

Observations

[1]	Limited by phase shifting transformer in Meeden
[2]	Limited by phase shifting transformer in Meeden
[3]	Limited by transformer with regulation in Gronau
[4]	Limited by transformer with regulation in Gronau
[5]	Transformer in Borssele
[6]	Transformer in Jamiolle
[7]	Transducer
[8]	Installed in Verbois
[9]	Cross-border power station (220/130)
[10]	Cross-border power station (220/130)
[11]	Cross-border power station (220/130)
[12]	Line property EnBW Netz in Germany partially on the same tower as line Asphard-Kühmoos or Sierentz-Laufenburg
[13]	DC link with three connections
[14]	Transforming station of Lucciana in Corsica
[15]	DC link with three connections
[16]	Transforming station of Lucciana in Corsica
[17]	Partially on the same tower as the Laufenbourg-Engstlatt line (No. 105.1)
[18]	Transducer
[19]	Transducer
[20]	On the same tower as line No. 81 Laufenbourg-Sierentz 380 kV
[21]	Sag of conductor taken into consideration
[22]	From Kühmoos to Laufenbourg on the same tower
[23]	Disconnecter
[24]	Limited by measuring transducer at Laufenbourg
[25]	From Kühmoos to Laufenbourg on the same tower
[26]	On the same tower as line Sierentz-Laufenburg
[27]	Limited by switching devices in Austria

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.	Nr.	Nr.	4	5	6	7	8	9	kV	kV	MVA	MVA	MVA	kV	MVA	kV
11	1	1	DE	Diele	E.ON Netz	NL	Meeden	TenneT		380		1382		1000 [1]		
11	1	2	DE	Diele	E.ON Netz	NL	Meeden	TenneT		380		1382		1000 [2]		
13	1	1	DE	Siersdorf	RWE Transportnetz Strom	NL	Maasbracht	TenneT		380		1645				
13	1	2	DE	Rommerskirchen	RWE Transportnetz Strom	NL	Maasbracht	TenneT		380		1698				
15	1	1	DE	Gronau W	RWE Transportnetz Strom	NL	Hengelo	TenneT		380		1790			1300 [3]	
15	1	2	DE	Gronau Z	RWE Transportnetz Strom	NL	Hengelo	TenneT		380		1790			1300 [4]	
25	1	1	BE	Gramme	Elia	NL	Maasbracht	TenneT		380		1207				
25	1	2	BE	Meerhout	Elia	NL	Maasbracht	TenneT		380		1270				
26	1	1	BE	Zandvliet	Elia	NL	Geertruidenberg	TenneT		380		1476				
26	2	1	BE	Zandvliet	Elia	NL	Borssele	TenneT		380		1476		450 [5]		
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	Jamiolle	Elia	FR	Chooz	RTE		220		338		290		150 [6]
51	2	1	BE	Avelgem	Elia	FR	Avelin	RTE		380		1207				
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 [7]		220		
72	1	2	DE	Eichstetten	EnBW Transportnetze	FR	Muhlbach	RTE		380		1751				
81	1	1	CH	Bassecourt	BKW	FR	Sierentz	RTE		380		1186				
81	2	1	CH	Laufenburg	EGL Grid	FR	Sierentz	RTE		380		1167		1264		
81	3	1	CH	Bassecourt	BKW	FR	Mambelin	RTE		380		1046		1316		
82	1	1	CH	Verbois	EOS	FR	Bois-Tollot	RTE		380		1211		800		220 [8]
82	1	2	CH	Chamoson	EOS	FR	Bois-Tollot	RTE		380		1409		600		
82	2	1	CH	Verbois	EOS	FR	Génissiat	RTE		220		315				11 [9]
82	2	2	CH	Verbois	EOS	FR	Génissiat	RTE		220		315				11 [10]
82	3	1	CH	Verbois	EOS	FR	Chancy-Pougny	SFRM C-P		130		52		42		11 [11]
82	4	1	CH	La Bâtiâz	Atel	FR	Vallorcine	RTE		220		266				
82	5	1	CH	Riddes	EGL Grid	FR	Cornier	RTE		220		275				
82	6	1	CH	St-Triphon	EOS	FR	Cornier	RTE		220		275				
83	1	1 [12]	CH/DE	Asphard	Atel/NOK /EnBW Transp.netze	FR	Sierentz	RTE		380		1167				
91	1	1	FR	Albertville	RTE	IT	Rondissone	GRTN		380		1150				
91	1	2	FR	Albertville	RTE	IT	Rondissone	GRTN		380		1150				
92	1	1	FR	Le Broc Carros	RTE	IT	Camporosso	GRTN		220		320				
93	1	1	FR	Villarodin	RTE	IT	Venaus	GRTN		380		879				
94	1	1 [13]	FR	Lucciana	EDF	IT	Suvereto	GRTN		220 [14]		300			50	
94	1	2 [15]	FR	Lucciana	EDF	IT	Suvereto	GRTN		220 [16]		300			50	
102	1 [17]	1	CH	Laufenburg	EGL Grid	DE	Gurtweil	EnBW Transportnetze		220		485		457 [18]		220
102	1	2	CH	Laufenburg	EGL Grid	DE	Gurtweil	EnBW Transportnetze		220		469		457 [19]		220
102	2	1 [20]	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze		220		295[21]				220
102	3 [22]	1	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze	380	220		469		476 [23]		220
102	3	2	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze		380		1620		1264		
102	4	1	CH	Laufenburg	EGL Grid	DE	Kühmoos	EnBW Transportnetze		380		1620		1580		
102	4	2	CH	Laufenburg	EGL Grid	DE	Kühmoos	RWE Transportnetz Strom		380		1580		1264 [24]		
102	5 [25]	1	CH	Laufenburg	EGL Grid	DE	Tiengen	RWE Transportnetz Strom		380		1131				
103	1	1	CH	Bezau	NOK	DE	Tiengen	RWE Transportnetz Strom		380		1158				
103	1	2	CH	Bezau	NOK	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 [26]	CH	Asphard	Atel/NOK	DE	Kühmoos	EnBW Transportnetze		380		1340				
105	1	1	CH	Laufenburg	EGL Grid	DE	Engstlatt	EnBW Transportnetze		380		1675				
106	1	1	CH	Laufenburg	EGL Grid	DE	Breitematt	ED		110		246				
107	1	1	CH	Laufenburg	EGL Grid	DE	Breitematt	ED		110		246				
111	1	1	AT	Bürs	VIW	DE	Obermoosweiler	EnBW Transportnetze		380		1369				
111	1	2	AT	Bürs	VIW	DE	Obermoosweiler	EnBW Transportnetze		380		1369				
111	2	1	AT	Bürs	VIW	DE	Herbertingen	RWE Transportnetz Strom	380	220		389				
111	3	1	AT	Bürs	VIW	DE	Dellmensingen	RWE Transportnetz Strom	380	220		492		457 [27]		
111	4	1	AT	Rieden	VKW -ÜN	DE	Lindau	VKW -ÜN		110		84				
111	4	2	AT	Hörbranz	VKW -ÜN	DE	Lindau	VKW -ÜN		110		84				
111	5	1	AT	Vorderwald	VKW -ÜN	DE	Weiler	VKW -ÜN		110		141				

*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]	Cable at Braunau
[29]	Cable at Braunau
[30]	Normally no electricity exchange across this line/ electricity loop at pylon 32 open, circuit grounded
[31]	Transducer at Ering
[32]	Transducer at Ering
[33]	Isolator in St. Peter
[34]	Isolator in St. Peter
[35]	Normally no electricity exchange across this line
[36]	Line section national border-tower 62 owned by E.ON Netz
[37]	Normally no electricity exchange across this line
[38]	Line section national border-tower 62 owned by E.ON Netz
[39]	No international interconnector
[40]	CFT blocker at St. Peter
[41]	No international interconnector
[42]	CFT blocker at St. Peter
[43]	Switching device at Oberbrunn
[44]	Switching device at Oberbrunn
[45]	Possible to lay a second circuit
[46]	Possible to lay a second circuit
[47]	New substation with 400kV near Spanish frontier : replace Cantegrit
[48]	New substation with 225 kV near Spanish frontier : replace Mouguerre
[49]	Limited by transformer in Ensted / DK West
[50]	Limited by transformer in Kassø / DK West
[51]	Transducer at Kassø / DK West
[52]	Transducer at Kassø / DK West
[53]	Monopol
[54]	DC submarine and underground cable
[55]	DC submarine and underground cable
[56]	DC submarine and underground cable
[57]	Under water cable
[58]	Under water cable
[59]	Under water cable
[60]	Limited by high-frequency coil

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.	Nr.	Nr.	4	5	6	7	8	9	kV	kV	MVA	MVA	MVA	kV	MVA	kV
115	1	1	AT	Braunau	ÖBK	DE	Neuötting	E.ON Netz		110			102			
115	2	1	AT	Braunau	ÖBK	DE	Stammham	E.ON Netz		110			102			
115	3	1	AT	Ranshofen	Verbund - APG	DE	Neuötting	E.ON Netz		110			90			
115	3	2 [30]	AT	Ranshofen	Verbund - APG	DE	Neuötting	E.ON Netz		110			90			
115	4	1	AT	Antiesenhofen	Verbund - APG	DE	Eggfling	E.ON Netz		110			102			
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 [31]
115	7	2	AT	St. Peter	Verbund - APG	DE	Ering	E.ON Netz		110			152	137		114 [32]
115	8	1	AT	St. Peter	Verbund - APG	DE	Eggfling	E.ON Netz		110			105			
115	9	1	AT	St. Peter	Verbund - APG	DE	Pirach	E.ON Netz		220			518	457 [33]		
115	10	1	AT	St. Peter	Verbund - APG	DE	Pleinting	E.ON Netz		220			518	457 [34]		
115	11	1	AT	Ranna	EAGOÖ	DE	Passau [35,36]	E.ON Netz		110			90			
115	11	2	AT	Ranna	EAGOÖ	DE	Passau [37,38]	E.ON Netz		110			90			
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	EAGOÖ	DE	Weidach	Thüga		110			130			
115	14	2	AT	Antiesenhofen	EAGOÖ	DE	Weidach	Thüga		110			130			
115	15	1	AT	Aigerding	Verbund - APG/EAGOÖ	DE	Passau	ÖBK		110			102			
115	16 [39]	1	AT	St. Peter	Verbund - APG	DE	Schärding	ÖBK		220			301			229 [40]
115	16 [41]	2	AT	St. Peter	Verbund - APG	DE	Schärding	ÖBK		220			301			229 [42]
115	17	1	AT	Kufstein	TIRAG	DE	Oberaudorf	ÖBK		110			90			
115	17	2	AT	Ebbs	TIRAG	DE	Oberaudorf	ÖBK		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		380			762			
117	1	1	AT	Silz	TIRAG	DE	Oberbrunn	E.ON Netz		220			793	762 [43]		
117	1	2	AT	Silz	TIRAG	DE	Oberbrunn	E.ON Netz		220			793	762 [44]		
117	3	1	AT	Reutte	TIRAG	DE	Füssen	EW Reutte		110			127			
117	3	2	AT	Reutte	TIRAG	DE	Füssen	EW Reutte		110			127			
121	1	1	CH	Airolo	Atel	IT	Ponte	GRTN		220			257	457		
121	2	1	CH	Gorduno	Atel	IT	Mese	GRTN		220			257	250		
121	3	1	CH	Soazza	EGL Grid	IT	Bulciago	GRTN		380			1142			
121	4	1	CH	Lavorgo	Atel	IT	Musignano	GRTN		380			1118			
122	1	1 [45]	CH	Campocologno	RE	IT	Poschiavino	GRTN		150			103	42		
123	1	1	CH	Riddes	EGL Grid	IT	Avisè	GRTN		220			290			
123	2	1	CH	Riddes	EGL Grid	IT	Valpelline	GRTN		220			290			
123	3	1	CH	Mörel	RHOWAG	IT	Pallanzeno	GRTN		220			257			
132	1	1	AT	Lienz	Verbund - APG	IT	Soverzene	GRTN		220			257			
141	1	1 [46]	AT	Meiningen	VKW-ÜN	CH	Y-Rehag	NOK		220			501			
141	2	1	AT	Meiningen	VKW-ÜN	CH	Winkeln	NOK		220			776			
142	1	1	AT	Westtirol	Verbund - APG	CH	Pradella	EGL Grid		380			1340			
142	2	1	AT	Westtirol	Verbund - APG	CH	Pradella	EGL Grid		380			1340			
151	1	1	ES	Hernani	REE	FR	Argia [47]	RTE		380			1136			
151	2	1	ES	Irún	REE	FR	Errondenia	RTE		132			56			
151	3	1	ES	Arkale	REE	FR	Argia [48]	RTE		220			340			
151	4	1	ES	Biescas	REE	FR	Pragnères	RTE		220			257			
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	DE	Flensburg	E.ON Netz	DK_W	Ensted	ELTRA		220			332	305 [49]		
161	2	1	DE	Flensburg	E.ON Netz	DK_W	Kassø	ELTRA		220			332	305 [50]		
161	3	1	DE	Audorf	E.ON Netz	DK_W	Kassø	ELTRA		380			1078	658 [51]		
161	3	2	DE	Audorf	E.ON Netz	DK_W	Kassø	ELTRA		380			1078	658 [52]		
161	4	1	DE	Flensburg UW Nord	E.ON Netz	DK_W	Ensted	ELTRA		150			150			
162	1 [53]	1	DE	Bentwisch	VE Transmission	DK_E	Bjæverskov	ELKRAFT		400			600 [54]			
163	1	1	NO	Kristiansand	Statnett	DK_W	Tjele	ELTRA					250 [55]			
163	1	2	NO	Kristiansand	Statnett	DK_W	Tjele	ELTRA					250 [56]			
164	1	1	NO	Kristiansand	Statnett	DK_W	Tjele	ELTRA					350 [57]			
165	1	1	SE	Stenkullen	Svenska Kraftnät	DK_W	Vester Hassing	ELTRA					125 [58]	500		
166	1	1	SE	Lindome	Svenska Kraftnät	DK_W	Vester Hassing	ELTRA					360 [59]	285		
171	1	1	AT	Bisamberg	Verbund - APG	CZ	Sokolnice	CEPS		220			269			
171	2	1	AT	Bisamberg	Verbund - APG	CZ	Sokolnice	CEPS		220			269			
172	1	1	AT	Dümnrohr	Verbund - APG	CZ	Slavetice	CEPS		380			1711	1386 [60]		
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		

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Observations

[61]	Generator line in radial operation - interconnected operation impossible
[62]	Installed at Vianden
[63]	Generator line in radial operation - interconnected operation impossible
[64]	Installed at Vianden
[65]	Generator line in radial operation - interconnected operation impossible
[66]	Installed at Vianden
[67]	Generator line in radial operation - interconnected operation impossible
[68]	Installed at Vianden
[69]	Limited by pumped storage power station at Bauler
[70]	520 MW in total because of the use of pumps in the power station of Vianden
[71]	520 MW in total because of the use of pumps in the power station of Vianden
[72]	The 400kV DC link between GR-IT is composed of an overhead line and a submarine cable
[73]	In Hungary 2 systems in parallel operation
[74]	DC submarine cable
[75]	DC submarine cable
[76]	Unit is MW instead of MVA
[77]	Unit is MW instead of MVA
[78]	Limited by the connected network
[79]	Nominal voltage in Croatia
[80]	Limited by the connected network
[81]	Nominal voltage in Croatia
[82]	Built for 750 kV
[83]	4500 MVA at 750 kV
[84]	The limitation is 750MW
[85]	Limited by the Albanian network
[86]	Capacity of current transformers at Bistrica
[87]	Limitating installations in CZ
[88]	Limitating installations in Etzenricht
[89]	Limited by disconnector / CEPS
[90]	Limited by disconnector / CEPS
[91]	Disconnected in Yugoslavia
[92]	Limitation by measuring transducer

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.	Nr.	Nr.	4	5	6	7	8	9	kV	kV	MVA	MVA	MVA	kV	MVA	kV
191	1	1	DE	Niederstedem	RWE Transportnetz Strom	LU	Vianden	SEO		220		730		460 [61,62]		
191	2	1	DE	Niederstedem	RWE Transportnetz Strom	LU	Vianden	SEO		220		365		172 [63,64]		
191	2	2	DE	Niederstedem	RWE Transportnetz Strom	LU	Vianden	SEO		220		365		172 [65,66]		
191	3	1	DE	Bauler	RWE Transportnetz Strom	LU	Vianden	SEO		220		730		460 [67,68]		
191	4	1	DE	Bauler	RWE Transportnetz Strom	LU	Flebour	CEGEDEL Net SA		220		490 [69]			260 [70]	
191	4	2	DE	Bauler	RWE Transportnetz Strom	LU	Roost	CEGEDEL Net SA		220		490			260 [71]	
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				
201	1	1	IT	Redipuglia	GRTN	SI	Divaja	ELES		380		1712				
201	2	1	IT	Padriciano	GRTN	SI	Divaja	ELES		220		305				
205	1 [72]	1	IT	Galatina	GRTN	GR	Arachthos	HTSO		380		500				
211	1	1	AT	Wien Süd-Ost	Verbund - APG	HU	Győr	MAVIR		220		305				
211	1	2	AT	Neusiedel	Verbund - APG	HU	Győr	MAVIR		220		305				
212	1	1 [73]	AT	Wien Süd-Ost	Verbund - APG	HU	Győr	MAVIR		380		1514				
221	1	1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [74]		1000 [76]				
221	2	1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [75]		1000 [77]				
231	1	1	ES	Las Conchas	REE	PT	Lindoso	REN		132		90				
232	1	1	ES	Aldeadávila	REE	PT	Bemposta	REN		220		321				
232	2	1	ES	Aldeadávila	REE	PT	Pocinho	REN		220		321				
232	3	1	ES	Saucelle	REE	PT	Pocinho	REN		220		321				
233	1	1	ES	Cedillo	REE	PT	Falagueira	REN		380		948				
234	1	1	ES	Cartelle	REE	PT	Alto Lindoso	REN		380		1036				
234	1	2	ES	Cartelle	REE	PT	Alto Lindoso	REN		380		1036				
235	1	1	ES	Balboa	REE	PT	Alqueva	REN		400		1258				
241	1	1	MK	Dubrovo	ESM	GR	Thessaloniki	HTSO		400		1300		700		
242	1	1	MK	Bitola	ESM	GR	Amynteo	HTSO		150		120		100		
251	1	1	HU	Lenti	MAVIR	HR	Nedeljanec	HEP		120		82		50 [78]		110 [79]
251	2	1	HU	Siklos	MAVIR	HR	Donji Miholjac	HEP		120		114		50 [80]		110 [81]
251	3	1	HU	Héviz	MAVIR	HR	Zerjavinec	HEP		400		1246				
251	3	2	HU	Héviz	MAVIR	HR	Zerjavinec	HEP		400		1246				
261	1	1	CS	Djerdap	EPS	RO	Portile de Fier	TRANSELECTRICA		380		1264				
261	2	1	CS	Sip	EPS	RO	Gura Văii	TRANSELECTRICA		110		90				
262	1	1	CS	Kikinda 1	EPS	RO	Jimbolia	TRANSELECTRICA		110		90				
263	1	1	CS	Kusijak	EPS	RO	Ostrovu Mare	TRANSELECTRICA		110		257				
271	1	1	BG	Sofija Zapad	NEK	CS	Niš	EPS		380		1264				
272	1	1	BG	Breznik	NEK	CS	HE Vrla 1	EPS		110		90				
273	1	1	BG	Kula	NEK	CS	Zaječar	EPS		110		90				
275	1	1	RO	Isaccea	TRANSELECTRICA	BG	Varna	NEK		750		400 [82]		4500		2390 [83]
275	2	1	RO	Isaccea	TRANSELECTRICA	BG	Dobrodja	NEK		400		1700				750 [84]
276	1	1	RO	Işalnița	TRANSELECTRICA	BG	Kozlodui	NEK		220		360				
277	1	1	RO	Țântăreni	TRANSELECTRICA	BG	Kozlodui	NEK		400		1309			1000	
277	1	2	RO	Țântăreni	TRANSELECTRICA	BG	Kozlodui	NEK		400		1309				
281	1	1	AL	Vau i Dejës	KESH	CS	Podgorica	EP CG		220		311				
282	1	1	AL	Fierza	KESH	CS	Prizren	EPS		220		311				
291	1	1	AL	Elbassan	KESH	GR	Kardia	HTSO		400		1300		250 [85]		
292	1	1	AL	Bistrica	KESH	GR	Mourtos	HTSO		150		120		40 [86]		
301	1	1	BG	Blagoevgrad	NEK	GR	Thessaloniki	HTSO		400		1300		700		
321	1	1	CZ	Hradec Zapad	CEPS	DE	Etzenricht	E.ON Netz		380		1386		1316 [87]		
321	1	2	CZ	Prestice	CEPS	DE	Etzenricht	E.ON Netz		380		1579 [88]				
322	1	1	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	VE Transmission		380		1476		1320 [89]		
322	1	2	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	VE Transmission		380		1476		1320 [90]		
331	1	1	HU	Sándorfalva	MAVIR	CS	Subotica 3	EPS		380		1264		1050		
332	1	1	HU	Szeged	MAVIR	CS	Subotica	EPS		120		86 [91]				
341	1	1	BG	Skakavica	NEK	MK	Kriva Palanka	ESM		110		123				
341	2	1	BG	Petric	NEK	MK	Sušica	ESM		110		123				
351	1	1	HR	Melina	HEP	SI	Divaja	ELES		380		1264				
351	2	1	HR	Pehlin	HEP	SI	Divaja	ELES		220		366				
351	3	1	HR	Buje	HEP	SI	Koper	ELES		110		89				
351	4	1	HR	Matulji	HEP	SI	Ilirska Bistrica	ELES		110		53				
352	1	1	HR	Tumbri	HEP	SI	Krško	ELES		380		1316				
352	1	2	HR	Tumbri	HEP	SI	Krško	ELES		380		1316				
352	2	1	HR	Žerjavinec	HEP	SI	Cirkovce	ELES		220		297				
352	3	1	HR	Nedeljanec	HEP	SI	Formin	ELES		110		115				
361	1	1	BA	Mostar	JPCC	HR	Konjsko	HEP		400		1316				
361	2	1	BA	Mostar	JPCC	HR	Zakučac	HEP		220		311				
361	3	1	BA	Grahovo	JPCC	HR	Knin	HEP		110		90				
361	4	1	BA	Buško Blato	JPCC	HR	Kraljevac	HEP		110		115				
361	5	1	BA	Buško Blato	JPCC	HR	Peruca	HEP		110		90				
361	6	1	BA	Grude	JPCC	HR	Imotski	HEP		110		72				
361	7	1	BA	Kulen Vakuf	JPCC	HR	Gracac	HEP		110		120		101 [92]		

*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

[93]	Destroyed line
[94]	Out of operation
[95]	Destroyed line and substation
[96]	Destroyed line
[97]	Destroyed line
[98]	Line is destroyed, currently under construction
[99]	Line is destroyed, currently under construction
[100]	Monopol
[101]	Limited by the measuring transformer of current
[102]	Limited by the connections among equipments
[103]	Limited by the measuring transformer of current
[104]	Limited by the measuring transformer of current
[105]	Submarine cable
[106]	Limited by current transformer at Krosno and Lemešany
[107]	Limited by current transformer at Krosno and Lemešany
[108]	Out of operation / substation local automatic equipment
[109]	Limited by HF attenuator
[110]	Radial operation
[111]	Limited by HF attenuator
[112]	Isolated operation
[113]	Submarine cable
[114]	Limited by a metering current transformer
[115]	Limited by the measuring transformer of current
[116]	Limited by HF attenuator
[117]	Limited by the measuring transformer of current
[118]	Limited by HF attenuator
[119]	Limited by HF attenuator
[120]	Out of operation/ substation local automatic equipment
[121]	Limited by the measuring transformer of current
[122]	Out of operation / substation local automatic equipment
[123]	Limited by HF attenuator
[124]	Not in operation
[125]	Limitation 900 MW

T 9			Connection between:						Voltage of the circuit		Conventional transmission capacity of the connection (thermal)*		Limited by the transformers or by the substations of circuits of lines				T 9
Frontier point	Line	Circuit	From substation			to substation			Forecast	Present	Forecast	Present	at	Voltage	Transmission capacity	Voltage	
			Country	Name	Operated by	Country	Name	Operated by									
Nr.	Nr.	Nr.	4	5	6	7	8	9	kV	kV	MVA	MVA	MVA	kV	MVA	kV	
1	2	3							10	11	12	13	14	15	16	17	
362	1	1	BA	Jajce	JPCC	HR	Mraclin	HEP		220		297 [93]					
362	2	1	BA	Prijedor	JPCC	HR	Međurić	HEP		220		297					
363	1	1	BA	Trebinje	JPCC	HR	Dubrovnik	HEP		220		460 [94]					
363	2	1	BA	Trebinje	JPCC	HR	Dubrovnik	HEP		220		460					
363	3	1	BA	Čapljina	JPCC	HR	Opuzen	HEP		110		84					
363	4	1	BA	Neum	JPCC	HR	Opuzen	HEP		110		84					
363	5	1	BA	Neum	JPCC	HR	Ston	HEP		110		76					
363	6	1	BA	Trebinje	JPCC	HR	Komolac	HEP		110		84					
364	1	1	BA	Ugljevik	JPCC	HR	Ernestinovo	HEP		400		831 [95]					
364	2	1	BA	Gradačac	JPCC	HR	Đakovo	HEP		220		229 [96]					
364	3	1	BA	Tuzla	JPCC	HR	Đakovo	HEP		220		229					
364	4	1	BA	Bosanski Brod	JPCC	HR	Slavonski Brod 2	HEP		110		115 [97]					
364	5	1	BA	Orasje	JPCC	HR	Županja	HEP		110		76					
371	1	1	HR	Ernestinovo	HEP	CS	S.Mitrovica	EPS		380		1264					
371	2	1	HR	Nijemci	HEP	CS	Šid	EPS		110		76					
371	3	1	HR	Beli Manastir	HEP	CS	Apatin	EPS		110		78					
381	1	1	BA	Trebinje	JPCC	CS	Podgorica	EP CG		380		1264					
381	2	1	BA	Trebinje	JPCC	CS	Perućica	EP CG		220		311					
381	3	1	BA	Trebinje	JPCC	CS	Herceg Novi	EP CG		110		90					
381	4	1	BA	Bileća	JPCC	CS	Vilusi	EP CG		110		84					
382	1	1	BA	Sarajevo 20	JPCC	CS	Piva	EP CG		220		366					
382	2	1	BA	Goražde	JPCC	CS	Pljevlja	EP CG		110		90					
383	1	1	BA	Višegrad	JPCC	CS	Požega	EPS		220		311					
383	2	1	BA	Bijeljina	JPCC	CS	Lešnica	EPS		110		123					
383	3	1	BA	Zvornik	JPCC	CS	HE Zvornik	EPS		110		123					
383	4	1	BA	Višegrad	JPCC	CS	Potpeč	EPS		110		123					
391	1	1	MK	Skopje 1	ESM	CS	Kosovo A	EPS		220		311 [98]					
391	2	1	MK	Skopje 1	ESM	CS	Kosovo A	EPS		220		311 [99]					
391	3	1	MK	Skopje 5	ESM	CS	Kosovo B	EPS		380		1264					
401	1 [100]	1	DE	Herrenwyk	E.ON Netz	SE	Kruseberg	Sydskraft/Vattenfall		450		600					
404	1	1	CZ	Nosovice	CEPS	SK	Varin	SEPS		400		1465	1386 [101]				
410	1	1	CZ	Liskovec	CEPS	SK	Pov. Bystrica	SEPS		220		269					
420	1	1	CZ	Sokolnice	CEPS	SK	Senica	SEPS		220		318					
424	1	1	CZ	Sokolnice	CEPS	SK	Krizovany	SEPS		400		1503	1323 [102]				
430	1	1	CZ	Sokolnice	CEPS	SK	Stupava	SEPS		400		1559	831 [103]				
440	1	1	SK	V.Kapusany	SEPS	UA_W	Mukachevo	NPC Ukrenenergo		400		1186	693 [104]				
443	1	1	CZ	Albrechtice	CEPS	PL	Dobrzeń	PSE-Operator SA		400		1088					
444	1	1	CZ	Nošovice	CEPS	PL	Wielopole	PSE-Operator SA		400		1088					
450	1	1	CZ	Liskovec	CEPS	PL	Kopanina	PSE-Operator SA		220		400					
460	1	1	CZ	Liskovec	CEPS	PL	Bujakov	PSE-Operator SA		220		400					
501	1	1	DE	Vierraden	VE Transmission	PL	Krajnik	PSE-Operator SA		220		173					
501	1	2	DE	Vierraden	VE Transmission	PL	Krajnik	PSE-Operator SA		220		173					
502	1	1	DE	Hagenwerder	VE Transmission	PL	Mikulowa	PSE-Operator SA		380		1302					
502	1	2	DE	Hagenwerder	VE Transmission	PL	Mikulowa	PSE-Operator SA		380		1302					
601	1 [109]	1	ES	Pinar del Rey	REE	MA	Melloussa	ONE		380		730					
700	1	1	PL	Krosno Iskrzynia	PSE-Operator SA	SK	Lemešany	SEPS		400		1252	831 [106]				
700	1	2	PL	Krosno Iskrzynia	PSE-Operator SA	SK	Lemešany	SEPS		400		1252	831 [107]				
701	1	1	PL	Rzeszów	PSE-Operator SA	UA_W	Chmielnicka	NPC Ukrenenergo		750		2676 [108]	1949 [109]				
702	1	1	PL	Zamość	PSE-Operator SA	UA_W	Dobrotwor	NPC Ukrenenergo		220		309 [110]	381 [111]				
703	1	1	PL	Białystok	PSE-Operator SA	BY	Roś	Grodnoenergo		220		215 [112]					
704	1	1	PL	Ślupsk	PSE-Operator SA	SE	Ståmo	SvK		450		600 [113]					
710	1	1	HU	Győr	MAVIR	SK	Gabcikovo	SEPS		400		1246	1386 [114]				
711	1	1	HU	Göd	MAVIR	SK	Levice	SEPS		400		1246	1108 [115]				
720	1	1	HU	Albertirsa	MAVIR	UA_W	Zahidno Ukrainaska	NPC Ukrenenergo		750		4000	2146 [116]				
721	1	1	HU	Sajószöged	MAVIR	UA_W	Mukacevo	NPC Ukrenenergo		400		1635	693 [117]				
722	1	1	HU	Kisvárd	MAVIR	UA_W	Mukacevo	NPC Ukrenenergo		220		312	305 [118]				
722	1	2	HU	Tiszalök	MAVIR	UA_W	Mukacevo	NPC Ukrenenergo		220		312	305 [119]				
730	1	1	HU	Sándorfalva	MAVIR	RO	Arad	TRANSELECTRICA		400		1246					
740	1	1	RO	Roşiori	TRANSELECTRICA	UA_W	Mukacevo	NPC Ukrenenergo		400		1400 [120]	693 [121]				
741	1	1	RO	Isaccea	TRANSELECTRICA	UA_W	PivdennoUkrainska AES	NPC Ukrenenergo		750		4000 [122]	2100 [123]				
750	1	1	RO	Stânca	TRANSELECTRICA	MD	Costeşti	Moldenergo		110		90					
751	1	1	RO	Huşi	TRANSELECTRICA	MD	Cioara	Moldenergo		110		90					
752	1	1	RO	Tuţora	TRANSELECTRICA	MD	Ungheni	Moldenergo		110		90					
753	1	1	RO	Issaccea	TRANSELECTRICA	MD	Vulcanesti	Moldenergo		400		1700					
760	1	1	BG	Maritsa3	NEK	TR	Babaeski	TEIAS		400		1309 [124]	900				
761	1	1	BG	Maritsa3	NEK	TR	Hamitabat	TEIAS		400	1715	900 [125]					

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Abbreviations grid operators

Austria	TIRAG Verbund APG VKW ÜN	Tiroler Regelzone AG Verbund - Austria Power Grid GmbH, Wien VKW - Übertragungsnetz AG, Bregenz	Denmark West	ELTRA	ELTRA , Fredericia
Bosnia - Herzegovina	JPCC	Joint Power Coordination Center	Denmark East	ELKRAFT	ELKRAFT
Belgium	Elia	Elia System Operator SA	Ukraine West	NPC Ukrenergo	NPC Ukrenergo
Bulgaria	NEK	Natsionalna Elektricheska Kompania EAD, Sofia	Albania	KESH	Albanian Electroenergetic Corporation
Switzerland	ATEL BKW UTN EGL Grid EOS ETRANS NOK	Aare-Tessin Ltd.for Elektriccity BKW Übertragungsnetz AG, Bern EGL Grid AG, Laufenburg Energy Ouest Suisse S.A., Lausanne ETRANS Ltd. Nordostschweizerische Kraftwerke AG, Baden	Belarus	Grodnoenergo	Grodnoenergo
Serbia & Montenegro	EPCG EPS	Elektroprivreda Crne Gore, Niksic Elektroprivreda Srbije, Beograd	Great Britain	National Grid	The National Grid Company plc, London
Czech Republic	CEPS	CEPS a.s., Praha	Morocco	ONE	Office National de l'Electricité, Casablanca
Germany	E.ON Netz EnBW Transportnetze RWE Transportnetz Strom VE Transmission	E.ON Netz GmbH, Bayreuth EnBW Transportnetze AG, Karlsruhe RWE Transportnetz Strom GmbH, Dortmund Vattenfall Europe Transmission GmbH, Berlin	Republic of Moldavia	Moldenergo	Moldenergo
Spain	REE	Red Eléctrica de España S.A., Madrid	Norway	Statnett	Statnett
France	RTE	RTE Gestionnaire du Réseau de Transport d'Electricité,	Republic of Turkey	TEIAS	Türkiye Elektrik İletim A.S., Ankara
Greece	HTSO / DESMIE	Hellenic Transmission System Operator / Diachristis Elinikou Sistimatos Metaforas Illectrikis Energias	Sweden	SYDKRAFT VATTENFALL SvK	Sydkraft AB, Malmö Vattenfall AB, Stockholm Svenska Kraftnät
Croatia	HEP	Hrvatska Elektroprivreda d.d., Zagreb			
Hungary	MAVIR Rt	Magyar Villamosenergia - ipari Rendszerirányító Rt., Budapest			
Italy	GRTN	Gestore della Rete di Trasmissione Nazionale S.p.A., Roma			
Luxembourg	CEGEDEL Net	Compagnie Grand Ducale d'Electricité du Luxembourg S.A., Luxembourg			
FYROM	ESM	Elektrostopastvo na Makedonija, Skopje			
The Netherlands	TenneT	TenneT bV Transmission System Operator			
Poland	PSE-Operator	Polskie Sieci Elektroenergetyczne Operator S.A.			
Portugal	REN	Rede Eléctrica Nacional, S.A., Lisboa			
Romania	TRANSELECTRICA	Transelectrica S.A., National Power Grid Company, Bucuresti			
Slovenia	ELES	Elektro Slovenija, Ljubljana			
Slovak Republic	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)	380	1382	R1	611							611					
11.1.2	DE - Conneforde (E.ON Netz)	NL - Meeden (TenneT)	380	1382	R1	2439							2439					
13.1.1	DE - Siersdorf (RWE Transportnetz Strom)	NL - Maasbracht (TenneT)	380	1645	R1	34415					850	33565						
13.1.2	DE - Rommerskirchen (RWE Transportnetz Strom)	NL - Maasbracht (TenneT)	380	1698	R1	1113									1113			
15.1.1	DE - Gronau W (RWE Transportnetz Strom)	NL - Hengelo (TenneT)	380	1790	R1	4033							3427	606				
15.1.2	DE - Gronau Z (RWE Transportnetz Strom)	NL - Hengelo (TenneT)	380	1790	R1	3370							3370					
25.1.1	BE - Gramme (Elia)	NL - Maasbracht (TenneT)	380	1207	R9	19488										19488		
25.1.2	BE - Meerhout (Elia)	NL - Maasbracht (TenneT)	380	1270	R1	12193						12193						
26.2.1	BE - Zandvliet (Elia)	NL - Borssele (TenneT)	380	1476	R1	2509				1311			1198					
41.1.1	BE - Aubange (Elia)	LU - Belval (SOTEL)	220	358	R1	3392					3392							
41.2.1	BE - Aubange (Elia)	LU - Belval (SOTEL)	150	157	R1, R6, R9	9795				6106						15	3674	
41.3.1	BE - Aubange (Elia)	LU - Belval (SOTEL)	150	157	R1	5561				5561								
51.1.1	BE - Jamiole (Elia)	FR - Chooz (RTE)	220	338	R1, R9	4855				4739		116						
51.2.1	BE - Avelgem (Elia)	FR - Avelin (RTE)	380	1207	R1, R9	7002					410		3				6589	
51.3.1	BE - Achène (Elia)	FR - Lonny (RTE)	380	1207	R1, R9	22864					22857						7	
52.1.1	BE - Aubange (Elia)	FR - Moulaine (RTE)	220	286	R1	4817											4817	
71.1.1	DE - Uchtelfangen (RWE Transportnetz Strom)	FR - Vigy (RTE)	380	1790	R1	3622				3622								
71.1.2	DE - Uchtelfangen (RWE Transportnetz Strom)	FR - Vigy (RTE)	380	1790	R1, R9, 10	4459				3692								767
71.2.1	DE - Ensдорff (RWE Transportnetz Strom)	FR - St-Avoid (RTE)	220	261	R1	6654	5859				795							
72.1.1	DE - Eichstetten (EnBW Transportnetze)	FR - Vogelgrün (RTE)	220	338	R9, R10	2763			2429			334						
72.1.2	DE - Eichstetten (EnBW Transportnetze)	FR - Muhlbach (RTE)	380	1751	R9	2517			2061	456								
81.1.1	FR - Sierentz (RTE)	CH - Bassecourt (BKW)	380	1186	R1	11577				4945					6632			
81.2.1	CH - Laufenburg (EGL Grid)	FR - Sierentz (RTE)	380	1167	R1	72447						3442			5019	2452	43200	18334
81.3.1	FR - Mambelin (RTE)	CH - Bassecourt (BKW)	380	1046	R1, R10	4537	6				4531							
82.1.1	FR - Bois-Tollot (RTE)	CH - Verbois (EOS)	380	1211	R1	19631				3035						16223	373	
82.1.2	FR - Bois-Tollot (RTE)	CH - Chamoson (EOS)	380	1409	R1, R9	15544						2966	6679		5292	588		19
82.2.1	FR - Génissiat (RTE)	CH - Verbois (EOS)	220	315	R1	596					596							
82.2.2	CH - Verbois (EOS)	FR - Génissiat (RTE)	220	315	R1	594					594							
82.4.1	FR - Vallorcine (RTE)	CH - La Bâtiatz (Atel)	220	266	R1	3394							3394					
82.5.1	CH - Ridders (EGL Grid)	FR - Cornier (RTE)	220	275	R1, R2, R7, R8	7792		913					6178				571	
82.6.1	CH - St-Triphon (EOS)	FR - Cornier (RTE)	220	275	R1, R7	5010				127							4883	
83.1.1	FR - Sierentz (RTE)	CH - Asphard (Atel/NOK/EnBW TN)	380	1167	R9	6435						6435						
91.1.1	FR - Albertville (RTE)	IT - Rondissone (GRTN)	380	1150	R1, R9	3255						102			3153			
91.1.2	FR - Albertville (RTE)	IT - Rondissone (GRTN)	380	1150	R1	2979									2042	937		
92.1.1	FR - Le Broc Carros (RTE)	IT - Camporosso (GRTN)	220	320	R1, R6, R9	14091		6285		6404								1402
93.1.1	FR - Villarodin (RTE)	IT - Venusa (GRTN)	380	879	R1, R9	13570						130		13440				
94.1.1	FR - Lucciana (EDF)	IT - Suvereto (GRTN)	220	300	R1	29549	2911								5219	21419		
102.1.1	DE - Gurtweil (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	220	485	R1	7719				540				2502	4677			
102.1.2	DE - Gurtweil (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	220	469	R1	526				526								
102.2.1	CH - Laufenburg (EGL Grid)	DE - Kühmoos (EnBW Transportnetze)	220	295	R1, R10	865				599							266	
102.3.1	DE - Kühmoos (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	220	469	R1	1358				531					426	401		
102.3.2	DE - Kühmoos (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	380	1620	R1	13000			496	6193							6311	
102.4.1	DE - Kühmoos (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	380	1620	R1, R2	6567							6118				449	
102.4.2	DE - Kühmoos (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	380	1580	R1	6323			40		6283							
102.5.1	DE - Tiengen (RWE Transportnetz Strom)	CH - Laufenburg (EGL Grid)	380	1131	R1, R2, R9	11727				6669	645			639		3642		132
103.1.1	DE - Tiengen (RWE Transportnetz Strom)	CH - Beznau (NOK)	380	1158	R1	22556				4998				13521	3446	591		
103.1.2	DE - Tiengen (RWE Transportnetz Strom)	CH - Koblenz (NOK)	220	335	R1, R9	40957	558	133			780	23945	13514	2027				
104.1.1	DE - Kühmoos (EnBW Transportnetze)	CH - Asphard (Atel/NOK)	380	1340	R1, R2, R9	19772						6777			12516	479		
105.1.1	DE - Engstlatt (EnBW Transportnetze)	CH - Laufenburg (EGL Grid)	380	1675	R1	3289							3289					
111.2.1	DE - Herberlingen (RWE Transportnetz Strom)	AT - Bürs (VIW)	220	389	R1, R2, R9	37340	293			3111	6100		106		16435	11295		
111.3.1	DE - Dellmensingen (RWE Transportnetz Strom)	AT - Bürs (VIW)	220	492	R1, R2, R8, R9	13802		53	215	1891		4794			5274	996	579	
115.5.1	DE - Altheim (E.ON Netz)	AT - St. Peter (Verbund-APG)	220	301	R1, R9	19202	76	129						8126	9658	509	704	
115.6.1	DE - Simbach (E.ON Netz)	AT - St. Peter (Verbund-APG)	220	301	R1, R9	1692	77							1615				
115.9.1	DE - Pirach (E.ON Netz)	AT - St. Peter (Verbund-APG)	220	518	R1, R9	8424	2436								116		1236	4636
115.10.1	DE - Pleinting (E.ON Netz)	AT - St. Peter (Verbund-APG)	220	518	R1, R4, R9	3179		203	390		2446	67		73				
116.1.1	DE - Leupolz (RWE Transportnetz Strom)	AT - Westtirol (Verbund-APG)	380	1316	R1, R8	1617		77				544		320		461		215
116.2.1	AT - Westtirol (Verbund-APG)	DE - Memmingen (RWE Transportnetz Strom)	220	762	R1, R9	9516						3316	132	325		348		3448
117.1.1	DE - Oberbrunn (E.ON Netz)	AT - Silz (TIRAG)	220	793	R1, R9	21275				1671			2391		497	6056	5188	5472
117.1.2	DE - Oberbrunn (E.ON Netz)	AT - Silz (TIRAG)	220	793	R1, R2, R9	13404				2680					500	8679	1010	535
121.1.1	IT - Ponte (GRTN)	CH - Airola (Atel)	220	257	R1, R2	19637					170	3808	15127			292		240
121.2.1	IT - Mese (GRTN)	CH - Gorduno (Atel)	220	257	R1, R9	8556					779	752			764	6261		
121.3.1	IT - Bulciago (GRTN)	CH - Soazza (EGL Grid)	380	1142	R1	15104				11220				2904		591	389	
121.4.1	IT - Musignano (GRTN)	CH - Lavorgo (Atel)	380	1118	R1	1840								1352			488	
122.2.1	IT - Sondrio (GRTN)	CH - Robbia (RE)	220	257	R1	144005		556	44159	41760	44640	12890						
123.1.1	IT - Avise (GRTN)	CH - Ridders (EGL Grid)	220	290	R1, R2	18731					11039	6888				295	509	
123.2.1	IT - Valpellina (GRTN)	CH - Ridders (EGL Grid)	220	290	R1	22864					11039	6939					4886	
123.3.1	IT - Pallanzeno (GRTN)	CH - Mörel (RHOWAG)	220	257	R1, R2, R6	4810		97						384	3327	1002		
132.1.1	IT - Soverzene (GRTN)	AT - Lienz (Verbund-APG)	220	257	R1	7293						543		6300			450	
141.1.1	AT - Meiningen (VKW-ÜN)	CH - Y-Rehag (NOK)	220	501	R1	38032						566	14603	22249				614
141.2.1	AT - Meiningen (VKW-ÜN)	CH - Winkeln (NOK)	220	776	R1, R9	6079						96	2620	3363				

Reasons: R1 - Maintenance, R2 - Repair, R3 - New construction, R4 - Overload (also calculated),
R7 - Outside impacts (animals, trees, fire, avalanche,...), R8 - Very exceptional conditions (weather, natural disaster,...),

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

Country	Circuit length (km)				Transformers 400kV → 220kV		
	220 kV	of which cable	400 kV	of which cable	Number	Capacity GVA	
AT ¹	3765	5	2474	56	17	10,8	
BA	1507	0	766	0	7	3,0	
BE	400	0	1301	0	6	2,1	
BG	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
CH	4956	15	1780	0	18	10,0	
CS	2589	0	1814	0	12	4,8	
CZ	1922	0	3421	0	4	1,9	
DE ²	15900	20	19600	63	89	52,8	
ES	16839	110	16358	15	88	48,0	
FR	26264	921	21005	2	208	106,0	
GR	10940	111	4316	160	43	11,5	
HR	1145	0	1159	0	4	2,0	
HU	1188	0	2172	0	3	1,5	
IT	11579	860	9960	317	51	20,5	
LU	236	6	0	0	0	0,0	
MK ³	70	0	397	0	0	0,0	
NL	683	6	2003	0	4	2,5	
PL	7895	0	4832	245	16	7,2	
PT	2820	17	1454	0	7	3,2	
RO	4132	0	4630	0	22	9,0	
SI	328	0	510	0	3	1,2	
SK	962	0	1753	0	3	1,4	
UCTE	116120	2071	101705	858	605	299,3	
DK_W	39	0	833	14	0	0,0	
UA_W	594	0	590 ⁴	0	6 ⁴	2,3 ⁴	

¹ Values as of December 31, 2000

² Values transformers of power units as of 2000; values transformers in the network as of 2003

³ Values as of December 31, 2003

⁴ Including 330 kV and 750 kV equipment

Transformers 220kV → < 220kV				Transformers 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
64	7,1	67	11,5	3	1,2	13	3,9
15	2,0	15	2,0	3	1,0	7	2,0
3	0,8	25	3,2	14	8,4	25	12,5
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
101	4,7	149	13,9	8	4,3	2	0,4
23	4,6	51	7,7	11	4,9	13	3,8
5	1,1	20	4,0	33	11,3	41	11,3
111	31,0	438	82,1	100	62,0	190	54,7
0	0,0	0	0,0	0	0,0	53	14,0
234	31,0	1175	108,0	103	86,0	55	13,0
86	8,0	399	16,0	17	5,4	0	0,0
7	1,3	21	3,2	2	0,3	7	2,4
0	0,0	26	4,2	0	0,0	22	5,5
112	23,0	153	25,3	119	35,8	212	54,4
11	1,8	19	2,7	0	0,0	0	0,0
0	0,0	4	0,6	2	0,5	7	2,1
9	3,2	25	4,4	6	3,6	32	15,6
58	13,9	109	17,3	25	8,6	36	9,6
61	4,1	63	7,6	18	3,9	16	4,5
46	9,3	91	17,6	13	5,3	21	10,3
0	0,0	15	2,3	0	0,0	5	1,5
8	1,5	13	2,6	20	4,1	19	5,0
954	148,4	2878	336,1	497	246,7	776	226,4
0	0,0	2	1,0	4	2,0	18	8,0
7	1,8	14	1,9	5 ⁴	1,3 ⁴	1 ⁴	1,0 ⁴

	AT	BA	BE	BG	CH	CS	CZ	DE	ES	FR	GR	HR	HU	IT	LU	MK	NL	PL	PT	RO	SI	SK	DK W	UA W
AT					- 2 2		2 1 3	11 3					2 1	1 -								- 1 2		
BA						6 3 1						11 7 2												
BE										- 2 2					2 2 -	- -	4							
BG					2 -						- -					2					- 1 4			
CH							3 5 7	1 5 5	1 5 5				1 5 4											
CS												2 -	1 -			- 2 1					3 -			
CZ																						- 2 3		
DE										2 4					8 -	- 6	2 2						1 2 2	
ES										2 2 2											1 3 4			
FR																								
GR																	1 -							
HR																								
HU																								
IT																								
PL																								
RO																								
SK																								

<220 kV
220 kV
380 kV

As of 31.12.2004

Country	Name of line	Designed for	Equipped for	Operated with
Germany	Eschen-Feldkirch	2 x 110 kV	1 x 110 kV	1 x 110 kV
	Diele - Hanekenfähr Emsland West/Rhede	2 x 380 kV	2 x 380 kV	1 x 380 kV
	Connection Wustermark	2 x 380 kV	2 x 380 kV	2 x 380 kV
Greece	Argyroupolis - Lavrion	1 x 400 kV	1 x 400 kV	1 x 150
	Substation HT s/s Olympic Village :			150 kV
	Substation HT s/s Heron pp :			150 kV
	Substation EHT s/s Argyroupolis :			400 kV
Italy	S.Fiorano - Robbia	2 x 380 kV	2 x 380 kV	2 x 380 kV
	Teramo - S.Giacomo	1 x 380 kV	1 x 380 kV	1 x 380 kV
	Laino - Altomonte	1 x 380 kV	1 x 380 kV	1 x 380 kV
	Candela - Foggia	1 x 380 kV	1 x 380 kV	1 x 380 kV