203 km of new/refurbished circuits (combined with 93 km of removed installations and various modifications) including: - As part of the work to strengthen the electrical connection between Lyon and Chambéry, the overhead lines at 400 kV Le Chaffard - Grande Ile 1&2; - The 400 kV line St.Avoid-vigy, first section of the new double circuit line between Marlenheim (near to Strasbourg) and Vigy (near to Metz).
90 km of new /refurbished circuits	225	90 km of new/refurbished (combined with 128 km of removed installations and various modifications) incl.: The overhead interconnection line Chooz-Moncau in replacement of the ancient line Chooz-Jamiolle, after the commissioning of a phase-shifting transformer in BE at the substation of Monceau in order to facilitate the exchange of electrical energy between FR and BE	

Country	Name of line or equipment	Voltage in kV	Main characteristics
GR	OHL 150KV S/S Meliti - Bitola	150	Upgrade to 400 kV
	OHL 150 kV S/S Dedymotiho - Hamatibat	150	New tie-line for temporary connection of a power plant in Turkey on island operation
IT	Matera - S.Sofia	380	Single line 220,3 km
	Leyni - AcreaElectrabel	380	Single line 6,1 km
	Colunga - Bussolengo	220	Single line 151,7 km
	Colunga - Benedetto Berceto	220	Single line 28,8 km
	Benedetto Berceto - Caselina	220	Single line 61,3 km
	150/132 kV lines	150/132	A total of 159,9 km
	Capacitor banks in HV substations	n.a.	760 MVAR, were installed in HV substations
	New transformers	n.a.	Total installed capacity 3730 MVA
MK	Bitola - Meliti	400	Interconnection capacity between FYROM and Greece (MEPSO and HTSO)
PT	Batalha-Pego	400	New 400 kV line, 65,9 km long; Facilitates flows along Tejo axis where there exists a 400 kV interconnection between Falagueira (Portugal) and Cedillo (Spain)
	Recarei - Paraimo and Paraimo - Batalha	400	Opening of Recarei-Batalha 400 kV line at Paraimo new substation (85,3 km plus 101,5 km minus 186,8 km) This reinforcement is associated with the following one.
	Bodiosa sustation autotransformation	400/220	New 400/220 kV with 450 MVA, autotransformation; Closing of a new axis between Douro river areand the coast. Facilitates flows through Douro International 220 kV interconnections. These reinforcements are associated with the previous one.
	Bodiosa - Paraimo	400	New 400 kV line, temporarily used at 220 kV, 60, km
	Alqueva-Ferreira - Alentejo	400	64,1 km
	Alqueva - Brovales	400	39,9 km (just to border)
	Central Alqueva - Alqueva	400	1,2 km Construction of new Alqueva substation nearby Alquevapower plant, eliminating the previous 'T' connection of this power plant. Improves Alqueva-Brovales interconnection reliability.
Castelo Branco substation	220/150	New 220/150 kV line, capacity 250 MVA, autotransformer. Closing of a new axis in interior facilitating flows from Douro International and Tejo areas. Facilitates flows through Douro International 220 kV interconnections.	

Country	Name of line or equipment	Voltage in kV	Main characteristics
SI	Substation Okroglo	400/110	New transformer with installed capacity 300 MVA
SK	Substation Krizovany	400/110	New transformer installed in October 2007; capacity 350 MVA; choke coils with totally 2x45 MVAr;
	Substation Lemesany	400/110	New transformer installed in December 2007; capacity 350 MVA; new choke coils with totally 2x45 MVAr;