



--- ELECTRICITY IN EUROPE 2014

SYNTHETIC OVERVIEW OF ELECTRIC SYSTEM CONSUMPTION,
GENERATION AND EXCHANGES IN THE ENTSO-E AREA

European Network of
Transmission System Operators
for Electricity

entsoe

CONTENTS



1. MAIN FACTS – ENERGY TRANSITION IN PROGRESS	3
2. CONSUMPTION	4
EVOLUTION OF OVERALL ENTSO-E CONSUMPTION	4
EVOLUTION OF CONSUMPTION PER COUNTRY	5
3. GENERATION	6
EVOLUTION OF OVERALL ENTSO-E NET GENERATING CAPACITY	6
EVOLUTION OF OVERALL ENTSO-E ENERGY NET GENERATION	7
NET GENERATION PER COUNTRY	7
RENEWABLE NET GENERATION PER COUNTRY	11
4. EXCHANGES	12
EXCHANGE BALANCES PER COUNTRY	12
EXPORTED GENERATION	13
IMPORTED GENERATION	13
APPENDIX: DATA SOURCES AND REFERENCES	14
IMPRINT	15

Electricity in Europe is a synthetic overview of electric system consumption, generation and exchanges in ENTSO-E during a given year. It comments on main evolutions in comparison to the previous year.

The 2014 edition is mainly based on provisional data as of March 2015 delivered by ENTSO-E members and published on the ENTSO-E data portal as “Monthly Statistics”. It is complementary to the Statistical Factsheet and the Yearly Statistics & Adequacy Retrospect, which is issued once the data is definitive.



MAIN FACTS

1. ENERGY TRANSITION IN PROGRESS

ENTSO-E ELECTRICITY CONSUMPTION IS DECREASING

Overall electricity consumption in the ENTSO-E perimeter reached 3 210 TWh in 2014. It is 2.4 % lower than in 2013, under the combined effects of mild weather conditions, economic slowdown and energy efficiency efforts. This fits in with the continuous trend of consumption decrease observed in the ENTSO-E area since 2010.

In 2014, the peak load of the overall system reached 522 GW on 29 January at 7pm and was below the historical maximum of 557.3 GW reached in February 2012, when an exceptional period of cold weather stroke the main part of Europe.

FOSSIL FUEL GENERATION ON THE DECREASE WHILE RENEWABLE GENERATION KEEPS ON PROGRESSING

The Net Generating Capacity (installed capacity) of fossil fuel, nuclear and hydraulic is stable. The capacity of other Renewable Electricity Sources (RES) increased by 11 GW and has now reached 22 % of the total Net Generating Capacity of ENTSO-E.

The reduction of consumption has resulted on average to a decrease of the total net generation. The evolution of the net generation between 2013 and 2014 however differs from one type of fuel to the other: wind and solar energy increased by 12 % each, while fossil fuels decreased by 7 %. Hydraulic and nuclear generation remain stable.

Including hydro generation, 32 % of the consumption in ENTSO-E was covered by renewable energy sources in 2014.

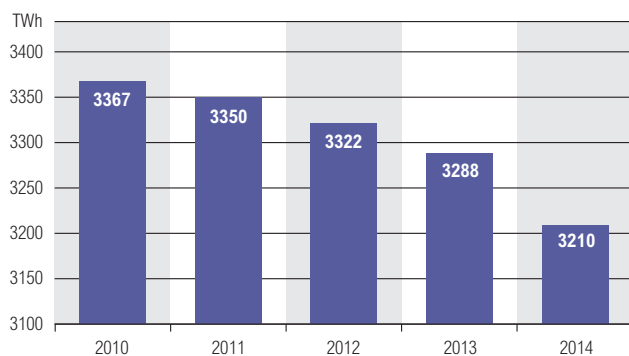
INCREASED CROSS BORDER EXCHANGES AND RENEWABLES DRIVE THE NETWORK DEVELOPMENT

Electricity exchanges are facilitated by the interconnected network. In 2014, ten countries within the ENTSO-E perimeter exported more than 10 % of their annual national generation to neighbouring countries. Thirteen other countries of ENTSO-E imported more than 10 % of their annual internal consumption from other ENTSO-E countries.

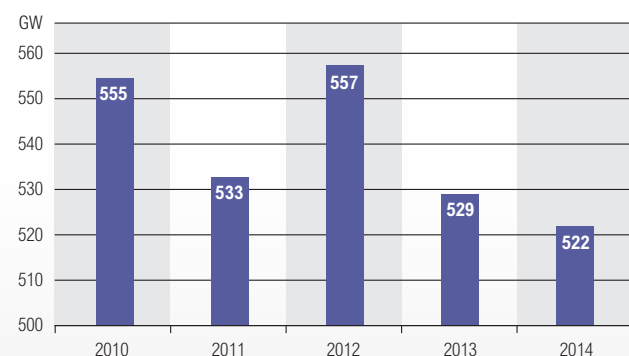
As in 2013 exports from countries along a North-East to South-West axis increased and were related to an energy mix based on hydro, coal and renewables. Countries where gas fired plants are preponderant saw an increase of imports due to a market context unfavourable to gas.

As electricity consumption is low, the development of renewables and cross-border exchanges are actually the main drivers for the development of ENTSO-E's interconnected network.

2. CONSUMPTION



Yearly energy consumption in TWh



Maximum peak load in GW

Estimated amount of own consumption is included.



EVOLUTION OF OVERALL ENTSO-E CONSUMPTION

YEARLY ENERGY CONSUMPTION

In 2014, the ENTSO-E consumption reached 3 210 TWh which represents a 2.4 % decrease compared to previous year. The following reasons can explain this reduction:

- Meteorology: the fresh temperatures of the summer period combined with the mild temperatures of the winter led to a lower level of consumption;
- Economy: the slow economic context and relocation of certain industries outside the ENTSO-E area;
- Efficiency: the improvements in the energy efficiency of buildings, lighting and appliances.

PEAK LOAD

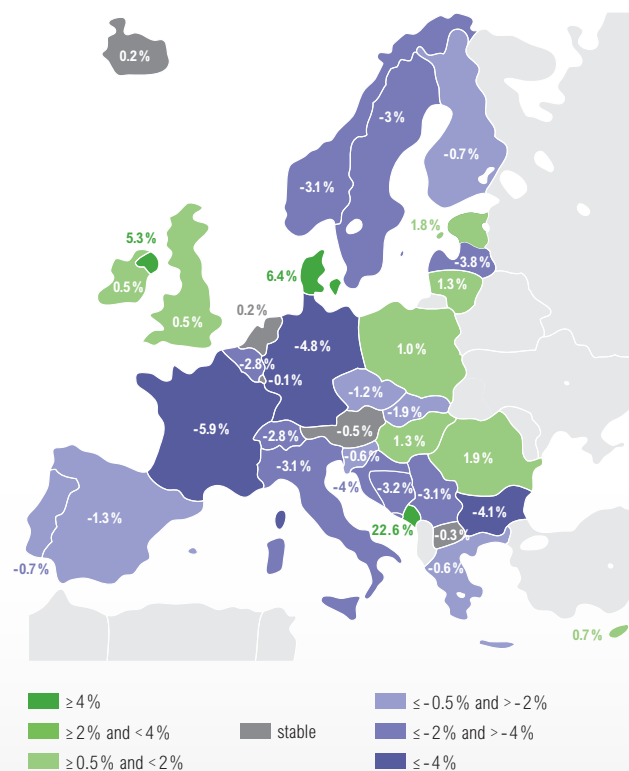
In the absence of cold weather, the peak load was stable compared to previous year and reached 522 GW on 29 January 2014. This is 35 GW lower than the peak load registered during the cold wave of February 2012.



EVOLUTION OF CONSUMPTION PER COUNTRY

The majority of ENTSO-E countries observed a reduction of their consumption. For some countries, especially France where electric heating is important, this reduction in consumption can mainly be explained by mild weather conditions.

But structural decrease due to energy efficiency improvements combined with the closure of heavy industry also contributed to the decrease of consumption throughout Europe.



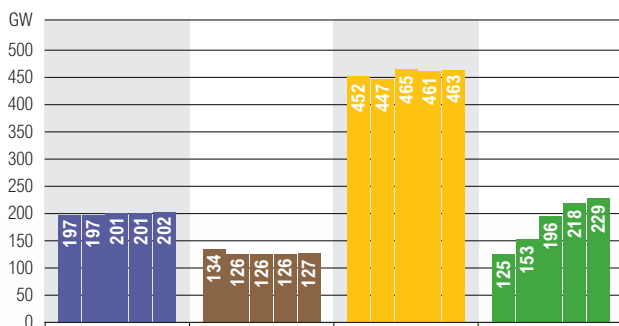
3. GENERATION



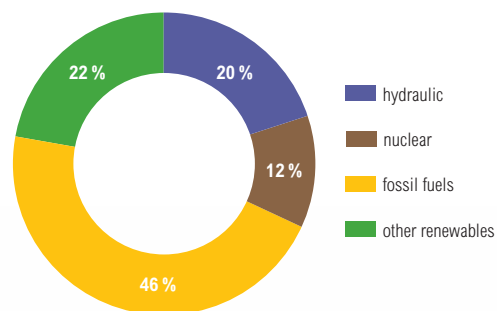
EVOLUTION OF OVERALL ENTSO-E NET GENERATING CAPACITY

In 2014, the total ENTSO-E Net Generating Capacity (NGC) is 1024 GW. While NGC is stable when it comes to nuclear, hydraulic and fossil fuel energy, non-hydro renewable energy sources increased by 11 GW (+ 4.9 % compared to 2013) and represented 22 % of the total NGC of ENTSO-E.

The NGC of a power station is the maximum electrical net active power it can produce continuously throughout a long period of operation in normal conditions.



Net generating capacity from 2010 to 2014 in GW



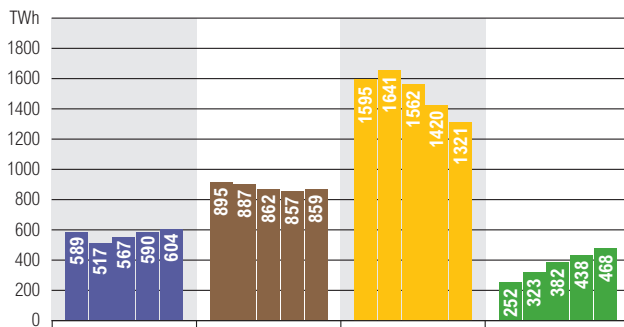
Net generating capacity in 2014



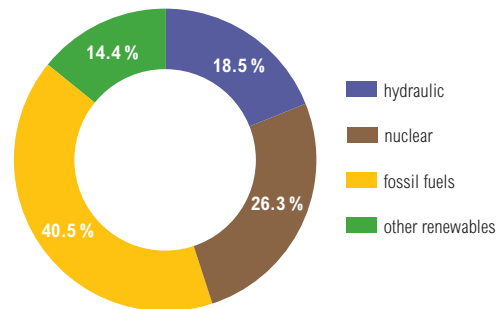
EVOLUTION OF OVERALL ENTSO-E ENERGY NET GENERATION

Hydraulic and nuclear generation were stable in 2014 compared to previous years in opposition to the fossil fuel generation which decreased by 7 %. This drop is partially compensated by the

increase in renewable generation (+6.6 %) mainly driven by solar and wind generation which both increased by 12 %.



Energy net generation from 2010 to 2014 in TWh



Energy net generation in 2014



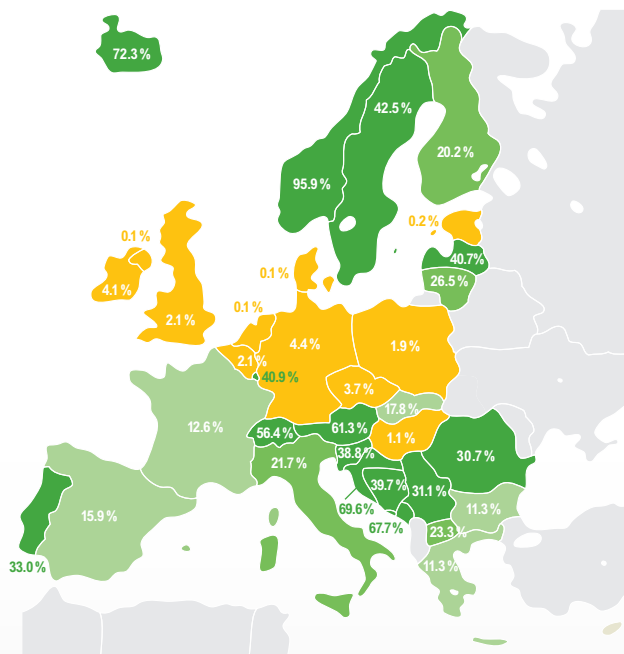
NET GENERATION PER COUNTRY

HYDRAULIC ENERGY

In Europe, hydraulic power plants are concentrated in the trans-alpine range, the Carpathians and the Scandinavian countries where hydraulic generation represents up to 96 % of the total

national generation. Although hydraulic capacities do not significantly evolve any more, hydro generation is highly depending on rainfalls which differ from one country to the other.

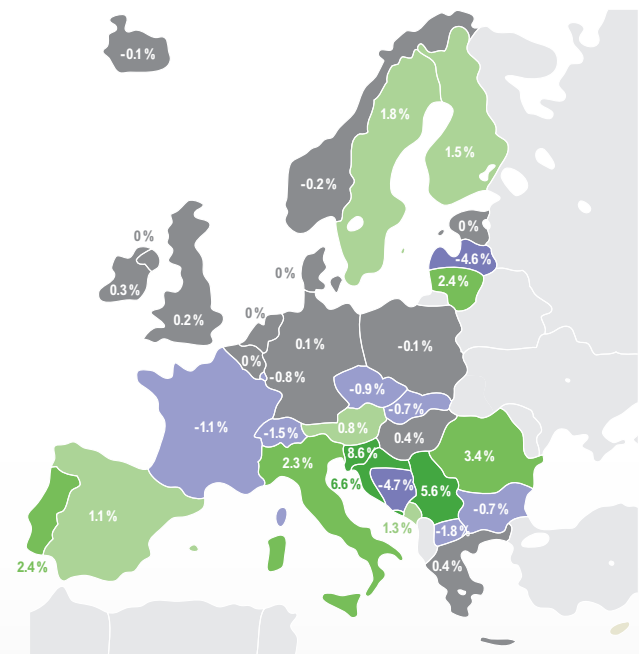
SHARE OF HYDRAULIC ENERGY NET GENERATION IN 2014



Share of the national generation:

- ≥ 30 %
- ≥ 20 % and < 30 %
- ≥ 10 % and < 20 %
- < 10 %
- no plant

EVOLUTION OF HYDRAULIC ENERGY NET GENERATION IN PERCENTAGE POINT



Share of the national generation:

- ≥ 5 %
- ≥ 2 % and < 5 %
- ≥ 0.5 % and < 2 %
- stable
- no plant
- ≤ -0.5 % and > -2 %
- ≤ -2 % and > -5 %
- ≤ -5 %

A percentage point (pp) is the arithmetic difference between two percentages (for example going from 4 % to 7 % is a 3 percentage point increase).

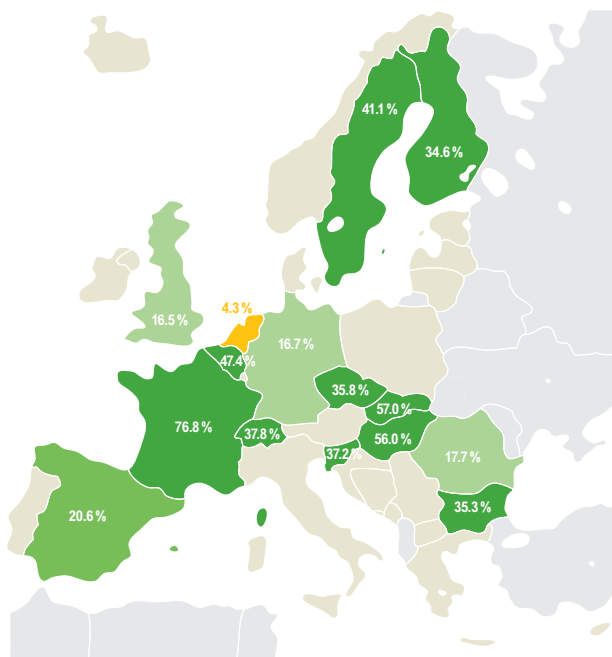


NUCLEAR ENERGY

The total nuclear Net Generating Capacity is quite stable in ENTSO-E. The net generation is influenced by the availability of power plants and how they are used.

The drop in nuclear generation in Great Britain and Belgium is for instance mainly due to the temporary shutdown of nuclear reactors in 2014.

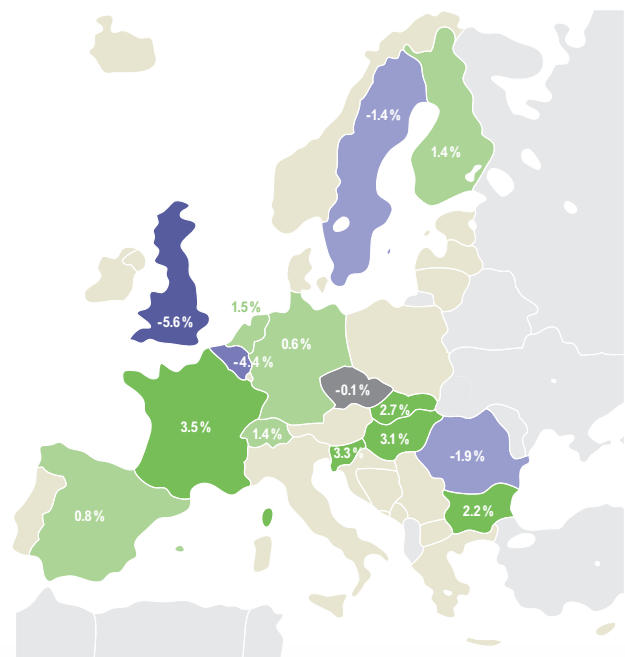
SHARE OF NUCLEAR ENERGY NET GENERATION IN 2014



Share of the national generation:

- ≥ 30%
- ≥ 20% and < 30%
- ≥ 10% and < 20%
- < 10%
- no plant

EVOLUTION OF NUCLEAR ENERGY NET GENERATION IN PERCENTAGE POINT



Evolution of nuclear energy net generation in percentage point:

- ≥ 5%
- ≥ 2% and < 5%
- ≥ 0.5% and < 2%
- stable
- no plant
- ≤ -0.5% and > -2%
- ≤ -2% and > -5%
- ≤ -5%



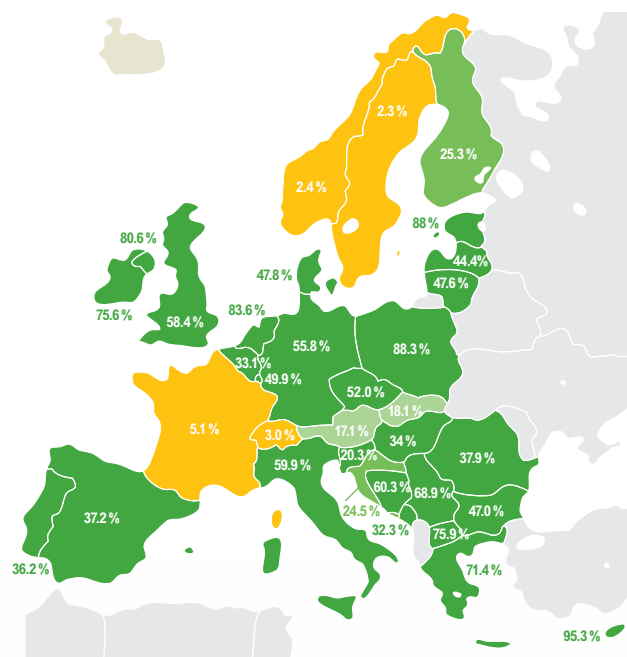
FOSSIL FUEL

Historically, fossil fuels have been the main electricity generation source for countries which have no hydraulic resources or nuclear plants. In recent years, the share of electricity generation from fossil fuels has decreased in all European countries.

Three reasons may explain this trend:

- the development of RES generation;
- the decrease in consumption;
- the shutdown of some thermal plants which do not meet European environmental standards.

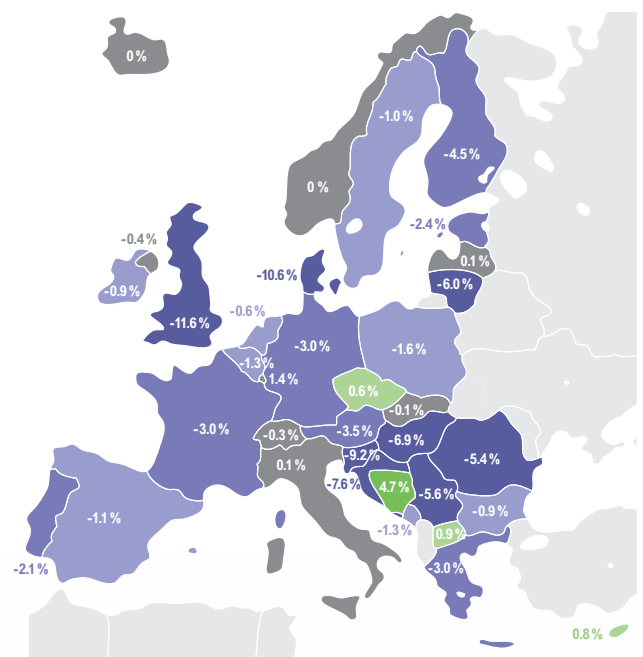
SHARE OF FOSSIL FUELS ENERGY NET GENERATION IN 2014



Share of the national generation:

- ≥ 30%
- ≥ 20% and < 30%
- ≥ 10% and < 20%
- < 10%
- no plant

EVOLUTION OF FOSSIL FUELS ENERGY NET GENERATION IN PERCENTAGE POINT



Evolution in percentage point:





- ≥ 5%
- ≥ 2% and < 5%
- ≥ 0.5% and < 2%
- ≤ -5%
- ≤ -2% and > -5%
- ≤ -0.5% and > -2%
- stable
- no plant/ no data



Like wind power, the growth of solar energy depends on the evolution of capacity and weather conditions. Germany, Italy and Spain represent 78 % of the total ENTSO-E solar generation (91 TWh).



Map of Europe showing the percentage of the population aged 65 and over in 2019. The map uses a color scale from light green (low percentage) to dark green (high percentage). The highest percentages are in Italy (8.7%) and Greece (9.5%). The lowest is in the UK (0.1%).

Country	Percentage of population aged 65 and over
United Kingdom	0.1%
Ireland	1.2%
Portugal	4.9%
France	1.1%
Spain	4.2%
Netherlands	4.2%
Belgium	2.1%
Germany	6.3%
Austria	2.6%
Switzerland	1.4%
Italy	8.7%
Poland	1.9%
Czech Republic	1.8%
Slovakia	1.9%
Hungary	2.7%
Romania	3.0%
Greece	9.5%

 $\geq 5\%$
 $\geq 2\%$ and $< 5\%$
 $\geq 1\%$ and $< 2\%$
 $< 1\%$

A map of Europe showing the percentage change in the number of people aged 65 and over from 2007 to 2020. The map uses a color scale from light green (positive change) to dark green (positive change) and purple (negative change). The percentage values are labeled on the map for various countries.

Country	Percentage Change (%)
Albania	0.2%
Andorra	0.2%
Austria	0.3%
Belarus	0.1%
Belgium	0.9%
Bulgaria	-0.3%
Croatia	0.1%
Cyprus	0.2%
Czechia	0.3%
Denmark	1.9%
Estonia	0.8%
Finland	0.9%
France	0.3%
Germany	1.1%
Greece	-0.5%
Hungary	0.1%
Iceland	0.2%
Ireland	0.3%
Italy	1.1%
Latvia	-0.1%
Lithuania	-0.3%
Malta	0.2%
Netherlands	0.9%
Norway	1.9%
Poland	0.1%
Portugal	0.3%
Romania	0.1%
Slovakia	0.1%
Slovenia	0.1%
Spain	0.3%
Sweden	1.9%
Switzerland	0.9%
Turkey	0.1%
Ukraine	0.1%
United Kingdom	0.3%
United States	0.2%
Yemen	0.2%

 $\leq -0.1\%$ and $> -0.5\%$
 $\leq -0.5\%$ and $> -1\%$
 $\leq -1\%$

32% of the overall ENTSO-E consumption is covered by renewable generation. Without hydraulic generation, the renewable generation, mainly solar and wind, represents 14.4% of the total ENTSO-E consumption.

Map of Europe showing the percentage of the population aged 65 and over in 2019. The map uses a color scale from light green (4.7%) to dark green (100%).

Country	Percentage (%)
Iceland	100%
Finland	63.1%
Sweden	110.1%
Denmark	30.4%
Poland	16%
Czechia	38.1%
Slovakia	13.5%
Hungary	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%
Albania	49.6%
Greece	34.2%
Turkey	62.8%
Spain	19.8%
France	4.8%
Germany	14.5%
Poland	28.7%
Czechia	10.6%
Slovakia	12.2%
Hungary	21.5%
Romania	16.6%
Bulgaria	47.9%
Greece	16%
Turkey	38.1%
Albania	13.5%
Slovenia	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%
Albania	49.6%
Greece	34.2%
Turkey	62.8%
Spain	19.8%
France	4.8%
Germany	14.5%
Poland	28.7%
Czechia	10.6%
Slovakia	12.2%
Hungary	21.5%
Romania	16.6%
Bulgaria	47.9%
Greece	16%
Turkey	38.1%
Albania	13.5%
Slovenia	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%
Albania	49.6%
Greece	34.2%
Turkey	62.8%
Spain	19.8%
France	4.8%
Germany	14.5%
Poland	28.7%
Czechia	10.6%
Slovakia	12.2%
Hungary	21.5%
Romania	16.6%
Bulgaria	47.9%
Greece	16%
Turkey	38.1%
Albania	13.5%
Slovenia	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%
Albania	49.6%
Greece	34.2%
Turkey	62.8%
Spain	19.8%
France	4.8%
Germany	14.5%
Poland	28.7%
Czechia	10.6%
Slovakia	12.2%
Hungary	21.5%
Romania	16.6%
Bulgaria	47.9%
Greece	16%
Turkey	38.1%
Albania	13.5%
Slovenia	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%
Albania	49.6%
Greece	34.2%
Turkey	62.8%
Spain	19.8%
France	4.8%
Germany	14.5%
Poland	28.7%
Czechia	10.6%
Slovakia	12.2%
Hungary	21.5%
Romania	16.6%
Bulgaria	47.9%
Greece	16%
Turkey	38.1%
Albania	13.5%
Slovenia	11.2%
Romania	23%
Bulgaria	6.6%
Greece	50.2%
Turkey	21.8%
Albania	23.4%
Italy	63.3%
Slovenia	15%
Croatia	28.4%
Serbia	49.4%
Bosnia and Herzegovina	54.3%
Montenegro	49.6%
North Macedonia	60.8%

■ $\geq 30\%$
■ $\geq 20\%$ and $< 30\%$
■ $\geq 10\%$ and $< 20\%$
■ $< 10\%$

ENTSO-E Electricity in Europe 2014



4. EXCHANGES



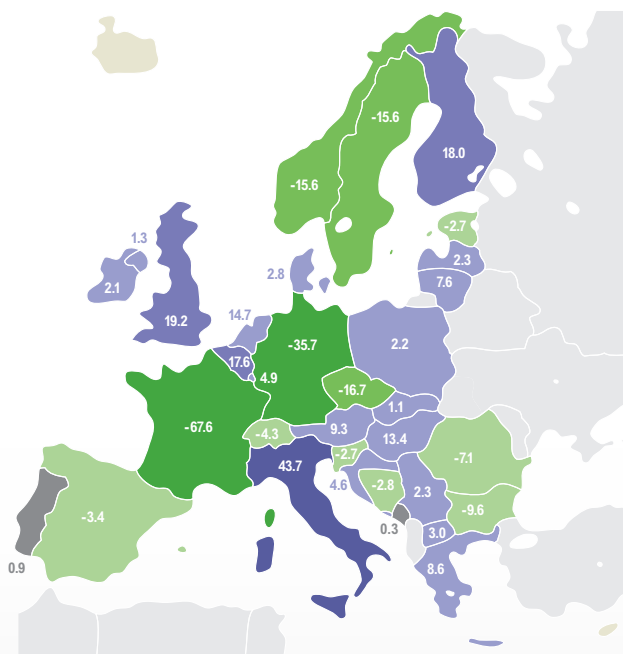
EXCHANGE BALANCES PER COUNTRY

2014 was marked by an increase of electricity exports from countries alongside a North-East to South-West axis, including France and Germany, and an increase of imports to Italy and Great Britain.

The balance of electricity exchanges is the balance between the energy physically flowing out of the country and the energy

physically flowing in. It equals the balance of commercial transactions of each country (exports minus imports). However, in an interconnected system where electricity spreads out using various paths, the energy physical flows through a specific border between two countries usually differ from the commercial energy transactions between these two countries.

EXCHANGE BALANCES IN 2014



Exporting balance:

- ≤ -30 TWh
- ≤ -15 TWh and > -30 TWh
- ≤ -1 TWh and > -15 TWh

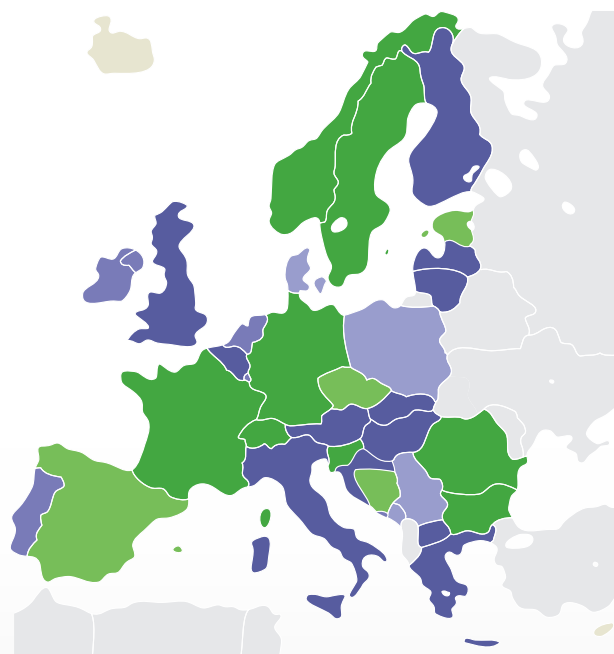
balanced

isolated

Importing balance:

- ≥ 1 TWh and < 15 TWh
- ≥ 15 TWh and < 30 TWh
- ≥ 30 TWh

EVOLUTION OF EXCHANGE BALANCES BETWEEN 2013 AND 2014



Balance:

- more exporting
- less exporting
- becomes exporting

stable

isolated

Balance:

- becomes importing
- less importing
- more importing



EXPORTED GENERATION

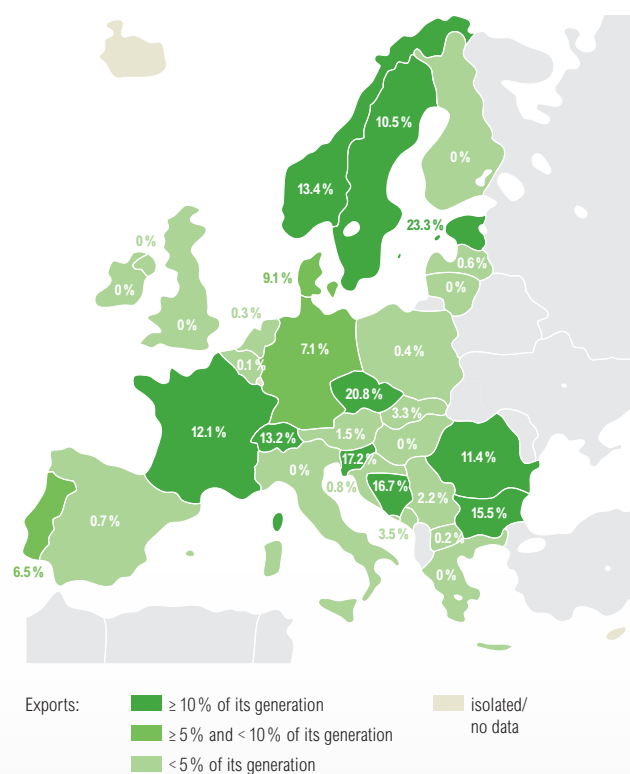
The share of generation of a country which is physically exported by a country to its neighbours is the ratio between the country's net exports and generation. Ten countries of ENTSO-E's perimeter export more than 10% of their annual national generation to neighbouring countries.

IMPORTED GENERATION

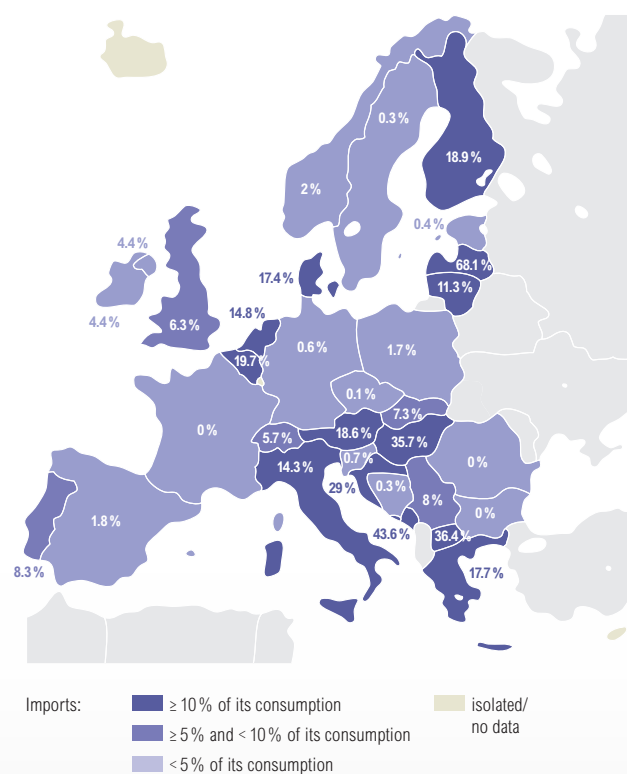
For each country, the ratio between its imports and its consumption represents the share of its yearly consumption which is covered by physical imports from its neighbours.

Eleven countries of ENTSO-E import more than 10% of their annual internal consumption from other ENTSO-E countries.

SHARE OF YEARLY GENERATION EXPORTED



SHARE OF YEARLY CONSUMPTION IMPORTED



This map and the following are based on "net exports" and "net imports" calculation, excluding transit flows and loop flows. Net balance of exchanges per country are calculated on an hourly basis.

Adding separately net balances whether positive or negative respectively gives the amount of net exports and the amount of net imports of the country. Exports and imports can be driven by market conditions or adequacy needs.



APPENDIX: DATA SOURCES AND REFERENCES

SOURCE OF DATA:

The data for 2014 comes from ENTSO-E's monthly statistics whereas the data from 2013 comes from ENTSO-E's yearly statistics. The data used for consumption, generation and exchange balance's figures in chapter 2, 3 and 4.1 is taken from ENTSO-E's data portal:

www.entsoe.eu/data/data-portal/

The data used for "net export" and "net import" calculations in chap. 4.2 and 4.3 is taken from the ENTSO-E transparency platform (data pre-5.1.15):

<https://transparency.entsoe.eu/>

Pages 7 to 11: A percentage point (pp) is the arithmetic difference between two percentages (for example going from 4 % to 7 % is a 3 percentage point increase).

CONTRIBUTORS

This publication, mainly based on data collected by ENTSO-E Statistical Data Correspondents, has been written by Data Expert Group Members:

Apostolos Anagostou (IPTO SA)

Alexandre Cadet (RTE)

Zdeněk Fučík (ČEPS)

Lukasz Jeżyński (PSE)

Raymond Kok (TenneT NL)

Nikolaos Kouveliotis (IPTO SA)

Philippe Lagarrigue (ENTSO-E)

Felix Martinez Casares (REE)

Erik Pharabod (RTE)

Cristian Radoi (Transelectrica)

Ernst Reittinger-Hubmer (APG)

Florian Schwaiger (TenneT GER)

OTHER RELATED ENTSO-E PUBLICATIONS:

Monthly statistics:

www.entsoe.eu/publications/statistics/monthly-statistics/

Statistical Factsheet:

www.entsoe.eu/publications/general-publications/memo-entso-e-facts-figures/

Yearly Statistics & Adequacy Retrospect (YS&AR):

www.entsoe.eu/publications/statistics/statistical-yearbooks/



IMPRINT

Publisher:

ENTSO-E aisbl, Avenue de Cortenbergh 100
1000 Brussels – Belgium

Design & Layout:

DreiDreizehn Werbeagentur, Berlin
www.313.de

Photos:

National Grid (title, p. 4–5, p. 13 left),
TenneT TSO GmbH (p. 3, p. 10), ČEPS (p. 6),
APG (p. 8, p. 9 right), Terna (p. 9 left),
Fingrid (p. 12), Elia (p. 13 right)

Publishing date: May 2015

Contact

ENTSO-E AISBL

Avenue de Cortenbergh 100
1000 Brussels – Belgium

Tel +32 2 741 09 50

Fax +32 2 741 09 51

info@entsoe.eu

www.entsoe.eu



European Network of
Transmission System Operators
for Electricity