

- 1 ENTSO-E Net generation, exchanges and consumption 2011
- 2 Yearly values/operation and physical exchanges
- 3 System information**
- 4 Glossary of statistical terms

System information

Statistical database as of 31 August 2012

Page

Inventory of transmission network installations as of 31 December 2011	106
Number of circuits < 220kV, 220 kV and over 220 kV on tie lines	107
Simplified diagram of tie lines of the ENTSO-E synchronous area as of 31 December 2011	109
Characteristics of the ENTSO-E tie lines as of 31 December 2011	110
Unavailability of international tie lines - yearly overview 2011	121

Inventory of transmission network installations as of 31 December 2011

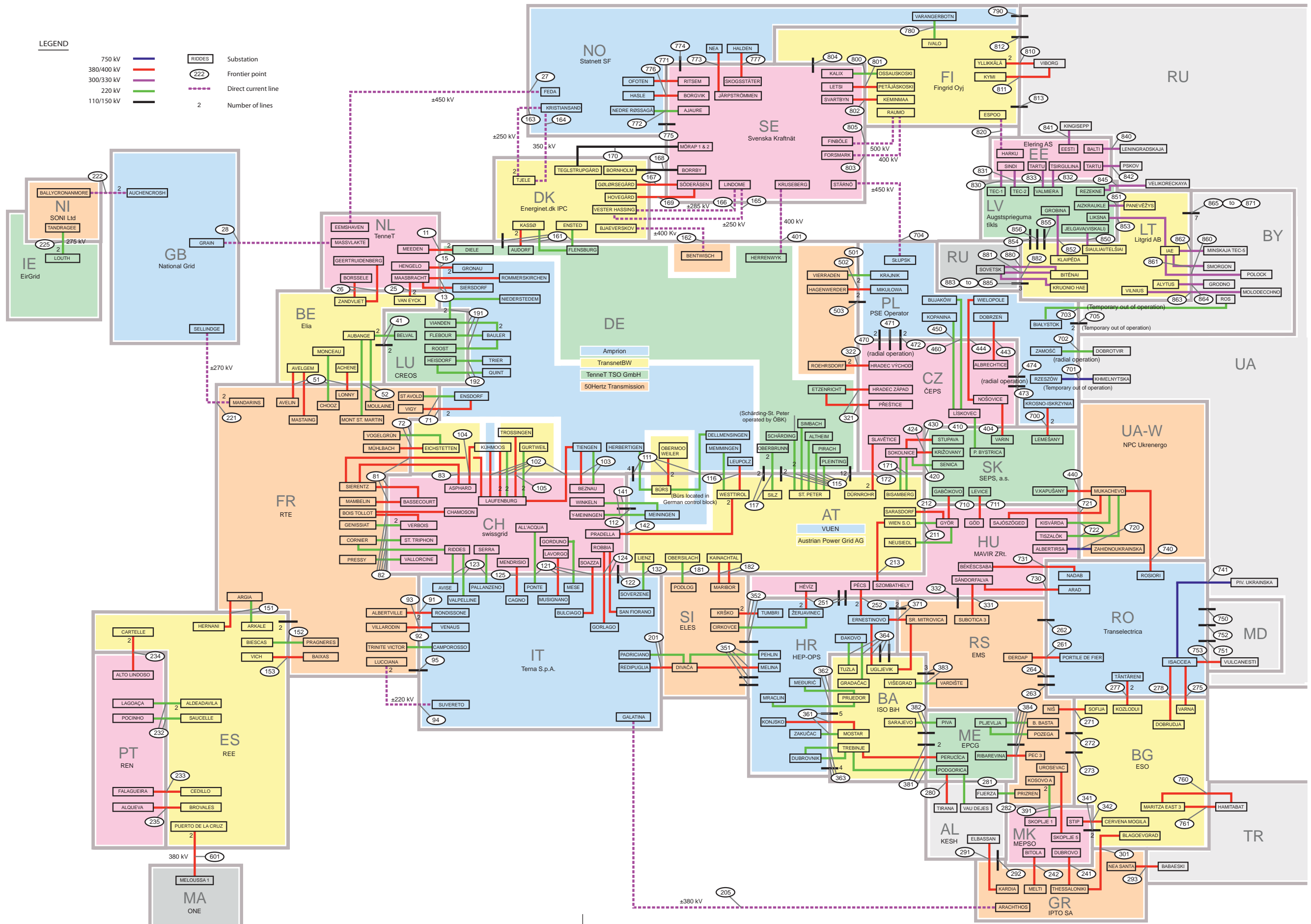
Lengths of circuits in km															
Country	< 220 kV	of which cable < 220 kV		220 - 285 kV	of which cable 220 - 285 kV		330 kV	of which cable 330 kV		380/400 kV	of which cable 380/400 kV		< 400 kV	of which cable < 400 kV	
		AC	DC		AC	DC		AC	DC		AC	DC		AC	DC
AT				3676	5					2838	55				
BA				1525	0					865	0				
BE				451	5					1335	0				
BG				2815	0					2327	0		85	0	
CH				4918	23					1788	8				
CY ¹	1227	120													
CZ				1909	0					3508	0				
DE				14472	39					20307	70				
DK				702	231					1508	371				
EE	3537	114		184	0		1540	0							
ES				17625	545					19622	55				
FI				2601	0					4331	0				
FR				26546	1019					21364	3				
GB				6126	522					11979	229				
GR				11484	267					4344	5				
HR				1210	0					1248	0				
HU				1433	0					2807	0		268	0	
IE				1862	129					439	0				
IS				851	0										
IT				10254	431					10327	466				
LT	5011	45					1672	0							
LU				259	18										
LV	3946	63		3940	67		1250	0							
ME ¹				400	0					280	0				
MK				103	0					507	0				
NI	1282	85		828	4										
NL				670	9					2091	30				
NO				445	0					8355	442				
PL				7921	1					5352	0		114	0	
PT				3478	42					2236	0				
RO				4755	0					4867	0		159	0	
RS				2284	0					1713	0				
SE				4400	0					10708	8				
SI				328	0					508	0				
SK				758	0					1551	0				
ENTSO-E^{2,3}	15003	427	365	141214	3356	2142	4462	0	0	149105	1742	1207	626	0	1654

¹ Values as of 31 December 2010

² ENTSO-E calculated sum of the member TSOs' countries

³ ENTSO-E calculated sum of DC cable length is equal to 5368 km and includes NorNed Cable (580 km), BritNed (520 km), FR Suvereto - IT Lucciana (430 km), Kontek (170 km), Skagerrak 1 (438 km), Skagerrak 2 (438 km), Skagerrak 3 (219 km), Konti-Skan 1 (176 km), Konti-Skan 2 (149 km), IT Galatina - GR Arachtos (316 km), IFA (140 km), Moyle Interconnector (127 km), East-West Interconnector (260 km), Baltic Cable (269 km), SwePol (254 km), Fenno-Skan 1 (233 km), Fenno-Skan 2 (300 km), Estlink (105 km), ES Balearic System and ES Mainland (488 km).

Simplified diagram of the ENTSO-E tie lines of the synchronous area of ENTSO-E as of 31 December 2011



Observations	
[1]	Limited by phase shifting transformer in Meeden
[2]	Limited by phase shifting transformer in Meeden
[3]	DC submarine cable
[4]	Unit is MW instead of MVA
[5]	Transducer
[6]	Line property TransNetBW in Germany partielly on the same tower as line Asphard-Kühmoos or Sierentz-Laufenburg; Line owned and operated by EnBW in Germany
[7]	DC link with three connections
[8]	Transforming station of Lucciana in Corsica
[9]	DC link with three connections
[10]	Transforming station of Lucciana in Corsica
[11]	Partially on the same tower as the Laufenbourg-Engstlatt line (No. 105.1): Alb- Nord
[12]	On the same tower as line No. 81 Laufenbourg-Sierentz 380 kVLeitung: Hotzenwald
[13]	From Kühmoos to Laufenbourg on the same tower; Leitung Eggberg
[14]	On the same tower as line Sierentz-Laufenburg
[15]	On CH side: The Trafo 20 in Laufenburg 200 MVA
[16]	Limited by switching devices in Austria
[17]	Disconnected till approx. 2010; afterwards line will be dismantled
[18]	Cable at Braunau
[19]	Cable at Braunau

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	TenneT DE	NL	Meeden	TenneT NL		380		1382	1000 [1]			
11.1.2	DE	Diele	TenneT DE	NL	Meeden	TenneT NL		380		1382	1000 [2]			
13.1.1	DE	Siersdorf	Amprion	NL	Maasbracht	TenneT NL		380		1645				
13.1.2	DE	Rommerskirchen	Amprion	NL	Maasbracht	TenneT NL		380		1698				
15.1.1	DE	Gronau	Amprion	NL	Hengelo	TenneT NL		380		1645				
15.1.2	DE	Gronau	Amprion	NL	Hengelo	TenneT NL		380		1645				
25.1.1	BE	Van Eyck	Elia	NL	Maasbracht	TenneT NL		380		1207				
25.1.2	BE	Van Eyck	Elia	NL	Maasbracht	TenneT NL		380		1270				
26.1.1	BE	Zandvliet	Elia	NL	Geertruidenberg	TenneT NL		380		1476				
26.2.1	BE	Zandvliet	Elia	NL	Borssele	TenneT NL		380		1476	450			
27.1.1	NO	Feda	Statnett	NL	Eemshaven	TenneT NL		450		700 [3,4]				
28.1.1	GB	Isle of Grain	National Grid	NL	Maasvlakte	TenneT NL		450		500				
28.2.1	GB	Isle of Grain	National Grid	NL	Maasvlakte	TenneT NL		450		500				
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		338				
51.2.1	BE	Avelgem	Elia	FR	Mastaing	RTE		380		1168				
51.2.2	BE	Avelgem	Elia	FR	Avelin	RTE		380		1303				
51.3.1	BE	Achène	Elia	FR	Lonny	RTE		380		1168				
52.1.1	BE	Aubange	Elia	FR	Moulaine	RTE		220		381				
52.2.1	BE	Aubange	Elia	FR	Mont St Martin	RTE		220		381				
71.1.1	DE	Ensdorf	Amprion	FR	Vigy	RTE		380		1790				
71.1.2	DE	Ensdorf	Amprion	FR	Vigy	RTE		380		1790				
71.2.1	DE	Ensdorf	Amprion	FR	St-Avold	RTE		220		261				
72.1.1	DE	Eichstetten	TransnetBW	FR	Vogelgrün	RTE	380	220		338 [5]		220		
72.1.2	DE	Eichstetten	TransnetBW	FR	Muhlbach	RTE		380		1684				
81.1.1	CH	Bassecourt	swissgrid	FR	Sierentz	RTE		380		1172				
81.2.1	CH	Laufenburg	swissgrid	FR	Sierentz	RTE		380		946				
81.3.1	CH	Bassecourt	swissgrid	FR	Mambelin	RTE		380		846				
82.1.1	CH	Verbois	swissgrid	FR	Bois-Tollot	RTE		380		1552				
82.1.2	CH	Chamoson	swissgrid	FR	Bois-Tollot	RTE		380		1552				
82.2.1	CH	Verbois	swissgrid	FR	Génissiat	RTE		220		237				
82.2.2	CH	Verbois	swissgrid	FR	Génissiat	RTE		220		237				
82.4.1	CH	Vallorcine	swissgrid	FR	Pressy	RTE		220		355				
82.5.1	CH	Riddes	swissgrid	FR	Cornier	RTE		220		216				
82.6.1	CH	St-Triphon	swissgrid	FR	Cornier	RTE		220		222				
83.1.1 [6]	CH/DE	Asphard	swissgrid/EnBW Tr.netze Strom	FR	Sierentz	RTE		380		1168				
91.1.1	FR	Albertville	RTE	IT	Rondissone	Terna		380		1244				
91.1.2	FR	Albertville	RTE	IT	Rondissone	Terna		380		1244				
92.1.1	FR	Trinite Victor	RTE	IT	Camporosso	Terna		220		319				
93.1.1	FR	Villarodin	RTE	IT	Venaus	Terna		380		1237				
94.1.1 [7]	FR	Lucciana	EDF	IT	Suvereto	Terna		220 [8]		300			50	
94.1.2 [9]	FR	Lucciana	EDF	IT	Suvereto	Terna		220 [10]		300			50	
95.1.1	FR	Bonifacio	EDF	IT	Santa Teresa	Terna		150		53				
102.1.1 [11]	CH	Laufenburg	swissgrid	DE	Gurtweil	TransnetBW		220		442		220		
102.1.2	CH	Laufenburg	swissgrid	DE	Gurtweil	TransnetBW		220		457		220		
102.2.1 [12]	CH	Laufenburg	swissgrid	DE	Kühmoos	TransnetBW		220		410				
102.3.1 [13]	CH	Laufenburg	swissgrid	DE	Kühmoos	TransnetBW	380	220		430				
102.3.2	CH	Laufenburg	swissgrid	DE	Kühmoos	TransnetBW		380		1527				
102.4.1	CH	Laufenburg	swissgrid	DE	Kühmoos	TransnetBW		380		1527				
102.4.2	CH	Laufenburg	swissgrid	DE	Kühmoos	Amprion		380		1607				
102.5.1	CH	Laufenburg	swissgrid	DE	Tiengen	Amprion		380		1122				
103.1.1	CH	Beznau	swissgrid	DE	Tiengen	Amprion		380		1158				
103.1.2	CH	Beznau	swissgrid	DE	Tiengen	Amprion	380	220		335				
104.1.1 [14]	CH	Asphard	swissgrid	DE	Kühmoos	TransnetBW		380		1263				
105.1.1	CH	Laufenburg	swissgrid	DE	Trossingen	TransnetBW		380		1607				
107.1.1 [15]	CH	Laufenburg 220kV	swissgrid	DE	Laufenburg 110 kV	ED		110		200				
111.1.1	AT	Bürs	VIW	DE	Obermoowweiler	TransnetBW		380		1369				
111.1.2	AT	Bürs	VIW	DE	Obermoowweiler	TransnetBW		380		1369				
111.2.1	AT	Bürs	VIW	DE	Herbertingen	Amprion		220		389				
111.3.1	AT	Bürs	VIW	DE	Dellmensingen	Amprion		220		492	457 [16]			
111.4.1	AT	Rieden	Vorarlberg Netz	DE	Lindenberg	Vorarlberg Netz		110		84				
111.4.2	AT	Hörbranz	Vorarlberg Netz	DE	Lindau	Vorarlberg Netz		110		84				
111.4.3	AT	Werben	Vorarlberg Netz	DE	Lindau	Vorarlberg Netz		110		162				
111.5.1	AT	Vorderwald	Vorarlberg Netz	DE	Weiler	Vorarlberg Netz		110		127				
112.1.1	AT	Feldkirch	Vorarlberg Netz	CH	Eschen	swissgrid		110		130				
115.1.1	AT	Braunau	Grenzkraftwerke AG	DE	Neuötting	E.ON Netz GmbH		110		90 [17]			82 [18]	
115.2.1	AT	Braunau	Grenzkraftwerke AG	DE	Stammham	E.ON Netz GmbH		110		102			82 [19]	
115.4.1	AT	Antiesenhofen	APG	DE	Eggfling	E.ON Netz GmbH		110		102				
115.5.1	AT	St. Peter	APG	DE	Altheim	TenneT DE		220		301				

*The conventional transmission capacity of tie lines is based upon parameters standardised within former 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

[20]	Transducer at Ering
[21]	Transducer at Ering
[22]	Isolator in St. Peter
[23]	Isolator in St. Peter
[24]	Only temporary line; from December 2005 till summer 2006; afterwards disconnected till approx.2010
[25]	No international interconnector
[26]	CFT blocker at St. Peter
[27]	No international interconnector
[28]	CFT blocker at St. Peter
[29]	Switching device at Oberbrunn
[30]	Switching device at Oberbrunn
[31]	Possible to lay a second circuit⇒Not yet managed by swissgrid, so no technical data available.
[32]	Limited by transformer in Enstedt
[33]	Limited by transformer in Kasso
[34]	Transducer at Kasso
[35]	Transducer at Kasso
[36]	DC submarine and underground cable
[37]	DC submarine and underground cable
[38]	DC submarine and underground cable
[39]	Under water cable
[40]	Under water cable
[41]	Under water cable
[42]	Generator line in radial operation - interconnected operation impossible; installed at Vianden
[43]	Generator line in radial operation - interconnected operation impossible; installed at Vianden
[44]	Generator line in radial operation - interconnected operation impossible; installed at Vianden

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
115.6.1	AT	St. Peter	APG	DE	Simbach	TenneT DE		220		301				
115.7.1	AT	St. Peter	APG	DE	Ering	E.ON Netz GmbH		110		152			114 [20]	
115.7.2	AT	St. Peter	APG	DE	Ering	E.ON Netz GmbH		110		152			114 [21]	
115.8.1	AT	St. Peter	APG	DE	Eggfling	E.ON Netz GmbH		110		105				
115.9.1	AT	St. Peter	APG	DE	Pirach	TenneT DE		220		518			457 [22]	
115.10.1	AT	St. Peter	APG	DE	Pleinting	TenneT DE		220		449			457 [23]	
115.11.1	AT	Ranna	EAGOO-Netz	DE	Passau/Hauzenberg	E.ON Netz GmbH		110		90 [24]				
115.12.1	AT	Oberaudorf	ÖBK	DE	Rosenheim	E.ON Netz GmbH		110		93				
115.13.1	AT	Oberaudorf	ÖBK	DE	Kiefersfelden	E.ON Netz GmbH		110		102				
115.14.1	AT	Antiesenhofen	EAGOO-Netz	DE	Weidach	APG 1		110		130				
115.14.2	AT	Antiesenhofen	EAGOO-Netz	DE	Weidach	APG 1		110		130				
115.15.1	AT	Aigerding	APG / EAGOO-Netz	DE	Passau	Grenzkraftwerke AG		110		102				
115.16.1 [25]	AT	St. Peter	APG	DE	Schärding	ÖBK		220		301			229 [26]	
115.16.2 [27]	AT	St. Peter	APG	DE	Schärding	ÖBK		220		301			229 [28]	
115.17.1	AT	Kufstein	TIWAG-Netz	DE	Oberaudorf	Grenzkraftwerke AG		110		90				
115.17.2	AT	Ebbs	TIWAG-Netz	DE	Oberaudorf	Grenzkraftwerke AG		110		127				
116.1.1	AT	Westtirol	APG	DE	Leupolz	Amprion		380		1316				
116.2.1	AT	Westtirol	APG	DE	Memmingen	Amprion		220		762				
117.1.1	AT	Silz	APG	DE	Oberbrunn	TenneT DE		220		793			762 [29]	
117.1.2	AT	Silz	APG	DE	Oberbrunn	TenneT DE		220		793			762 [30]	
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 [31]	CH	Campocologno	RE	IT	Poschiavino	Terna		150		103			42	
123.1.1	CH	Riddes	swissgrid	IT	Avise	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		1330				
124.1.2	CH	Robbia	swissgrid	IT	San Fiorano	Terna		380		1330				
125.1.1	CH	Mendrisio	swissgrid	IT	Cagno	Terna		380		450			200	
132.1.1	AT	Lienz	APG	IT	Soverzene	Terna		220		257				
141.1.1	AT	Meiningen	APG on behalf of VUEN	CH	Y-Meiningen	swissgrid		220		494				
141.2.1	AT	Meiningen	APG on behalf of VUEN	CH	Winkeln	swissgrid		220		765				
142.1.1	AT	Westtirol	APG	CH	Pradella	swissgrid		380		1330				
142.2.1	AT	Westtirol	APG	CH	Pradella	swissgrid		380		1330				
151.1.1	ES	Hemani	REE	FR	Argia	RTE		380		1137				
151.2.1	ES	Irún	REE	FR	Errondenia	RTE		132		59				
151.3.1	ES	Arkale	REE	FR	Argia	RTE		220		339				
151.4.1	ES	Biescas	REE	FR	Pragnères	RTE		220		183				
152.1.1	ES	Benós	REE	FR	Lac d'Oo	RTE		110		76				
153.1.1	ES	Vich	REE	FR	Baixas	RTE		380		1348				
161.1.1	DE	Flensburg	TenneT DE	DK	Ensted	Energinet.dk IPC		220		332			305 [32]	
161.2.1	DE	Flensburg	TenneT DE	DK	Kassø	Energinet.dk IPC		220		332			305 [33]	
161.3.1	DE	Audorf	TenneT DE	DK	Kassø	Energinet.dk IPC		380		1078			658 [34]	
161.3.2	DE	Audorf	TenneT DE	DK	Kassø	Energinet.dk IPC		380		1078			658 [35]	
161.4.1	DE	Flensburg UW Nord	Stadtwerke Flensburg	DK	Ensted	Energinet.dk IPC		150		150				
162.1.1 [36]	DE	Bentwisch	50Hertz	DK	Bjæverskov	Energinet.dk IPC		400		600				
163.1.1 [37]	NO	Kristiansand	Statnett SF	DK	Tjele	Energinet.dk IPC		250		250				
163.1.2 [38]	NO	Kristiansand	Statnett SF	DK	Tjele	Energinet.dk IPC		250		250				
164.1.1 [39]	NO	Kristiansand	Statnett SF	DK	Tjele	Energinet.dk IPC		350		350				
165.1.1 [40]	SE	Lindome	Svenska Kraftnät	DK	Vester Hassing	Energinet.dk IPC		282		370				
166.1.1 [41]	SE	Lindome	Svenska Kraftnät	DK	Vester Hassing	Energinet.dk IPC		285		360				
167.1.1	SE	Söderåsen	Svenska Kraftnät	DK	Gørløsegård	Energinet.dk IPC		400		830				
168.1.1	SE	Borrby	E.ON Elnät Sverige AB	DK	Bornholm	Energinet.dk IPC		60		51				
169.1.1	SE	Söderåsen	Svenska Kraftnät	DK	Hovegård	Energinet.dk IPC		400		830				
170.1.1	SE	Mörarp 1and 2	E.ON Elnät Sverige AB	DK	Teglstrupgård	Energinet.dk IPC		130		311				
171.1.1	AT	Bisamberg	APG	CZ	Sokolnice	CEPS		220		250				
171.2.1	AT	Bisamberg	APG	CZ	Sokolnice	CEPS		220		250				
172.1.1	AT	Dümröhr	APG	CZ	Slavetice	CEPS		380		1559				
172.1.2	AT	Dümröhr	APG	CZ	Slavetice	CEPS		380		1559				
181.1.1	AT	Obersielach	APG	SI	Podlog	ELES		220		320				
182.1.1	AT	Kainachtal	APG	SI	Maribor	ELES		380		1164				
182.2.1	AT	Kainachtal	APG	SI	Maribor	ELES		380		1164				
191.1.1	DE	Niederstedem	Amprion	LU	Vianden	SEO		220		490			460 [42]	
191.1.2	DE	Niederstedem	Amprion	LU	Vianden	SEO		220		490			230	
191.2.1	DE	Bauler	Amprion	LU	Vianden	SEO		220		730			345 [43]	
191.2.2	DE	Bauler	Amprion	LU	Vianden	SEO		220		730			230 [44]	
191.3.1	DE	Bauler	Amprion	LU	Flebour	Creos Luxembourg		220		490				

*The conventional transmission capacity of tie lines is based upon parameters standardised within former 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 times 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	
[45]	The 400kV link between GR-IT is composed of an overhead line and a submarine cable
[46]	DC submarine cable
[47]	Unit is MW instead of MVA
[48]	DC submarine cable
[49]	Unit is MW instead of MVA
[50]	DC submarine cable
[51]	DC Submarine Cable - 250MW instead 250 MVA
[52]	Due to Existing Constraints the following applies to the 275kV double circuit tie line (both 225.1.1 AND 225.2.1):IE Louth to NI Tandragee = 380M WNI Tandragee to IE Louth
[53]	Due to Existing Constraints the following applies to the 275kV double circuit tie line (both 225.1.1 AND 225.2.1):IE Louth to NI Tandragee = 380M WNI Tandragee to IE Louth
[54]	In May 2007 out of operation 150 kV line Bitola1-Amyndeo; from June 2007 the new 400 kV line Bitola2-Meliti in operation
[55]	Limited by the connected network
[56]	Nominal voltage in Croatia
[57]	Limited by the connected network
[58]	Nominal voltage in Croatia
[59]	Built for 750 kV
[60]	4500 MVA at 750 kV
[61]	Limited by the Albanian network
[62]	Capacity of current transformers at Bistrica
[63]	Disconnected in Serbia

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
191.4.1	DE	Bauler	Amprion	LU	Roost	Creos Luxembourg		220		490				
192.1.1	DE	Trier	Amprion	LU	Heisdorf	Creos Luxembourg		220		490				
192.2.1	DE	Quint	Amprion	LU	Heisdorf	Creos Luxembourg		220		490				
201.1.1	IT	Redipuglia	Terna	SI	Divaca	ELES		380		1619			1200	
201.2.1	IT	Padriciano	Terna	SI	Divaca	ELES		220		320				
205.1.1 [45]	IT	Galatina	Terna	GR	Arachthos	IPTO SA		380		500				
211.1.1	AT	Wien Süd-Ost	APG	HU	Győr	MAVIR		220		209				
211.1.2	AT	Neusiedl	APG	HU	Győr	MAVIR		220		209				
212.1.1	AT	Sarasdorf	APG	HU	Győr	MAVIR		380		1514				
213.1.1	AT	Wien Süd-Ost	APG	HU	Szombathely	MAVIR		380		1514				
221.1.1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [46]		1000 [47]				
221.2.1	FR	Mandarins	RTE	GB	Sellindge	National Grid		270 [48]		1000 [49]				
222.1.1	NI	Ballycronamore	SONI Ltd	GB	Auchencrosh	National Grid		250 [50]		250				
222.2.1	NI	Ballycronamore	SONI Ltd	GB	Auchencrosh	National Grid		250		250 [51]				
225.1.1	NI	Tandragee	SONI Ltd	IE	Louth	EirGrid		275		660 [52]				
225.2.1	NI	Tandragee	SONI Ltd	IE	Louth	EirGrid		275		660 [53]				
231.1.1	ES	Las Conchas	REE	PT	Lindoso	REN		132		90				
232.1.1	ES	Aldeadávila	REE	PT	Pocinho	REN		220		374				
232.2.1	ES	Aldeadávila	REE	PT	Pocinho	REN		220		374				
232.2.1	ES	Aldeadávila	REE	PT	Lagoaça	REN		400		1469				
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	Brovaes	REE	PT	Alqueva	REN		400		1280				
241.1.1	MK	Dubrovo	MEPSO	GR	Thessaloniki	IPTO SA		400		1300				
242.1.1 [54]	MK	Bitola	MEPSO	GR	Meliti	IPTO SA		400		1300				
251.1.1	HU	Lenti	MAVIR	HR	Nedeljanec	HEP-OPS		120		79		50 [55]	110 [56]	
251.2.1	HU	Siklos	MAVIR	HR	Donji Miholjac	HEP-OPS		110		114		50 [57]	110 [58]	
251.3.1	HU	Héviz	MAVIR	HR	Zerjavinec	HEP-OPS		400		1246				
251.3.2	HU	Héviz	MAVIR	HR	Zerjavinec	HEP-OPS		400		1246				
252.1.1	HU	Pécs	MAVIR	HR	Ernestinovo	HEP-OPS		400		1246				
252.1.2	HU	Pécs	MAVIR	HR	Ernestinovo	HEP-OPS		400		1246				
261.1.1	RS	Djerdap 1	EMS	RO	Portile de Fier	Transelectrica		400		1135				1107
262.1.1	RS	Kikinda	EMS	RO	Jimbolia	Transelectrica		110		65				57
263.1.1	RS	Djerdap 2	EMS	RO	Ostrovu Mare	Transelectrica		110		90				
264.1.1	RS	Sip	EMS	RO	Gura Văii	Transelectrica		110		87				19
271.1.1	BG	Sofija Zapad	ESO	RS	Niš	EMS		380		1309				
272.1.1	BG	Breznik	ESO	RS	HE Vrla 1	EMS		110		97				
273.1.1	BG	Kula	ESO	RS	Zaječar	EMS		110		90				
275.1.1	RO	Isaccea	Transelectrica	BG	Varna	ESO		750		400 [59]		2168 [60]		
277.1.1	RO	Ţânăreni	Transelectrica	BG	Kozloduj	ESO		400		1300			1000	
277.1.2	RO	Ţânăreni	Transelectrica	BG	Kozloduj	ESO		400		1300			1000	
278.1.1	RO	Rahman	Transelectrica	BG	Dobrudja	ESO		400		1135				830
280.1.1	AL	Tirana2	OST	ME	Podgorica 2	CGES AD		380		1264				
281.1.1	AL	Vau i Dejës	KESH	ME	Podgorica 2	CGES AD		220		276				
282.1.1	AL	Fierza	KESH	RS	Prizren	EMS		220		270				
291.1.1	AL	Elbassan	KESH	GR	Kardia	IPTO SA		400		1300		250 [61]		
292.1.1	AL	Bistrica	KESH	GR	Mourtos	IPTO SA		150		120		40 [62]		
293.1.1	TR	Babaeski	TEIAS	GR	Nea Santa	IPTO SA		400		2000				
301.1.1	BG	Blagoevgrad	ESO	GR	Thessaloniki	IPTO SA		400		1300		700		
321.1.1	CZ	Hradec Zapad	CEPS	DE	Etzenricht	TenneT DE		380		1386				
321.1.2	CZ	Prestice	CEPS	DE	Etzenricht	TenneT DE		380		1569				
322.1.1	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	50Hertz		380		1386				
322.1.2	CZ	Hradec Vychod	CEPS	DE	Röhrsdorf	50Hertz		380		1386				
331.1.1	HU	Sándorfalva	MAVIR	RS	Subotica 3	EMS		400		1295		1050		
332.1.1	HU	Szeged	MAVIR	RS	Subotica	EMS		110		79 [63]		62		
341.1.1	BG	Skakavica	ESO	MK	Kriva Palanka	MEPSO		110		123				
341.2.1	BG	Petric	ESO	MK	Sušica	MEPSO		110		123				
342.1.1	BG	Cervena Mogila	ESO	MK	Stip	MEPSO		400		1309				
351.1.1	HR	Melina	HEP-OPS	SI	Divaca	ELES		380		1164				
351.2.1	HR	Pehlin	HEP-OPS	SI	Divaca	ELES		220		320				
351.3.1	HR	Buje	HEP-OPS	SI	Koper	ELES		110		76				
351.4.1	HR	Matulji	HEP-OPS	SI	Ilirska Bistrica	ELES		110		53				
352.1.1	HR	Tumbri	HEP-OPS	SI	Krško	ELES		380		1164				
352.1.2	HR	Tumbri	HEP-OPS	SI	Krško	ELES		380		1164				
352.2.1	HR	Zerjavinec	HEP-OPS	SI	Čirkovce	ELES		220		297				
352.3.1	HR	Nedeljanec	HEP-OPS	SI	Formin	ELES		110		101				
361.1.1	BA	Mostar	NOS BIH	HR	Konjsko	HEP-OPS		400		1316				
361.2.1	BA	Mostar	NOS BIH	HR	Zakučac	HEP-OPS		220		311				
361.3.1	BA	Grahovo	NOS BIH	HR	Knin	HEP-OPS		110		90				

*The conventional transmission capacity of cross-frontier tie-lines is based upon parameters standardised within former 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.

Characteristics of the ENTSO-E tie lines as of 31 December 2011

Observations	
[64]	Line is destroyed, currently under construction
[65]	Line is destroyed, currently under construction
[66]	DC submarine cable
[67]	Monopol
[68]	Limited by the measuring transformer of current
[69]	Value for 30°C (no data for 35°C)
[70]	Value for 30°C (no data for 35°C)
[71]	Value for 30°C (no data for 35°C)
[72]	Limitation due to current transformer in Kudowa SS
[73]	Value for 30°C (no data for 35°C)
[74]	Limitation due to current part of combined current/voltage transformer in Pogwizdów SS
[75]	Value for 30°C (no data for 35°C)
[76]	Limitation due to current part of combined current/voltage transformer in Pogwizdów SS
[77]	Value for 30°C (no data for 35°C)
[78]	Limitation due to current transformer in Mnisztwo SS
[79]	Value for 30°C (no data for 35°C)
[80]	On Polish side 400 kV line (internal designation between 50Hertz and PSE Operator)
[81]	On Polish side 400 kV line (internal designation between 50Hertz and PSE Operator)
[82]	Value for 30°C (no data for 35°C)
[83]	Submarine cable
[84]	Submarine cable
[85]	Limited by current transformer at Krosno
[86]	Limited by current transformer at Krosno
[87]	Temporary out of operation
[88]	Limited by HF attenuator at UA side
[89]	Radial operation
[90]	Temporary out of operation
[91]	Value for 30°C (no data for 35°C)
[92]	DC Submarine cable
[93]	Temporary out of operation
[94]	Value for 30°C (no data for 35°C)
[95]	Temporary out of operation
[96]	Value for 30°C (no data for 35°C)

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
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	Prijedor	NOS BiH	HR	Mraclin	HEP-OPS		220		297				
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				
363.2.1	BA	Trebinje	NOS BiH	HR	Dubrovnik	HEP-OPS		220		460				
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				
364.2.1	BA	Gradacac	NOS BiH	HR	Đakovo	HEP-OPS		220		229				
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				
364.5.1	BA	Orasje	NOS BiH	HR	Zupanja	HEP-OPS		110		76				
371.1.1	HR	Ernestinovo	HEP-OPS	RS	Sremska Mitrovica	EMS		400		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 2	CGES AD		380		1264				
381.2.1	BA	Trebinje	NOS BiH	ME	Perucica	CGES AD		220		276				
381.3.1	BA	Trebinje	NOS BiH	ME	Herceg Novi	CGES AD		110		90				
381.4.1	BA	Bileca	NOS BiH	ME	Vilusi	CGES AD		110		84				
382.1.1	BA	Sarajevo 20	NOS BiH	ME	Piva	CGES AD		220		366				
382.2.1	BA	Goražde	NOS BiH	ME	Pljevlja 1	CGES AD		110		90				
383.1.1	BA	Višegrad	NOS BiH	RS	Pozega	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	Zamrsten	EMS		110		90				
383.5.1	BA	Ugljevik	NOS BiH	RS	Sremska Mitrovica	EMS		380		1264				
384.1.1	ME	Ribarevine	CGES AD	RS	Pec 3	EMS		380		1264				
384.2.1	ME	Pljevlja 2	CGES AD	RS	Bajina Basta	EMS		220		350				
384.3.1	ME	Pljevlja 2	CGES AD	RS	Pozega	EMS		220		365				
384.4.1	ME	Pljevlja 1	CGES AD	RS	Zamrsten	EMS		110		70				
391.1.1 [64]	MK	Skopje 1	MEPSO	RS	Kosovo A	EMS		220		311				
391.2.1 [65]	MK	Skopje 1	MEPSO	RS	Kosovo A	EMS		220		311				
391.3.1	MK	Skopje 5	MEPSO	RS	Urosevac	EMS		380		1218				
401.1.1 [66,67]	DE	Herrenwyk	TenneT DE	SE	Kruseberg	Baltic Cable AB		400		600				
404.1.1	CZ	Nosovice	CEPS	SK	Varin	SEPS		400		1205				
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				
430.1.1	CZ	Sokolnice	CEPS	SK	Stupava	SEPS		400		1363				
440.1.1	SK	V.Kapusany	SEPS	UA-W	Mukachevo	NPC Ukrenergo		400		115	831 [68]			
443.1.1	CZ	Albrechtice	CEPS	PL	Dobrzyn	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				
470.1.1	CZ	Porici	CEZ Distribuce	PL	Boguszów	Tauron Dystrybcja S.A.		110		78 [69]				
470.1.2	CZ	Porici	CEZ Distribuce	PL	Boguszów	Tauron Dystrybcja S.A.		110		78 [70]				
471.1.1	CZ	Náchod	CEZ Distribuce	PL	Kudowa	Tauron Dystrybcja S.A.		110		123 [71]	57 [72]			
472.1.1	CZ	Darkov	CEZ Distribuce	PL	Pogwizdów	Tauron Dystrybcja S.A.		110		123 [73]	114 [74]			
472.1.2	CZ	Darkov	CEZ Distribuce	PL	Pogwizdów	Tauron Dystrybcja S.A.		110		123 [75]	114 [76]			
473.1.1	CZ	Trinec	CEZ Distribuce	PL	Mnisztwo	Tauron Dystrybcja S.A.		110		123 [77]	114 [78]			
474.1.1	CZ	Trinec	CEZ Distribuce	PL	Mnisztwo/Ustro n	Tauron Dystrybcja S.A.		110		123 [79]				
501.1.1	DE	Vierraden	50Hertz	PL	Krajnik	PSE Operator S.A.		220		402				
501.1.2	DE	Vierraden	50Hertz	PL	Krajnik	PSE Operator S.A.		220		402				
502.1.1	DE	Hagenwerder	50Hertz	PL	Mikulowa	PSE Operator S.A.		380 [80]		1302				
502.1.2	DE	Hagenwerder	50Hertz	PL	Mikulowa	PSE Operator S.A.		380 [81]		1302				
503.1.1	DE	Neueibau	ENSO Netz GmbH	PL	Turów	Tauron Dystrybcja S.A.		110		39 [82]				
601.1.1 [83]	ES	Puerto de la Cruz	REE	MA	Melloussa 1	ONE		380		715				
601.1.2 [84]	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 [85]			
700.1.2	PL	Krosno Iskrzynia	PSE Operator S.A.	SK	Lemešany	SEPS		400		1252	831 [86]			
701.1.1 [87]	PL	Rzeszów	PSE Operator S.A.	UA	Khmelnitska NPP	NPC Ukrenergo		750		2676	2595 [88]			
702.1.1 [89]	PL	Zamosc	PSE Operator S.A.	UA	Dobrotvir	NPC Ukrenergo		220		279				
703.1.1 [90]	PL	Bialystok	PSE Operator S.A.	BY	Ros	Grodnoenergo		220		158 [91]				
704.1.1 [92]	PL	Slupsk	PSE Operator S.A.	SE	Ståmó	Svenska Kraftnat		442		600				
705.1.1 [93]	PL	Wólka Dobrynska	PGE Dystrybcja S.A.	BY	Brest	RUB Brestenergo		110		123 [94]				
705.1.2 [95]	PL	Wólka Dobrynska	PGE Dystrybcja S.A.	BY	Brest	RUB Brestenergo		110		123 [96]				

*The conventional transmission capacity of tie lines is based upon parameters standardised within former 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	
[97]	Limited by the measuring transformer of current
[98]	Out of operation
[99]	Limited by HF attenuator at RO side
[100]	Passive island operation limit
[101]	Passive island operation limit
[102]	Passive island operation limit
[103]	Not in operation
[104]	DC submarine cable
[105]	Used only for import to Finland
[106]	Used only for import to Finland
[107]	Used only for import to Finland
[108]	Used only for import to Finland
[109]	Used only for import to Finland
[110]	DC submarine cable
[111]	Limited by the relay protection circuits
[112]	Limited by the relay protection circuits
[113]	Limited by the current transformers
[114]	limited by the relay protection circuits
[115]	Limited by the relay protection circuits
[116]	Limited by the relay protection circuits
[117]	Limited by the current transformers
[118]	Limited by the relay protection circuits

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
710.1.1	HU	Győr	MAVIR	SK	Gabcikovo	SEPS		400		1330				
711.1.1	HU	Göd	MAVIR	SK	Levice	SEPS		400		1330				
720.1.1	HU	Albertirsa	MAVIR	UA-W	Zahidno Ukrainaska	NPC Ukrenergo		750		4010	1400			
721.1.1	HU	Sajószöged	MAVIR	UA-W	Mukachevo	NPC Ukrenergo		400		1390	693 [97]			
722.1.1	HU	Kisvárd	MAVIR	UA-W	Mukachevo	NPC Ukrenergo		220		209	305			
722.1.2	HU	Tiszalök	MAVIR	UA-W	Mukachevo	NPC Ukrenergo		220		209	305			
730.1.1	HU	Sándorfalva	MAVIR	RO	Arad	Transelectrica		400		1135	1109		1107	
731.1.1	HU	Békéscsaba	MAVIR	RO	Nadab	Transelectrica		400		1300	1385			
740.1.1	RO	Rosiori	Transelectrica	UA-W	Mukachevo	NPC Ukrenergo		400		1135			1107	
741.1.1 [98]	RO	Isaccea	Transelectrica	UA	PivdennoUkrainska AES	NPC Ukrenergo		750		4064	2100		2595 [99]	
750.1.1	RO	Stânca	Transelectrica	MD	Costesti	Moldenergo		110		119			90 [100]	
751.1.1	RO	Husi	Transelectrica	MD	Cioara	Moldenergo		110		87			65 [101]	
752.1.1	RO	Tutora	Transelectrica	MD	Ungheni	Moldenergo		110		87			76 [102]	
753.1.1	RO	Issaccea	Transelectrica	MD	Vulcanesti	Moldenergo		400		1135			830	
760.1.1 [103]		3	Maritsa3	ESO	TR	Babaeski	TEIAS	400		1309				
761.1.1	BG	Maritsa3	ESO	TR	Hamitabat	TEIAS		400		1962				
770.1.1	NO	Sildvik	Statnett SF	SE	Tomehamn	VE Eldistribution AB		130		70				
771.1.1	NO	Ofoten	Statnett SF	SE	Ritsem	Svenska Kraftnät		400		880				
772.1.1	NO	Rössåga	Statnett SF	SE	Ajaure	Svenska Kraftnät		220		250				
773.1.1	NO	Nea	Statnett SF	SE	Järpströmmen	Svenska Kraftnät		400		500				
774.1.1	NO	Lutufallet	Statnett SF	SE	Höjjes	Fortum Distribution		130						
775.1.1	NO	Eidskog	Statnett SF	SE	Charlottenberg	Fortum Distribution		130						
776.1.1	NO	Hasle	Statnett SF	SE	Borgvik	Svenska Kraftnät		400		1510				
777.1.1	NO	Halden	Statnett SF	SE	Skogssäter	Svenska Kraftnät		400		2000				
780.1.1	NO	Varangerbotn	Statnett SF	FI	Ivalo	Fingrid		220		100				
790.1.1	NO	Kirkenes	Statnett SF	RU	Boris Gleb	JSC FGC UES		154						
800.1.1	FI	Ossauskoski	Fingrid	SE	Kalix	Svenska Kraftnät		220						
801.1.1	FI	Petäjäskoski	Fingrid	SE	Letsi	Svenska Kraftnät		400						
802.1.1	FI	Keminmaa	Fingrid	SE	Svartbyn	Svenska Kraftnät		400						
803.1.1 [104]	FI	Raumo	Fingrid	SE	Forsmark	Svenska Kraftnät		400		550				
804.1.1	FI	Tingsbacka (Åland)	Kraftnät Åland AB	SE	Senneby	VE Eldistribution AB		110		80				
805.1.1	FI	Raumo	Fingrid	SE	Finnböle	Svenska Kraftnät		500		800				
810.1.1 [105]	FI	Yliikkälä	Fingrid	RU	Viborg	JSC FGC UES		400						
810.1.2 [106]	FI	Yliikkälä	Fingrid	RU	Viborg	JSC FGC UES		400						
811.1.1 [107]	FI	Kymi	Fingrid	RU	Viborg	JSC FGC UES		400						
812.1.1 [108]	FI	Nellimö	Inergia Oy	RU	Kaitakoski	JSC FGC UES		110		60				
813.1.1 [109]	FI	Imatra	Fortum Corporation	RU	GES 10	JSC FGC UES		110		100				
820.1.1 [110]	FI	Espoo	Fingrid	EE	Harku	Elering AS		150		350				
830.1.1	LV	TEC-1	Augstsprieguma tikls	EE	Sindi	Elering AS		330		1228				
831.1.1	LV	TEC-2	Augstsprieguma tikls	EE	Sindi	Elering AS		330		1228				
832.1.1	LV	Valmiera	Augstsprieguma tikls	EE	Tsirgullina	Elering AS		330		350				
833.1.1	LV	Valmiera	Augstsprieguma tikls	EE	Tartu	Elering AS		330		350				
840.1.1	RU	Leningradskaja	JSC FGC UES	EE	Balti	Elering AS		330		590				
841.1.1	RU	Kingisepp	JSC FGC UES	EE	Eesti	Elering AS		330		393				
842.1.1	RU	Pskov	JSC FGC UES	EE	Taru	Elering AS		330		389				
845.1.1	RU	Velikoreckaya	JSC FGC UES	LV	Rezekne	Augstsprieguma tikls		330		350				
850.1.1	LT	Šiauliai/Telšiai	LITGRID AB	LV	Jelgava (Viskali)	Augstsprieguma tikls		330		714	572 [111]			
851.1.1	LT	Panevežys	LITGRID AB	LV	Aizkraukle	Augstsprieguma tikls		330		714	686 [112]			
852.1.1	LT	Klaipėda	LITGRID AB	LV	Grobina	Augstsprieguma tikls		330		714	572 [113]			
853.1.1	LT	IAE	LITGRID AB	LV	Liksna	Augstsprieguma tikls		330		830				
854.1.1	LT	Paroveja	LITGRID AB	LV	Nereta	Augstsprieguma tikls		110		75				
855.1.1	LT	Zarasai	LITGRID AB	LV	Daugavpils	Augstsprieguma tikls		110		86				
856.1.1	LT	IAE	LITGRID AB	LV	Daugavpils	Augstsprieguma tikls		110		102				
860.1.1	LT	IAE	LITGRID AB	BY	Polock	Belenergo		330		966	857 [114]			
861.1.1	LT	IAE	LITGRID AB	BY	Smorgon	Belenergo		330		830				
862.1.1	LT	IAE	LITGRID AB	BY	Minskaja TEC-5	Belenergo		330		1786	857 [115]			
863.1.1	LT	Vilnius	LITGRID AB	BY	Molodechno	Belenergo		330		714				
864.1.1	LT	Alytus	LITGRID AB	BY	Grodno	Belenergo		330		714				
865.1.1	LT	IAE	LITGRID AB	BY	Opsa	Belenergo		110		63				
866.1.1	LT	IAE	LITGRID AB	BY	Vidzi	Belenergo		110		63				
867.1.1	LT	Didžiasalis	LITGRID AB	BY	Kaziani	Belenergo		110		44	29 [116]			
868.1.1	LT	Pabrada	LITGRID AB	BY	Podolci	Belenergo		110		44				
869.1.1	LT	Kalveliai	LITGRID AB	BY	Asmena	Belenergo		110		63	38 [117]			
870.1.1	LT	Šalčininkai	LITGRID AB	BY	Voronovo	Belenergo		110		86	46 [118]			
871.1.1	LT	Leipalingis	LITGRID AB	BY	Grodno	Belenergo		110		75				
880.1.1	LT	Bitenai	LITGRID AB	RU	Sovetsk	UES-SO-CDA		330		714				
881.1.1	LT	Bitenai	LITGRID AB	RU	Sovetsk	UES-SO-CDA		330		714				
882.1.1	LT	Kruonio HAE	LITGRID AB	RU	Sovetsk	UES-SO-CDA		330		714				
883.1.1	LT	Kybartai	LITGRID AB	RU	Nesterovo	UES-SO-CDA		110		75				
884.1.1	LT	Pagegiai	LITGRID AB	RU	Sovetsk	UES-SO-CDA		110		75				
885.1.1	LT	Pagegiai	LITGRID AB	RU	Sovetsk	UES-SO-CDA		110		75				

*The conventional transmission capacity of tie lines is based upon parameters standardised within former 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 times 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.

Abbreviations used of TSO operators

AT	Austria	APG VUEN	Austria Power Grid AG Vorarlberger Übertragungsnetz GmbH (until January 2012 VKW-Netz GmbH)	MK	FYROM	MEPSO	Macedonian Transmission System Operator AD
BA	Bosnia - Herzegovina	NOS BiH	Nezavisni operator sustava u Bosni i Hercegovini	NL	The Netherlands	TenneT NL	TenneT TSO B.V.
BE	Belgium	Elia	Elia System Operator SA	NO	Norway	Statnett	Statnett SF
BG	Bulgaria	ESO	Electroenergien Sistemen Operator EAD	PL	Poland	PSE Operator	PSE Operator S.A.
CH	Switzerland	swissgrid	swissgrid ag	PT	Portugal	REN	Rede Eléctrica Nacional, S.A.
CZ	Czech Republic	CEPS	CEPS a.s.	RO	Romania	Transelectrica	C.N. Transelectrica S.A.
DE	Germany	Amprion TransnetBW	Amprion GmbH TransnetBW (until February 2012 EnBW Transportnetze AG)	RS	Serbia	EMS	JP Elektromreža Srbije
		TenneT DE 50Hertz	TenneT TSO GmbH 50Hertz Transmission GmbH	SE	Sweden	Svenska Kraftnät	Affärsverket Svenska Kraftnät
DK	Denmark	Energinet.dk IPC	Energinet.dk Independent Public Enterprise	SI	Slovenia	ELES	Elektro Slovenija d.o.o.
EE	Estonia	Elering AS	Elering AS	SK	Slovak Republic	SEPS	Slovenska elektrizacna prenosova sustava, a.s.
ES	Spain	REE	Red Eléctrica de España S.A.	AL	Albania	KESH	Albanian Electroenergetic Corporation
FI	Finland	Fingrid	Fingrid Oyj	BY	Belarus	Belenergo	Belenergo
FR	France	RTE	Réseau de Transport d'Electricité	MA	Morocco	ONE	Office National de l'Electricité
GB	United Kingdom	National Grid SONI Ltd	National Grid Electricity Transmission plc System Operator for Northern Ireland Ltd (The connections operated by SONI Ltd are described with the country code NI .)	MD	Republic of Moldavia	Moldenergo	Moldenergo
		SHETL SP Transmission	Scottish Hydro Electric Transmission Limited Scottish Power Transmission plc	RU	Russia	JSC FGC UES	Federal Grid Company
GR	Greece	IPTO SA	Independent Power Transmission Operator S.A. (until January 2012 Hellenic Transmission System Operator S.A.)	TR	Republic of Turkey	TEIAS	Türkiye Elektrik İletim A.S.
HR	Croatia	HEP-OPS	HEP-Operator prijenosnog sustava d.o.o.	UA	Ukraine	NPC Ukrenergo	NPC Ukrenergo
HU	Hungary	MAVIR	MAVIR Magyar Villamosenergia-ipari Átviteli Rends- Átviteli Rendszerirányító zérirányító Zártkörűen Működő Részvénytársaság	UA-W	Ukraine West	NPC Ukrenergo	NPC Ukrenergo
IE	Ireland	EirGrid	EirGrid plc				
IT	Italy	Terna	Terna - Rete Elettrica Nazionale SpA				
LT	Lithuania	LITGRID AB	LITGRID AB				
LU	Luxembourg	Creos Luxembourg	Creos Luxembourg S.A.				
LV	Latvia	Augstsprieguma tīkls	AS Augstsprieguma tīkls				
ME	Montenegro	CGES AD	Crnogorski elektroprenosni sistem AD				

Unavailability of international tie lines - yearly overview 2011

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 (TenneT DE)	NL - Meeden (TenneT NL)	380	1382	R10	6493			6493									
11.1.2	DE - Diele (TenneT DE)	NL - Meeden (TenneT NL)	380	1382	R1	1266			1266									
13.1.1	DE - Siersdorf (Amprion)	NL - Maasbracht (TenneT NL)	380	1645	R1	606						606						
13.1.2	DE - Rommerskirchen (Amprion)	NL - Maasbracht (TenneT NL)	380	1698	R9	593		607			640	3946						
25.1.1	BE - Van Eyck (Elia)	NL - Maasbracht (TenneT NL)	380	1207	R1	19										19		
25.1.2	BE - Van Eyck (Elia)	NL - Maasbracht (TenneT NL)	380	1270	R1,R2	6928								6369			457	102
26.1.1	BE - Zandvliet (Elia)	NL - Geertruidenberg (TenneT NL)	380	1476	R1,R2	20560				20560								
26.2.1	BE - Zandvliet (Elia)	NL - Borssele (TenneT NL)	380	1476	R1,R2	20738				20738								
27.1.1	NL - Eemshaven (TenneT NL)	NO - Feda (Statnett SF)	450	700	R2,R6	60855				17655	43200							
28.1.1	GB - Isle of Grain (National Grid)	NL - Maasvlakte (TenneT NL)	450	500	R6	13500					13500							
41.1.1	BE - Aubange (Elia)	LU - Belval (SOTEL)	220	358	R1,R2	22486								3889	18597			
41.1.2	BE - Aubange (Elia)	LU - Belval (SOTEL)	220	358	R1	16363								16003	360			
41.2.1	BE - Aubange (Elia)	LU - Belval (SOTEL)	150	157	R1	1548								1548				
51.1.1	BE - Monceau (Elia)	FR - Chooz (RTE)	220	338	R1	10924									6183	4741		
51.2.1	BE - Avelgem (Elia)	FR - Mastaing (RTE)	380	1168	R1	6616	7						6314			39	256	
51.2.2	BE - Avelgem (Elia)	FR - Avelin (RTE)	380	1303	R1,R7	14972									11	14893	68	
51.3.1	BE - Achene (Elia)	FR - Lonny (RTE)	380	1168	R1	5813	8			514					645	46		
52.1.1	BE - Aubange (Elia)	FR - Moulaine (RTE)	220	395	R1	1414	540				644				12		218	
52.2.1	BE - Aubange (Elia)	FR - Mont St Martin (RTE)	220	395	R1	6318					6318							
71.1.1	DE - Enseldorf (Amprion)	FR - Vigy (RTE)	380	1790	R1	12405									12405			
71.1.2	DE - Enseldorf (Amprion)	FR - Vigy (RTE)	380	1790	R1	14100							2151		11949			
71.2.1	DE - Enseldorf (Amprion)	FR - St-Avold (RTE)	220	261	R1,R2,R9	108093		550	559			35603	44640	7018		16282	3441	
72.1.1	DE - Eichstetten (TransnetBW)	FR - Vogelgrün (RTE)	220	338	R2	514												514
72.1.2	DE - Eichstetten (TransnetBW)	FR - Muhlbach (RTE)	380	1684	R1	16608				16113								495
81.1.1	CH - Bassecourt (swissgrid)	FR - Sierentz (RTE)	380	1172	R1,R9	18076					2517	14043	807			15	694	
81.2.1	CH - Laufenburg (swissgrid)	FR - Sierentz (RTE)	380	1330	R1,R9	6013		4				271		3561		2177		
81.3.1	CH - Bassecourt (swissgrid)	FR - Mambelin (RTE)	380	1330	R1,R9	46732				7431	35284				358	114	2545	
82.1.1	CH - Verbois (swissgrid)	FR - Bois-Tollot (RTE)	380	1552	R1	6403				14						6389		
82.1.2	CH - Chamoson (swissgrid)	FR - Bois-Tollot (RTE)	380	1552	R1,R9	60301			25409	29789	3320	1775				8		
82.2.1	CH - Verbois (swissgrid)	FR - Génissiat (RTE)	220	237	R1	11											11	
82.2.2	CH - Verbois (swissgrid)	FR - Génissiat (RTE)	220	237	R1	5											5	
82.5.1	CH - Riddes (swissgrid)	FR - Cornier (RTE)	220	216	R1	8302					1365			6442			495	
82.6.1	CH - St.-Triphon (swissgrid)	FR - Cornier (RTE)	220	222	R1,R8	11261					3	6489		4769				
83.1.1	DE - Asphard (swissgrid/EnBW Tr.Netze Strom)	FR - Sierentz (RTE)	380	1168	R1	6085	4812						1273					
91.1.1	FR - Albertville (RTE)	IT - Rondissone (Terna)	380	1244	R1	6274					6274							
91.1.2	FR - Albertville (RTE)	IT - Rondissone (Terna)	380	1244	R1	6125					6125							
92.1.1	FR - Trinite Victor (RTE)	IT - Camporosso (Terna)	220	319	R1	28838									6774	19859	2205	
93.1.1	FR - Villarodin (RTE)	IT - Venaus (Terna)	380	1237	R1	19672							16062	3610				
102.2.1	CH - Laufenburg (swissgrid)	DE - Kühmoos (TransnetBW)	220	410	R1,R9	15794							749	13988	1057			
102.3.1	CH - Laufenburg (swissgrid)	DE - Kühmoos (TransnetBW)	220	430	R1,R9	17916						2110	768	13985	1053			
102.3.2	CH - Laufenburg (swissgrid)	DE - Kühmoos (TransnetBW)	380	1527	R1,R9	6624							3457			2149	573	445
102.4.1	CH - Laufenburg (swissgrid)	DE - Kühmoos (TransnetBW)	380	1527	R1	2750		62					570			218		
102.4.2	CH - Laufenburg (swissgrid)	DE - Kühmoos (Amprion)	380	1607	R1,R3,R9	65811		142			3226	12971	32347	14007	1065	2053		
102.5.1	CH - Laufenburg (swissgrid)	DE - Tiengen (Amprion)	380	1122	R1	2209		161							2048			
103.1.2	CH - Beznau (swissgrid)	DE - Tiengen (Amprion)	220	335	R1	322			322									
104.1.1	CH - Asphard (swissgrid)	DE - Kühmoos (TransnetBW)	380	1263	R1,R2	6379	6357											22
105.1.1	CH - Laufenburg (swissgrid)	DE - Trossingen (TransnetBW)	380	1386	R1,R9	2458							274		2184			
107.1.1	CH - Laufenburg 220 kV (swissgrid)	DE - Laufenburg 110 kV (ED)	110	200	R1	2559			35			514			2010			
111.2.1	AT - Bürs (VIW)	DE - Herberlingen (Amprion)	220	389	R1,R2,R9	13510	101	1100			659	4467	560	1679	183	3616	557	588
111.3.1	AT - Bürs (VIW)	DE - Dellmensingen (Amprion)	220	492	R1,R9	7870						6314	1172	88				296
115.5.1	AT - St. Peter (APG)	DE - Altheim (TenneT DE)	220	301	R1,R2	3369						1387	1232		380			370
115.6.1	AT - St. Peter (APG)	DE - Simbach (TenneT DE)	220	301	R1	1779						404			1062			313
115.9.1	AT - St. Peter (APG)	DE - Pirach (TenneT DE)	220	518	R1	28882			5594	5645	6246	3222	6198		1007		970	
115.10.1	AT - St. Peter (APG)	DE - Pleinting (TenneT DE)	220	449	R1	7249					1420	494	4910		229		196	
116.1.1	AT - Westtirol (APG)	DE - Leupolz (Amprion)	380	1316	R1	356									356			
116.2.1	AT - Westtirol (APG)	DE - Memmingen (Amprion)	220	762	R1,R2	6987					6143					431	413	
117.1.1	AT - Silz (APG)	DE - Oberbrunn (TenneT DE)	220	793	R1,R9	831					146	329	356					
117.1.2	AT - Silz (APG)	DE - Oberbrunn (TenneT DE)	220	793	R1	118			349		255							514
121.2.1	CH - Gorduno (swissgrid)	IT - Mese (Terna)	220	278	R1	6281				6281								
121.3.1	CH - Soazza (swissgrid)	IT - Bulciago (Terna)	380	1224	R1	-6				-6								
121.4.1	CH - Lavorgo (swissgrid)	IT - Musignano (Terna)	380	1204	R1	23251								3822	19429			
123.1.1	CH - Riddes (swissgrid)	IT - Avise (Terna)	220	309	R1,R9	11271		266			4593					6412		
123.2.1	CH - Riddes (swissgrid)	IT - Valpelline (Terna)	220	309	R1,R9	10282					3858					6424		
123.3.1	CH - Serra (swissgrid)	IT - Pallanzeno (Terna)	220	278	R1	6378									6378			
124.1.1	CH - Robbia (swissgrid)	IT - Gorlago (Terna)	380	1330	R1,R2,R9	19808				3155				16328				325

Reasons: R1 - Maintenance, R2 - Repair, R3 - New construction, R4 - Overload (also calculated), R5 - False operation, R6 - Failure in protection device or other element, R7 - Outside impacts (animals, trees, fire, avalanche,...), R8 - Very exceptional conditions (weather, natural disaster,...), R9 - Other reasons, R10 - Unknown reasons

Unavailability of international tie lines - yearly overview 2011

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]
124.1.2	CH - Robbia (swissgrid)	IT - San Fiorano (Terna)	380	1330	R1,R2,R8	18853	2154		371					16328				
141.1.1	AT - Meiningen (Vorarlberg Netz)	CH - Y-Meiningen (swissgrid)	220	494	R1	38189					27406				10783			
141.2.1	AT - Meiningen (Vorarlberg Netz)	CH - Winkeln (swissgrid)	220	765	R1,R9	41039			171		30863			2063	6084		1858	
142.1.1	AT - Westtirol (APG)	CH - Pradella (swissgrid)	380	1330	R1,R2,R9	12226								9443	2001	782		
142.2.1	AT - Westtirol (APG)	CH - Pradella (swissgrid)	380	1330	R1	3433					3433							
151.1.1	ES - Hernani (REE)	FR - Argia (RTE)	380	1137	R1	19279											19279	
151.2.1	ES - Irún (REE)	FR - Errondenia (RTE)	132		R1,R2	6304			6304									
151.3.1	ES - Arkale (REE)	FR - Argia (RTE)	220	339	R1	4871				4871								
151.4.1	ES - Biescas (REE)	FR - Pragnères (RTE)	220	183	R1,R6	445				368			77					
152.1.1	ES - Benós (REE)	FR - Lac d'Oo (RTE)	110		R9	583											583	
153.1.1	ES - Vich (REE)	FR - Baixas (RTE)	380	1348	R2,R9	43566	10977	31170	523								896	
161.1.1	DE - Flensburg (TenneT DE)	DK - Ensted (Energinet.dk IPC)	220	332	R1,R9,R10	34746		232					513				29401	
161.2.1	DE - Flensburg (TenneT DE)	DK - Kassø (Energinet.dk IPC)	220	332	R9,R10	16159				5191							10968	
161.3.1	DE - Audorf (TenneT DE)	DK - Kassø (Energinet.dk IPC)	380	1078	R1,R2,R3	42475		228					21550		20697			
161.3.2	DE - Audorf (TenneT DE)	DK - Kassø (Energinet.dk IPC)	380	1078	R9,R10	20690	531											3356
171.1.1	AT - Bisamberg (APG)	CZ - Sokolnice (CEPS)	220	250	R1,R9	9641			5930					3711				
171.2.1	AT - Bisamberg (APG)	CZ - Sokolnice (CEPS)	220	250	R1,R9	9931	477		5871					3458				125
172.1.1	AT - Dürnröhr (APG)	CZ - Slavetice (CEPS)	380	1559	R1	419				419								
172.1.2	AT - Dürnröhr (APG)	CZ - Slavetice (CEPS)	380	1559	R1,R9	1141			611								530	
181.1.1	AT - Obersielach (APG)	SI - Podlog (ELES)	220	320	R10	7							7					
191.3.1	DE - Bauler (Amprion)	LU - Flebour (Creos Luxembourg)	220	490	R1	632			632									
192.1.1	DE - Trier (Amprion)	LU - Heisdorf (Creos Luxembourg)	220	490	R1,R9	600			56		84							
192.2.1	DE - Quint (Amprion)	LU - Heisdorf (Creos Luxembourg)	220	490	R1	1644				1644								
201.1.1	IT - Redipuglia (Terna)	SI - Divaca (ELES)	380	1619	R6,R8	87				81			6					
201.2.1	IT - Padriciano (Terna)	SI - Divaca (ELES)	220	320	R6	127				127								
205.1.1	IT - Galatina (Terna)	GR - Arachthos (IPTO SA)	380	500	R1,R6,R9,R10	100798	601	5024	6718	15630	12421	17060			20602	22692	50	
221.1.1	GB - Sellindge (National Grid)	FR - Mandarins (RTE)	270	1000	R1,R2,R3	329049		9203	30180	43200	44637	43197	44640	44640	43200	21255	3872	1025
221.2.1	GB - Sellindge (National Grid)	FR - Mandarins (RTE)	270	1000	R1,R3,R6	61314	30580	4863	671	55	913	578	888	3798	16974	1086	908	
222.1.1	GB - Auchencrosh (National Grid)	NI - Ballycronanmore (SONI Ltd)	250	250	R1,R2,R10	231979					50		43140	44640	43200	15330	42479	43140
222.2.1	GB - Auchencrosh (National Grid)	NI - Ballycronanmore (SONI Ltd)	250	250	R2,R10	141713					62			10611		44700	43200	43140
225.1.1	IE - Louth (EirGrid)	NI - Tandragee (SONI Ltd)	275	660	R4	124				124								
231.1.1	ES - Las Conchas (REE)	PT - Lindoso (REN)	132	90	R3	14459					14459							
232.2.1	ES - Aldeavilla (REE)	PT - Lagoaça (REN)	400	1469	R1	296									296			
232.3.1	ES - Saucelle (REE)	PT - Pociño (REN)	220	346	R1	59661		246	3006	22291				34118				
233.1.1	ES - Cedillo (REE)	PT - Falagueira (REN)	380	1300	R1,R9	2917							2605	293	19			
234.1.1	ES - Cartelle (REE)	PT - Alto Lindoso (REN)	380	1330	R1,R2	4397		283					4114					
234.1.2	ES - Cartelle (REE)	PT - Alto Lindoso (REN)	380	1330	R1	4491							4491					
235.1.1	ES - Brovales (REE)	PT - Alqueva (REN)	400	1280	R1	3314							3314					
241.1.1	MK - Dubrovo (MEPSO)	GR - Thessaloniki (IPTO SA)	400	1300	R1,R6	8665				374	949	6962	380					
242.1.1	MK - Bitola (MEPSO)	GR - Meliti (IPTO SA)	400	1300	R1,R2	3206					1123		331		1752			
261.1.1	RS - Djerdap 1 (EMS)	RO - Portile de Fier (Transelectrica)	400	1135	R1,R2	2568							403	2165				
271.1.1	BG - Sofija Zapad (ESO)	RS - Nis (EMS)	380	1309	R1,R2,R10	3041			55	40				33	2913			
275.1.1	RO - Isaccea (Transelectrica)	BG - Varna (ESO)	400	2168	R1	1164							987		177			
277.1.1	RO - Tântăreni (Transelectrica)	BG - Kozlodui (ESO)	400	1300	R1	6958					2381	4024				553		
277.1.2	RO - Tântăreni (Transelectrica)	BG - Kozlodui (ESO)	400	1300	R1	7676					2381	3739	304			1252		
278.1.1	RO - Rahman (Transelectrica)	BG - Dobrudja (ESO)	400	1135	R1	107365		324	33358	11087	38		16325		17028	28676		529
282.1.1	AL - Fierza (KESH)	RS - Prizren (EMS)		270	R1,R9	5257						4768					489	
291.1.1	AL - Elbassan (KESH)	GR - Kardina (IPTO SA)		1300	R1	7664									7664			
292.1.1	AL - Bistrica (KESH)	GR - Mourtos (IPTO SA)		120	R2	360										360		
293.1.1	GR - Nea Santa (IPTO SA)	TR - Babaeski (TEIAS)	400	2000	R1,R2,R4,R6,R10	8042	414				3645	244	620	67	2985	11	56	
301.1.1	BG - Blagoevgrad (ESO)	GR - Thessaloniki (IPTO SA)	400	1300	R1,R6,R10	6379					5815		20		535			9
321.1.1	CZ - Hradec Zapad (CEPS)	DE - Etzenricht (TenneT DE)	400	1386	R1	6420					6420							
321.1.2	CZ - Prestice (CEPS)	DE - Etzenricht (TenneT DE)	400	1491	R1	5496					2322	2238				625	311	
322.1.1	CZ - Hradec Vychod (CEPS)	DE - Röhrsdorf (50Hertz)	400	1386	R1,R9	7445		589					6856					
322.1.2	CZ - Hradec Vychod (CEPS)	DE - Röhrsdorf (50Hertz)	400	1386	R2,R9	4292	1011	1400					1881					
331.1.1	HU - Sandorfalva (MAVIR)	RS - Subotica (EMS)	400	1295	R1,R9	2276			2072					204				
351.1.1	HR - Melina (HEP-OPS)	SI - Divaca (ELES)	400	1164	R6,R9	100			7					93				
351.2.1	HR - Pehlin (HEP-OPS)	SI - Divaca (ELES)	220	320	R8	14						2			12			
352.1.2	HR - Tumbri (HEP-OPS)	SI - Krško (ELES)	400	1164	R9	66			66									
371.1.1	HR - Ernestinovo (HEP-OPS)	RS - Sremska Mitrovica (EMS)	400	1264	R1	2522								1562	960			
381.1.1	BA - Trebinje (NOS BiH)	ME - Podgorica 2 (CGES AD)	380	1264	R8	24953										24953		
383.1.1	BA - Visegrad (NOS BiH)	RS - Vardiste (EMS)	220	311	R2,R3	4277						935	2593			592	157	
383.5.1	BA - Sremska Mitrovica (NOS BiH)	RS - Sremska Mitrovica (EMS)	380	1264	R1,R10	2376					2339			37				
384.1.1	RS - Pec 3 (EMS)	ME - Ribarevine (CGES AD)	400	1264	R1,R2,R10	1442			85		1121			17				219
384.2.1	RS - Bajina Basta (EMS)	ME - Pljevlja 2 (CGES AD)	220	350	R1,R3	9999					741	601	2832		5825			

Reasons: R1 - Maintenance, R2 - Repair, R3 - New construction, R4 - Overload (also calculated), R5 - False operation, R6 - Failure in protection device or other element, R7 - Outside impacts (animals, trees, fire, avalanche,...), R8 - Very exceptional conditions (weather, natural disaster,...), R9 - Other reasons, R10 - Unknown reasons

Unavailability of international tie lines - yearly overview 2011

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]
384.3.1	RS - Pozega (EMS)	ME - Pljevlja 2 (CGES AD)	220	365	R1	6071						6071						
391.1.1	MK - Skopje 1 (MEPSO)	RS - Kosovo A (EMS)	220	311	R9	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	524160	44640	40320	44580	43200	44640	43200	43200	44640	43200	44700	43200	44640
391.3.1	MK - Skopje 5 (MEPSO)	RS - Urosevac (EMS)	380	1218	R2,R3	1302									178	1124		
401.1.1	DE - Herrenwyk (TenneT DE)	SE - Kruseberg (Baltic Cable AB)	400	600	R1,R4,R6,R10	34377	17	9		29034			232				5085	
404.1.1	CZ - Nosovice (CEPS)	SK - Varin (SEPS)	400	1205	R1,R9	8951						8070				602	279	
410.1.1	CZ - Liskovec (CEPS)	SK - Pov. Bystrica (SEPS)	220	221	R1,R2,R9	10289				6293		163						3833
420.1.1	CZ - Sokolnice (CEPS)	SK - Senica (SEPS)	220	213	R1,R2	11067		4736					6331					
424.1.1	CZ - Sokolnice (CEPS)	SK - Krizovany (SEPS)	400	1205	R1	13120							9121		3999			
430.1.1	CZ - Sokolnice (CEPS)	SK - Stupava (SEPS)	400	1363	R1,R5	6562					6533		29					
440.1.1	UA-W - Mukachevo (NPC Ukrenergo)	SK - V. Kapusany (SEPS)	400	1115	R1,R2,R6,R9	17813			6170			402	6455		4782		4	
443.1.1	CZ - Albrechtice (CEPS)	PL - Dobrzeń (PSE Operator S.A.)	400	1088	R1,R2,R9	21157		460				431			20266			
444.1.1	CZ - Nosovice (CEPS)	PL - Wielopole (PSE Operator S.A.)	400	1088	R1,R6	17698								20	17678			
450.1.1	CZ - Liskovec (CEPS)	PL - Kopanina (PSE Operator S.A.)	220	399	R1	5102			4828						274			
460.1.1	CZ - Liskovec (CEPS)	PL - Bujaków (PSE Operator S.A.)	220	399	R1,R9	5106			454	497			1848	2307				
501.1.1	DE - Vierraden (50Hertz)	PL - Krajnik (PSE Operator S.A.)	220	402	R1,R2,R8,R9	8236		154	2055		1466	438	1105	2312				706
501.1.2	DE - Vierraden (50Hertz)	PL - Krajnik (PSE Operator S.A.)	220	402	R1,R2,R8	4803			1725		1804							
502.1.1	DE - Hagenwerder (50Hertz)	PL - Mikulowa (PSE Operator S.A.)	380	1302	R1	2046				2046								
502.1.2	DE - Hagenwerder (50Hertz)	PL - Mikulowa (PSE Operator S.A.)	380	1302	R1	1458				1458								
601.1.1	ES - Puerto de la Cruz (REE)	MA - Melloussa 1 (ONE)	380		R1,R2,R6	76804			97	552	23176	43200	9779					
700.1.1	PL - Krosno Iskrzynia (PSE Operator S.A.)	SK - Lemešany (SEPS)	400	1252	R1,R2,R6	44104		2232					22508	19238			126	
700.1.2	PL - Krosno Iskrzynia (PSE Operator S.A.)	SK - Lemešany (SEPS)	400	1252	R1,R2	45550		3339					22498	19363			350	
704.1.1	PL - Słupsk (PSE Operator S.A.)	SE - Stårnø (Svenska Kraftnät)	450	600	R1,R2	26609	480											26129
710.1.1	HU - Gyoer (MAVIR)	SK - Gabčíkovo (SEPS)	400	1330	R1,R2	20157									19405	83	482	187
711.1.1	HU - Göd (MAVIR)	SK - Levice (SEPS)	400	1330	R2,R7,R8	7066			5658	1103			271					34
720.1.1	HU - Albertirsa (MAVIR)	UA-W - Zahidno Ukrainka (NPC Ukrenergo)	750	4010	R1,R6	81232	231	12020	10932	34250	11055			10755	1989			
721.1.1	HU - Sajószöged (MAVIR)	UA-W - Mukachevo (NPC Ukrenergo)	400	1390	R1	15908					7771							1856
722.1.1	HU - Kisvárda (MAVIR)	UA-W - Mukachevo (NPC Ukrenergo)	220	209	R1	23983								1282		17529	5172	
722.1.2	HU - Tiszalök (MAVIR)	UA-W - Mukachevo (NPC Ukrenergo)	220	209	R1	13272					6337		588	6347				
730.1.1	HU - Sándorfalva (MAVIR)	RO - Arad (Transelectrica)	400	1135	R1,R9	23229			706	106								1507
731.1.1	HU - Békéscsaba (MAVIR)	RO - Nadab (Transelectrica)	400	1300	R1	8875			866	17					7992			
740.1.1	RO - Rosiori (Transelectrica)	UA-W - Mukachevo (NPC Ukrenergo)	400	1135	R1	18031			5395	927		6562	1981					3166
800.1.1	FI - Ossauskoski (Fingrid Oyj)	SE - Kalix (Svenska Kraftnät)	220		R9	12												12
803.1.1	FI - Raumo (Fingrid Oyj)	SE - Forsmark (Svenska Kraftnät)	400	550	R1,R3,R6,R10	31647		441		13231	3772	239		8790	1300		1234	2640
805.1.1	FI - Raumo (Fingrid Oyj)	SE - Finnböle (Svenska Kraftnät)	500	800	R1,R2	2640												2640
810.1.1	FI - Ylikkälä (Fingrid Oyj)	RU - Viborg (JSC FGC UES)	400		R1	32640							30060	2580				
810.1.2	FI - Ylikkälä (Fingrid Oyj)	RU - Viborg (JSC FGC UES)	400		R6	78							78					
811.1.1	FI - Kymi (Fingrid Oyj)	RU - Viborg (JSC FGC UES)	400		R1	32640							30060	2580				
813.1.1	FI - Imatra (Fortum Oyj)	RU - GES 10 (JSC FGC UES)	110		R8	403					403							
820.1.1	FI - Espoo (Fingrid Oyj)	EE - Harku (Elering AS)	150		R1,R6,R9,R10	17563	2096	10676			2601	304	501		1080			305
850.1.1	LT - Šauliai/Telšiai (LITGRID AB)	LV - Jelgava (Viskali) (AS Augstsprieguma tīkls)	330	74	R1	10739			5070						4915	754		
851.1.1	LT - Panevėžys (LITGRID AB)	LV - Aizkraukle (AS Augstsprieguma tīkls)	330	74	R2,R3	49526				18102	30225		431		768			
852.1.1	LT - Klaipėda (LITGRID AB)	LV - Grobina (AS Augstsprieguma tīkls)	330	74	R1,R2	22755	14737									8018		
853.1.1	LT - IAE (LITGRID AB)	LV - Liksna (AS Augstsprieguma tīkls)	330	830	R1,R2	15230			1048	10813				3369				
854.1.1	LT - Parovėja (LITGRID AB)	LV - Nereta (AS Augstsprieguma tīkls)	110	75	R1	3409			586		2156				667			
855.1.1	LT - Zarasai (LITGRID AB)	LV - Daugavpils (AS Augstsprieguma tīkls)	110	86	R1,R7	319			212		107							
856.1.1	LT - IAE (LITGRID AB)	LV - Daugavpils (AS Augstsprieguma tīkls)	110	102	R1,R9	6579			755	5384						440		
860.1.1	LT - IAE (LITGRID AB)	BY - Polock (Belenergo)	330	966	R1	26289	4945	9465		6424		3399	2056					
861.1.1	LT - IAE (LITGRID AB)	BY - Smorgon (Belenergo)	330	830	R1	23242			4882		6481		6180	952				4747
862.1.1	LT - IAE (LITGRID AB)	BY - Minskaja TEC-5 (Belenergo)	330	1786	R1,R3,R9	250371	6384			29530	44640	43200	44640	44640	3140			6197
863.1.1	LT - Vilnius (LITGRID AB)	BY - Molodechno (Belenergo)	330	74	R1,R9	12981					6195				3445			1001
864.1.1	LT - Alytus (LITGRID AB)	BY - Grodno (Belenergo)	330	74	R1	5331			2282	1081				1968				
865.1.1	LT - IAE (LITGRID AB)	BY - Opsa (Belenergo)	110	63	R1,R3	10634					6060							4574
866.1.1	LT - IAE (LITGRID AB)	BY - Vidzi (Belenergo)	110	63	R2,R3	17041		3377	1898		7544			241				740
867.1.1	LT - Didžiasalis (LITGRID AB)	BY - Kaziani (Belenergo)	110	44	R1	6175				3587	2221	367						
868.1.1	LT - Pabradė (LITGRID AB)	BY - Podolci (Belenergo)	110	44	R3	72136	44640	25453			2043							
869.1.1	LT - Kalveliai (LITGRID AB)	BY - Asmena (Belenergo)	110	63	R2	16645							643	712				15290
870.1.1	LT - Šalčininkai (LITGRID AB)	BY - Voronovo (Belenergo)	110	86	R1	33080						465	5941					26674
871.1.1	LT - Leipalingis (LITGRID AB)	BY - Grodno (Belenergo)	110	75	R1,R2	8412						4466						1852
880.1.1	LT - Bitėnai (LITGRID AB)	RU - Sovetsk (UES-SO-CDA)	330	74	R1,R3,R7	41370	1685	185					27985	11515				
881.1.1	LT - Bitėnai (LITGRID AB)	RU - Sovetsk (UES-SO-CDA)	330	74	R1,R3	97516				18095	44640	32920			1861			
882.1.1	LT - Kruonio HAE (LITGRID AB)	RU - Sovetsk (UES-SO-CDA)	330	74	R1,R9	14377												8285
883.1.1	LT - Kybartai (LITGRID AB)	RU - Nesterovo (UES-SO-CDA)	110	75	R1,R9	8563			2857			1118						6092
884.1.1	LT - Pagėgiai (LITGRID AB)	RU - Sovetsk (UES-SO-CDA)	110	75	R1	6045					6045							4588
885.1.1	LT - Pagėgiai (LITGRID AB)	RU - Sovetsk (UES-SO-CDA)	110	75	R2	4802					4583							131

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