

Memo 2010

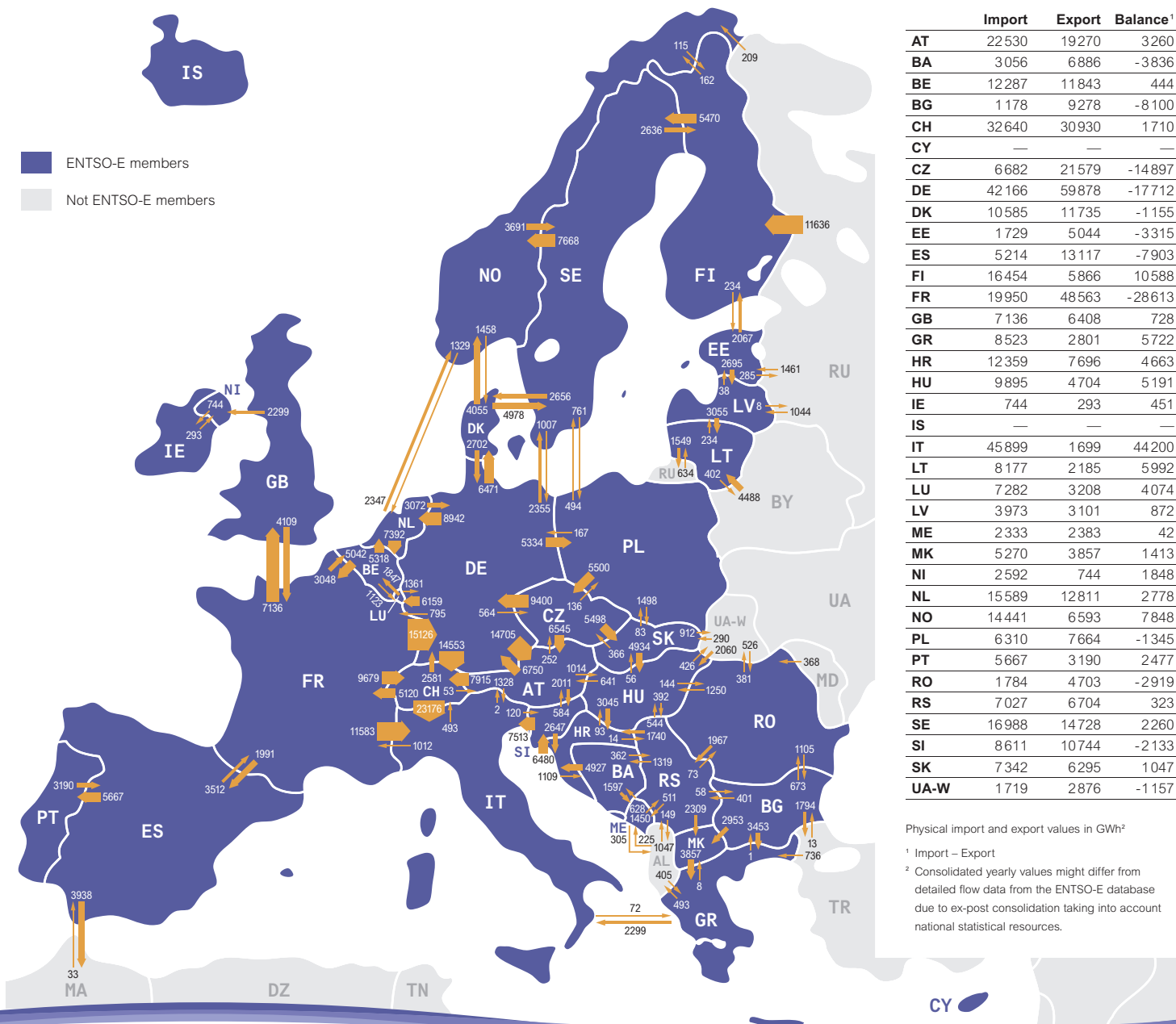
provisional values as of 30 April 2011



European Network of
Transmission System Operators
for Electricity

entsoe
Reliable Sustainable Connected

Physical energy flows



ENTSO-E in figures – Electricity system data of member TSOs' countries

	Country	AT ³	BA	BE	BG	CH ^{4,5}	CY	CZ	DE ⁶	DK	EE	ES	FI	FR	GB	GR	HR	HU	IE	IS	IT	LT	LU	
Net generation ¹	Nuclear thermal	TWh	0.0	0.0	45.7	14.2	25.2	0.0	26.4	133.4	0.0	0.0	59.1	21.9	407.9	58.2	0.0	0.0	14.8	0.0	0.0	0.0	0.0	0.0
	Fossil fuels	TWh	24.6	7.7	35.8	21.1	2.2	5.2	48.7	344.3	26.3	10.5	119.9	31.0	59.4	261.8	37.9	4.8	16.5	23.0	0.0	218.1	3.3	2.9
	Hydraulic net production	TWh	36.5	7.9	1.7	5.4	37.5	0.0	3.4	21.7	0.0	0.0	44.4	12.8	68.0	5.8	7.4	8.3	0.2	0.7	12.5	53.2	1.2	1.4
	Other renewable net production	TWh	0.0	0.0	6.6	0.3	1.4	0.0	0.9	73.8	10.4	0.8	55.6	10.6	15.0	6.8	2.5	0.1	2.3	2.8	4.2	15.0	0.3	0.2
	– of which wind	TWh	0.0	0.0	1.3	0.3	0.0	0.0	0.3	36.7	7.8	0.3	42.7	0.3	9.6	6.5	2.1	0.1	0.5	2.8	0.0	8.4	0.2	0.1
	– of which solar	TWh	0.0	0.0	0.2	0.0	0.0	0.0	0.6	10.9	0.0	0.0	6.7	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0	1.6	0.0	0.0
	Non-identifiable net production	TWh	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
	Total net generation	TWh	70.7	15.6	89.8	41.0	66.3	5.3	79.4	573.2	36.7	11.3	279.4	77.0	550.3	332.6	47.9	13.3	33.8	26.8	16.7	286.3	4.8	4.5
Consumption ¹	Consumption	TWh	67.3	11.7	88.6	31.5	65.7	5.3	64.0	548.2	35.6	8.0	266.6	87.5	513.3	335.7	53.6	17.6	39.0	27.0	16.7	326.2	9.7	6.7
	Variation (compared with 2009)	%	2.6	6.6	5.7	-3.2	4.3	4.4	3.9	4.1	2.4	4.1	3.0	7.6	5.5	6.7	0.1	0.5	2.5	2.9	2.3	1.8	1.7	8.0
	ENTSO-E Transmission network losses percentage consumption	%																						
Net generating capacity as of 31 December 2010 ²	NGC nuclear	MW	0	0	5945	2000	3220	0	3666	20300	0	0	7525	2646	63130	10608	0	0	1892	0	0	0	0	0
	NGC Fossil fuels	MW	7389	1506	8668	6451	355	1385	10892	69300	8867	2324	44753	9004	27403	62535	9396	1781	6181	6219	121	74371	2539	509
	NGC Hydro power	MW	12665	1971	1421	3108	13464	0	2203	10700	9	7	19040	3133	25418	3887	3215	2113	50	508	1883	21370	875	1128
	NGC Renewable energy sources	MW	1031	0	2659	513	328	82	2177	47400	3802	156	24860	2254	7559	2630	1322	116	630	1538	575	7190	193	95
	– of which wind	MW	1002	0	888	488	12	82	218	26600	3802	156	19821	197	5603	2630	1039	79	240	1538	0	5111	161	43
	– of which solar	MW	0	0	766	25	34	0	1959	16600	0		4104	0	762	0	153	0	0	0	0	1326	0	27
	NGC Other sources	MW	0	0	0	0	212	0	0	4500	697	0	131	44	0	45	0	0	0	208	0	0	0	0
	NGC Total	MW	21085	3477	18693	12072	17579	1467	18938	152200	13375	2487	96309	17081	123510	79705	13933	4010	8753	8473	2579	102931	3607	1732
Representativity of the values	%	100	100	100	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	

	Country	LV	ME	MK	NI	NL	NO	PL ^{7,8}	PT	RO	RS	SE	SI	SK	ENTSO-E	UA-W	
Net generation ¹	Nuclear thermal	TWh	0.0	0.0	0.0	0.0	3.8	0.0	0.0	10.7	0.0	55.6	5.4	13.6	895.9	0.0	
	Fossil fuels	TWh	2.8	1.3	4.3	6.6	99.5	5.3	140.3	23.9	25.3	28.5	7.8	4.8	5.6	1660.9	5.4
	Hydraulic net production	TWh	3.5	2.7	2.3	0.0	0.0	117.3	3.4	16.3	20.2	12.5	66.2	4.2	5.5	584.1	0.1
	Other renewable net production	TWh	0.1	0.0	0.0	0.7	10.4	0.9	2.1	11.5	0.4	0.0	15.4	0.0	0.5	251.9	0.0
	– of which wind	TWh	0.1	0.0	0.0	0.7	4.0	0.8	1.8	9.0	0.3	0.0	3.5	0.0	0.0	140.1	0.0
	– of which solar	TWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	20.9	0.0
	Non-identifiable net production	TWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	11.8	0.0
	Total net generation	TWh	6.4	4.0	6.6	7.3	113.7	123.5	145.8	51.7	56.6	41.0	145.0	14.4	26.1	3404.6	5.5
Consumption ¹	Consumption	TWh	7.3	4.0	8.3	9.2	116.5	129.8	143.6	53.8	53.4	39.5	147.1	12.5	26.6	3376.8	4.4
	Variation (compared with 2009)	%	4.1	11.0	6.8	4.1	3.1	6.7	4.9	4.7	5.4	-3.2	9.9	8.0	4.7	4.5	9.8
	Transmission network losses percentage consumption	%														1.5	
Net generating capacity as of 31 December 2010 ²	NGC nuclear	MW	0	0	0	0	480	0	0	1300	0	9151	696	1820	134379	0	
	NGC Fossil fuels	MW	848	210	1157	2317	22005	1166	29612	8547	9166	5475	5035	1282	2614	451383	2225
	NGC Hydro power	MW	1555	660	503	4	37	30164	2331	4988	6087	2884	16200	1063	2478	197122	27
	NGC Renewable energy sources	MW	59	0	0	358	2943	450	1366	4370	501	0	5315	0	143	122615	0
	– of which wind	MW	37	0	0	346	2273	450	1274	3705	479	0	2163	0	3	80440	0
	– of which solar	MW	0	0	0	0	68	0	0	122	0	0	0	0	82	26028	0
	NGC Other sources	MW	0	0	0	14	0	0	0	0	0	0	0	0	725	6576	0
	NGC Total	MW	2462	870	1660	2693	25465	31780	33309	17905	17054	8359	35701	3041	7780	912075	2252
Representativity of the values	%	100	100	100	100	100	100	100	97	100	100	100	100	100		100	

¹ All values are calculated to represent 100% of the national values

² All values are identical with the national values and their representativity

³ Official NGC values from E-Control of 31 December 2009

⁴ NGC values as of 31 December 2009

⁵ Calculation based on the ENTSO-E database differs from the official values from the Swiss Federal Office of Energy

⁶ Common, public supply

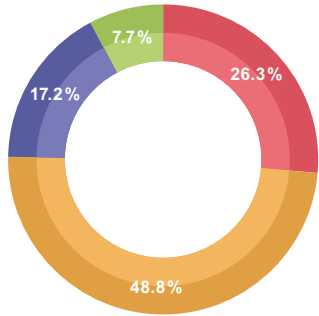
⁷ Operational data

⁸ Energy from co-firing (biomass combustion in lignite/hard coal power stations) is classified as energy from fossil fuels installations.

Generation

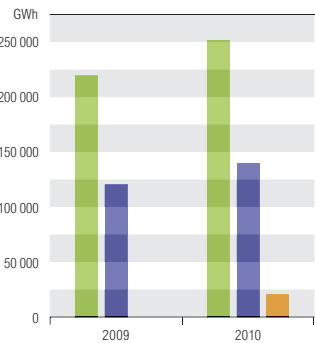
Generation mix in ENTSO-E member TSOs' countries¹

	GWh
Thermal nuclear	895887
Fossil fuels (lignite and hard coal, gas, fuel oil, mixed fuels, peat)	1660915
Hydraulic generation (storage, run of river, pumped storage)	584143
Other sources (wind, solar, geothermal, waste, bio fuels, non identifiable generation)	263692



Renewable generation except of hydro in ENTSO-E member TSOs' countries¹

	year	GWh
Renewable except hydro	2009	219566
	2010	251847
of which wind	2009	120489
	2010	140094
of which solar ²	2009	—
	2010	20901

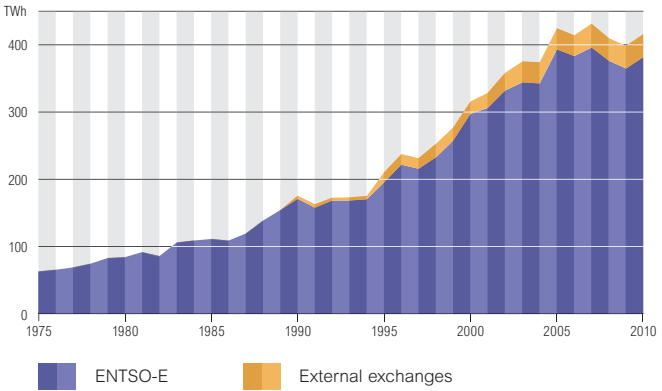


¹ All values are calculated to represent 100% of the national values

² ENTSO-E data collection from year 2010 on

Development of exchanges

Development of overall cross-border exchanges of ENTSO-E member TSOs' countries since 1975



– Reliable Baltic data is available since 1995

– There were no exchanges between the Republic of Ireland and Northern Ireland before 1995

– External exchanges include Albania, Belarus, Moldavia, Morocco, Russia, Turkey, Ukraine and Ukraine-West

Overview of overall electricity exchanges for 2010

All Exchanges	ENTSO-E	External
381 668 GWh	347 312 GWh	34 356 GWh

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Reliable. Sustainable. Connected.

ENTSO-E is the European Network of Transmission System Operators (TSOs) for Electricity, representing 41 TSOs across 34 European countries. Established on 19 December 2008, ENTSO-E has been actively preparing important groundwork to fulfill the mandate it was given by Regulation (EC) 714/2009 on cross-border electricity exchanges, which became fully applicable on 3 March 2011. With the end of this ‘interim period’, ENTSO-E has started its formal cooperation with ACER, the European Agency for Co-operation of Energy Regulators, and the European Commission to deliver on its new tasks. These include most notably the drafting of network codes that can become binding to system users; as well as EU-wide ten-year network development plans. Thus, ENTSO-E pursues primarily three objectives:

- ensuring the secure and reliable operation of the European power transmission system;
- facilitating a secure integration of new generation sources, particularly growing amounts of renewable energy and thus contributing to the achievement of the EU’s 20/20/20 goals;
- enhancing the integration of the internal electricity market through standardized market integration and transparency frameworks that facilitate competitive and truly integrated markets.

This Memo represents a short extract from a wide range of data and information, which is available from ENTSO-E’s website (www.entsoe.eu) on its four main areas of activity: system operation, system development, market and research & development. Extensive market related data and information is available on our transparency platform www.entsoe.net with many data updated daily on congestion management, vertical load, balance management, transfer capacities and outages.

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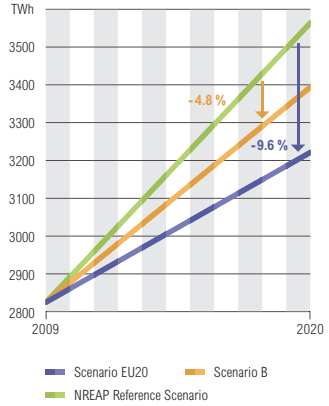
System development

The Ten-Year Network Development Plan (TYNDP) is one of ENTSO-E's most visible work products. A Pilot TYNDP was already published in June 2010 – see www.entsoe.eu/system-development.

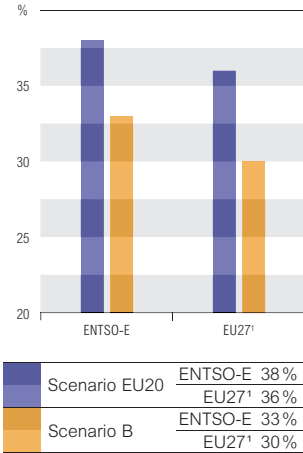
The TYNDP describes how almost 500 transmission projects in all parts of Europe, with a combined length of 42 100 km, will be needed by 2020 to achieve Europe's energy policy goals. The TYNDP is published every two years, and the ENTSO-E Scenario Outlook and Adequacy Forecast, published in February 2011, feeds into the 2012 TYNDP with scenarios to be analysed in market and network models.

The scenario EU2020 is based on the National Renewable Energy Action Plans published by the EU Member States in 2010 following the Renewable Energy Directive, and the scenario B combines the TSOs' best estimates of future developments.

Efficiency measures and electricity demand (year 2020)

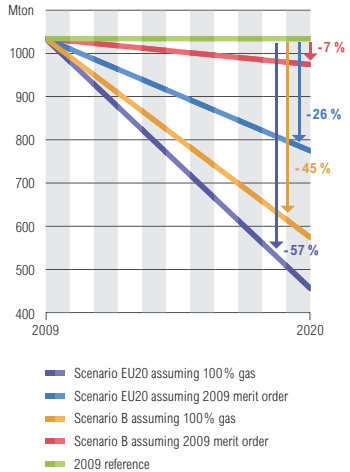


RES Share in electricity consumption (year 2020)

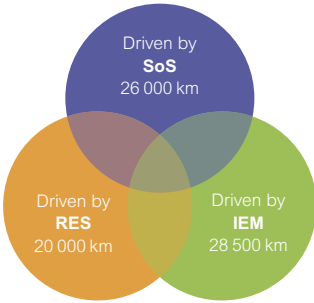


¹ Without Malta

CO₂ emissions (year 2020)



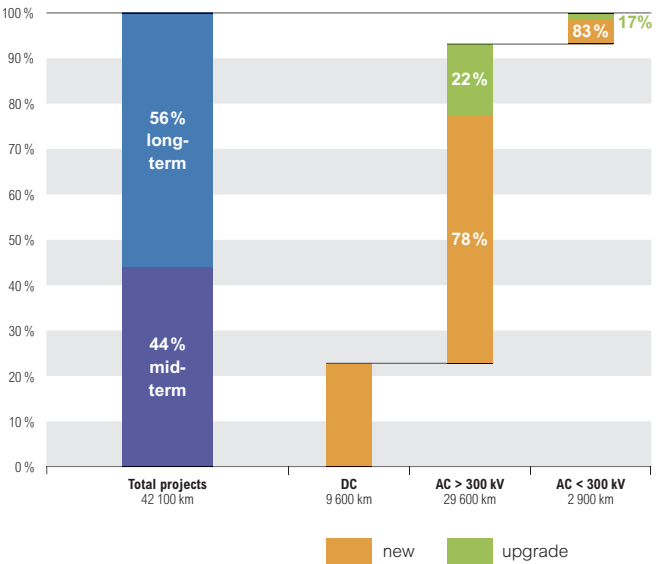
Main drivers for investment in new or refurbished power lines (projects of European Significance)



The investment for this network expansion needed to achieve Europe's energy policy goals is substantial for the TSOs, although impacts on customer rates are expected to be small: €23 to 28 billion for the first five years, roughly €100 billion until 2020.

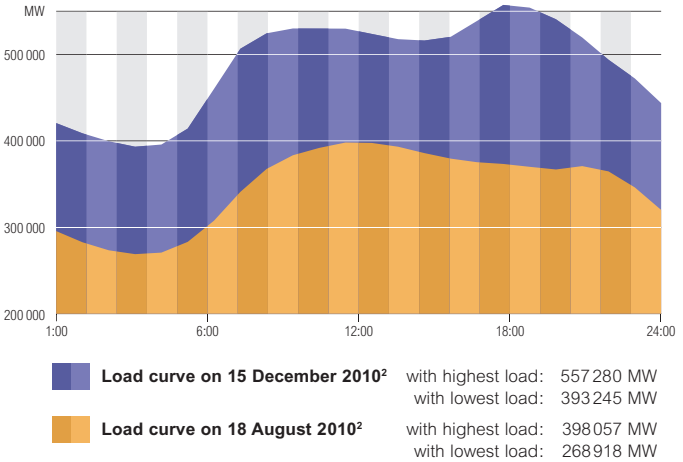
- IEM Internal energy market
- RES Renewable energy sources
- SoS Security of supply

Results of the Pilot TYNDP 2010



Consumption on the 3rd Wednesday 2010

ENTSO-E load diagram on the 3rd Wednesday of August and December 2010¹



Highest and lowest load of each country on 15 December 2010 in MW²

	Lowest value	Highest value		Lowest value	Highest value		Lowest value	Highest value
AT	6 852	9 548	FR	76 197	96 710	MK	1 022	1 535
BA	1 207	2 051	GB	35 869	59 008	NI	874	1 684
BE	10 361	13 810	GR	4 590	7 869	NL	10 489	18 187
BG	4 320	6 640	HR	1 886	3 116	NO	17 165	21 852
CH	8 185	10 835	HU	3 901	5 937	PL	15 742	23 081
CY	390	746	IE	2 638	4 664	PT	5 212	8 814
CZ	7 918	10 307	IS	1 903	2 113	RO	5 856	8 313
DE	64 738	83 090	IT	30 472	54 927	RS	4 849	7 034
DK	3 653	6 312	LT	1 025	1 680	SE	19 868	25 807
EE	925	1 367	LU	739	971	SI	1 349	1 919
ES	25 275	42 301	LV	687	1 243	SK	3 381	4 326
FI	11 501	13 923	ME	351	575	UA-W	691	1 087

¹ Calculated load values as sum of the ENTSO-E member TSOs' countries

² Values are calculated to represent 100% of the national values

Members of ENTSO-E

AT	Austria	APG VKW-Netz	APG-Austrian Power Grid AG VKW-Netz AG
BA	Bosnia-Herzegovina	NOS BiH	Nezavisni operator sustava u Bosni i Hercegovini
BE	Belgium	Elia	Elia System Operator SA
BG	Bulgaria	ESO	Electroenergien Sistemen Operator EAD
CH	Switzerland	swissgrid	swissgrid ag
CY	Cyprus	Cyprus TSO	Cyprus Transmission System Operator
CZ	Czech Republic	ČEPS	ČEPS a.s.
DE	Germany	EnBW TNG TTG Amprion 50Hertz	EnBW Transportnetze AG TenneT TSO GmbH Amprion GmbH 50Hertz Transmission GmbH
DK	Denmark	Energinet.dk	Energinet.dk
EE	Estonia	Elering OÜ	Elering OÜ
ES	Spain	REE	Red Eléctrica de España S.A.
FI	Finland	Fingrid	Fingrid Oyj
FR	France	RTE	Réseau de Transport d'Electricité
GB	United Kingdom	National Grid SONI (NI) SSE SPTransmission plc	National Grid Electricity Transmission plc System Operation Northern Ireland Ltd Scottish and Southern Energy plc Scottish Power Transmission plc
GR	Greece	HTSO	Hellenic Transmission System Operator S.A.
HR	Croatia	HEP-OPS	HEP-Operator prijenosnog sustava d.o.o.
HU	Hungary	MAVIR ZRT.	MAVIR Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság
IE	Ireland	EirGrid	EirGrid plc
IS	Iceland	Landsnet	Landsnet hf
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
MK	FYROM	MEPSO	Macedonian Transmission System Operator AD
NL	The Netherlands	TenneT TSO	TenneT TSO B.V.
NO	Norway	Statnett	Statnett SF
PL	Poland	PSE Operator	PSE Operator S.A.
PT	Portugal	REN	Rede Eléctrica Nacional, S.A.
RO	Romania	Transelectrica	C.N. Transelectrica S.A.
RS	Serbia	EMS	JP Elektromreža Srbije
SE	Sweden	SVENSKA KRAFTNÄT	Affärsverket Svenska Kraftnät
SI	Slovenia	ELES	Elektro Slovenija d.o.o.
SK	Slovak Republic	SEPS	Slovenska elektrizacna prenosova sustava, a.s.

Structure of ENTSO-E

