ENTSO-E Overview of transmission tariffs in Europe: Synthesis 2014

June 2014

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1. Background

- Transmission tariffs are one of the key elements of the Internal Electricity Market. As there is no single "correct solution" for the allocation of costs to transmission users, different tariff schemes coexist in Europe. For example, depending on the regulatory arrangements in force, ancillary services may be either totally or partially charged through the transmission tariffs or through market mechanisms. Similarly, energy to cover losses may be purchased by the TSO or by market participants. It is for this reason that a direct comparison of transmission tariffs could be misleading. Experience will determine the possibility of achieving a degree of harmonization of the underlying principles for setting transmission charges in the future.
- This report contains an overview of 2014 **unit transmission tariffs** for a pre-defined "**base case"** in 34 European countries. Unit transmission tariffs are calculated by taking into account: (i) charges due to costs related to TSO activities; and, where relevant, (ii) other regulatory charges recovered or invoiced by TSOs but not directly related to TSOs' activities. Thus, this overview is not made to compare individual transmission tariffs, but to compare calculated **unit transmission tariffs** expressed in €/MWh.
- In order to make the overview as comparable as possible, the calculation of the unit transmission tariff takes into account tariffs and charges due to the following costs:
  - (i) Costs related to TSO activities:
    - Infrastructure costs (OPEX and CAPEX),
    - Costs of system services,
    - Losses compensation costs;
  - (ii) Other regulatory charges invoiced or recovered through different mechanisms in each country by TSOs, but not directly related to TSOs' activities:
    - E.g. stranded costs, costs of supporting renewable or cogeneration energy production, regulatory levies, costs of diversification and security of supply, etc.
- It must be noted that this ENTSO-E overview only covers one aspect of the regulation: the calculated unit transmission tariffs. The overview does not take into account the differences among countries in areas such as quality of service, market arrangements, technical characteristics, environmental aspects, consumption density and generation location, that influence the level of such tariffs.
- This ENTSO-E overview is organized as follows. Section 2 describes the methodology and hypothesis considered as the "base case". Section 3 explains the main characteristics of the tariffs considered in the calculation of the unit transmission tariffs. Section 4 provides details on the TSO costs that have been included in the calculation of the unit transmission tariff for each country, as well as whether these costs are included in the TSO's tariff/s or if an estimation has been provided for comparability purposes. Sections 5 to 11 focus on different characteristics of the calculated unit transmission tariffs such as the share of TSO-related costs (Section 5), the energy/power components (Section 6), the charges applied to producers (Section 7) and consumers (Section 8), the impact of the utilization time (Section 9) and location (Section 10), and the tariff components (Section 11). Section 12 depicts the evolution of the calculated unit transmission tariff over the last few years. Further details on different country-specific issues related with transmission tariffs are provided in the Annexes.
- It must be underlined that comments as well as country-specific remarks added below charts and tables of this report are relevant for understanding this overview.

2. Methodology and hypotheses considered in this ENTSO-E overview

- As stated in Section 1, the main goal of this ENTSO-E overview is to present a comparison of calculated 2014 unit transmission tariffs expressed in €/MWh for a pre-defined "base case".
- The "base case" is characterized by (i) a pre-defined voltage level which load and generation are connected to; (ii) a power demand; and (iii) a utilization time, as follows:

  (i) Voltage level

  - Voltage levels of transmission networks vary across Europe. In particular, the lowest voltage level which is classified as transmission network varies to a great extent (see Appendix 1: Voltage levels operated by TSO);
  - Therefore, in order to make a comparison two main voltage assumptions lay at the core of this overview:
    - The producer and consumer are both connected to the EHV (Extra High Voltage) network (400 kV- 220 kV);
    - For countries with no EHV network or with no load or representative load connected to the EHV network, tariffs for lower voltages have been considered;

  (ii) Power demand

  - The typical load considered has a maximum power demand of 40 MW when it is connected to the EHV network and a maximum power demand of 10 MW when it is connected to lower voltages;

  (iii) Utilization time

  - 5,000 h of utilization time are hypothesized.
- The unit transmission tariff is calculated under the hypothesis of the "base case" by adding the charges applied to load (L) and generation (G) (in case G is charged), thus assuming that they produce and consume the energy they had in their programs (without individual deviations). For countries with tariff rates that are differentiated by location (locational signals), an average value has been taken.
- In addition, some examples are calculated by varying some of the hypothesis of the "base case":
  - The voltage level (See Section 5. Split of the unit transmission tariffs between components related to TSO activities and other regulatory charges);
  - The load's utilization time (see Section 9. Impact of utilization time on the unit transmission tariffs);
  - The location of generation and load (south or north of the country, same area / different area) (see Section 10. Impact of location on the unit transmission tariffs);
- There are some countries where certain elements of the transmission tariffs are set and settled on an *ex-post basis* or where an update occurs during the calendar year. In these cases it is not possible to provide exact *ex-ante* figures for the calculation of the 2014 unit transmission tariff. Therefore, either 2013 figures or best estimates for 2014 are provided for part or the whole of the calculation. Country remarks provide further explanations of this issue.
- For countries for which the applicable currency is not €, the currency exchange rate as of 31 December 2013 has been used to calculate the unit transmission tariff expressed in € (see Appendix 10: Exchange rates).

3. Main characteristics of the TSO tariffs in Europe

Table 3.1 summarizes the main characteristics of the TSO tariffs considered in the calculation of the unit transmission tariffs shown in this overview:

- Share of G and L network charges in %,
- Seasonal and locational differentiation,
- Information of whether costs of losses and system services are included in TSOs' tariffs or not and whether they are charged by TSOs or not.

Table 3.1. Main characteristics of the TSO tariffs in Europe

	Sharing of network operator charges (1)		Price signal		Are losses included in the tariffs charged by TSO?	Are system services included in the tariffs charged by TSO?
	Generation	Load	Seasonal / time-of-day (2)	Location		
Austria	32%	68%	-	-	Yes	Yes
Belgium	7%	93%	xxx	-	Not included for grid >=150 kV	Tariff for ancillary services
Bosnia and Herzegovina	0%	100%	-	-	No	No
Bulgaria	0%	100%	-	-	Yes	Yes
Croatia	0%	100%	x	-	Yes	Yes
Cyprus	0%	100%	-	-	Yes	Yes
Czech Republic	0%	100%	-	-	Yes	Yes
Denmark	4%	96%	-	-	Yes	Yes
Estonia	0%	100%	x	-	Yes	Yes
Finland	17%	83%	x	-	Yes	Yes
France	2%	98%	- / xxx	-	Yes	Yes
Germany	0%	100%	-	-	Yes	Yes
Great Britain	27% TNUoS Tariff 50% BSUoS Tariff	73% TNUoS Tariff 50% BSUoS Tariff	xx	TNUoS - locational; BSUoS - non-locational	No, recovered in the energy market	Included in BSUoS Tariff
Greece	0 % Use of system 0 % Uplift charges	100 % Use of system 100 % Uplift charges	x	-	No, recovered in the energy market	Included in Uplift charges
Hungary	0%	100%	-	-	Yes	Tariff for ancillary services
Iceland	0%	100%	-	-	Yes	Yes
Ireland	25%	75%	-	Generation only	No, recovered in the energy market	Yes
Italy	0%	100%	-	-	No	Yes
Latvia	0%	100%	-	-	Yes	Yes
Lithuania	0%	100%	-	-	Yes	Yes
Luxembourg	0%	100%	-	-	Yes	Yes
FYROM	0%	100%	-	-	Yes	Yes
Netherlands	0%	100%	-	-	Yes	Yes
Northern Ireland	25%	75%	xxxx (only load)	30% locational element on G tariff	No	No
Norway	38%	62%	xxx (via losses)	Location	Yes	Yes
Poland	0%	100%	-	-	Yes	Yes
Portugal	7%	93%	xx	-	No, included in energy price	No, included in energy price
Romania	19%	81%	-	Yes (both G and L transmission tariffs vary by location; 7G zones and 8 L zones)	Yes (included in the transmission tariff)	Yes
Serbia	0%	100%	x	-	Yes	Yes
Slovak Rep.	4%	96%	-	-	Through a specific fee	Through a specific fee
Slovenia	0%	100%	xx	-	Yes	Separate tariff for ancillary services charged by TSO
Spain	10%	90%	xxx		No, they are recovered through the energy market	No, they are included in the energy price
Sweden	33%	67%	-	Location	Yes	Yes
Switzerland	0%	100%	-	-	no, there is a separate tariff for losses	no, there is a separate tariff for ancillary services

Remarks:

(1) The % shares of network charges between G and L are provided for the base case charge.

(2) The "X" indicates time differentiation. With one "X", there is only one time differentiation ("day-night", "summer-winter" or another one). With two "X" (or more), there are two (or more) time differentiations.

Country remarks:

- **Estonia**: Seasonal tariff only for 110 kV.
- **France**: Time differentiation with 5 temporal classes for voltages lower than 350 kV. Three kinds of differentiation exist: summer/winter, mid-peak/off-peak, and peak hours only in January, February and December. Tariff for higher voltages remains only based on usage duration.
- **Great Britain:**
    - TNUoS: Transmission Network Use of System.
    - BSUoS: Balancing Services Use of System.
- **Norway:** Time differentiation via marginal losses (%) per connection point.

4. TSO costs included in the calculation of the unit transmission tariffs

Table 4.1 provides information on different cost items related to energy transmission that have been included in the calculation of the unit transmission tariff for the base case comparison which is presented in this overview. Some of these costs may not be included in the TSO transmission tariff or be included only partially, but are added for comparability purposes (they are indicated with red and blue colours; see the legend under the table). For further details, see country remarks.

Table 4.1. TSO costs included in the calculation of the unit transmission tariffs

	Infrastructure				System services								Losses	Other
	OPEX (except system-services, losses and ITC)	CAPEX		ITC	Primary reserve	Secondary reserve	Tertiary reserve	Congestion management (internal)	Congestion management (cross border)	Black -Start	Voltage Control Reactive Power	System Balancing		
		Depreciation	Return on capital invested											
Austria	C	C	C	C/B	C	C	C	C	C/B	C	C	N	C	N
Belgium	C	C	C	B/C	C	C/B	C/B	C	C/B	C	C	N	C	C
Bosnia & Herzegovina	C	C	C	B/C	C	C	C	N	B/C	C	C	N	C	N
Bulgaria	C	C	C	C	C	C	C	N	B/C	C	C	N	C	C
Croatia	C	C	C	N	N	C	C	C	C	C	C	C/B	C	C
Cyprus	C	C	C	N	C	C	C	N	N	C	C	N	C	N
Czech Rep.	C	C	C	C/B	C	C	C	C	C	C	C	C	C	N
Denmark	C	C	C	C/B	C	C	C	C/B	C/B	C	C	C/B	C	C/B
Estonia	C	C	C	B/C	N	N	C	N	B/C	C	C	N	C	N
Finland	C	C	C	C	N	N	C	C	C	C	C	N	C	C
France	C	C	C	C	C	C	N	C	N	C	C	N	C	C
Germany	C/B	C	C	C/B	C	C	C	C	C	C	C	N	C	C
Great Britain	C	C	C	C/B	C	C	C	C	C	C	C	C	N	C
Greece	C	C	C	N	C	C	N	N	N	N	N	N	C	C
Hungary	C	C	C	C/B	C	C	C	C	B/C	C	C	B/C	C	N
Iceland	C	C	C	N	C	C	C	N	N	C	C	C	C	N
Ireland	C	C	C	C	C	C	C	C	C	C	C	N	C	N
Italy	C	C	C	N	C	C	C	B/C	B/C	C	C	C	C	N
Latvia	C	C	C	C	C	C	C	N	N	N	C	N	C	N
Lithuania	C/B	C	C	C/B	N	C	C	N	N	C	C	B/C	C	N
Luxembourg	C	C	C	C/B	C	C	C	C	C	C	C	C	C	C
FYROM	C	C	C	C/B	N	C	C	C	C/B	C	C	C	C	C
Netherlands	C	C	C	C/B	C	C	C	C/B	C/B	C	C	B/C	C	C
Northern Ireland	C	C	C	N	C	C	C	N	N	C	C	N	N	N
Norway	C	C	C	C	C	C	C	C/B	B/C	N	C	N	C	N
Poland	C	C	C	N	C	C	C	C	N	C	C	C	C	C
Portugal	C	C	C	C	N	C/B	N	N	B/C	N	N	N	C	C
Romania	C	C	C	C/B	N	C	C	C	B/C	C	C	N	C	C
Serbia	C	C	C	C/B	C	C	C	C	C/B	C	C	C	C	C
Slovak Rep	C	C	C	C/B	C	C	C	C	N	C	C	N	C	N
Slovenia	C/B	C/B	C/B	C/B	N	C	C	C	C/B	C	C	N	C/B	C
Spain	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sweden	C	C	C	B/C	C	N	N	N	N	C	C	N	C	N
Switzerland	C	C	C	B/C	C/B	C/B	C/B	C/B	B/C	C/B	C/B	N	C/B	C

Legend:

- C if a given cost item is included in the calculation of the unit transmission tariff.
- C/B if for a given activity there are both costs and benefits/revenues, the costs are higher than benefits, and the difference is included in the calculation of the unit transmission tariff (surplus of costs).
- B/C if for a given activity there are both costs and benefits/revenues, the benefits are higher than costs, and the difference reduces the unit transmission tariff.
- N if a given cost is not considered in the calculation of the unit transmission tariff.
- C or C/B or B/C marked in red color means that the cost item is not invoiced by the TSO, but estimated values are provided for comparability purposes.
- C or C/B or B/C in blue color means that the cost item is invoiced only partially by the TSO and only part of the total costs is included in the calculation of the unit transmission tariff.

Country remarks:

- **Bosnia and Herzegovina**: The synthetic price for transmission system operation includes: Transco tariff (cost related to the maintenance of transmission grid), ISO tariff (cost related to the ISO operation), system service cost (the end users pay directly to the providers of ancillary services), energy of losses (the end users pay directly to the providers of ancillary services
- **Bulgaria**: For primary, secondary and tertiary reserve only the capacity cost is covered by the tariff

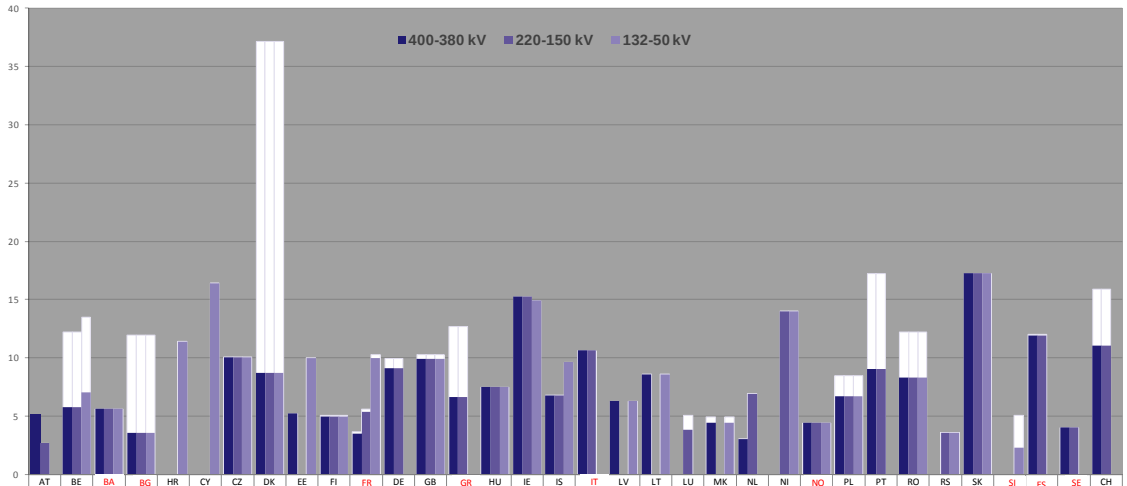
- **France:** Grid access tariffs do not include tertiary reserve, which is managed via the Balancing Mechanism. Therefore the figures provided for France exclude tertiary reserve. However, every Balancing Responsible party has to pay 0.15 €/MWh to RTE for every physical extraction from its perimeter to cover the cost of contracting fast reserve and industrial load-shedding capacities. "Other" includes the remuneration of interruptible customers.
- **Germany**: Secondary reserve and Tertiary reserve cover costs for capacity only.
- **Greece**: Transmission losses are paid by those who inject energy in the transmission system (generators and importers), however an estimated cost has been included here for comparison purposes. The purchasers pay just the adjustment for losses.
- **Hungary**:
    - Total congestion rents on inter-connections are taken into account by regulatory authorities when approving the methodology for calculating network tariffs for the OPEX of system operation - not system-services - similar to ITC. This revenue always reduces the next year's tariff.
    - The difference between the realized and planned (at the tariff determination) profit of the system balancing reduces/increases the next second year's tariff for ancillary services.
- **Ireland**: Congestion management (internal) is recovered through market. Losses are recovered through the market.
- **Netherlands:** In 2014 the auction receipts have been used to lower the implications of settlements of previous periods on the tariffs. This mainly neutralised the tariff increasing implications of Repayment of System Services in the period 2000-2011 (as a result of the interpretation of the judge that certain tariff payers were exempted) and to soften additional income related to the previous regulatory period (as a result of the successful appeal against the method decision for period 2008-2010)
- **Poland**: Stranded costs i.e. cost resulting from compensations paid to energy producers for dissolving long term energy sales contracts concluded in the past with a single buyer company. The long term contracts obliged energy producers to modernize their production units, adjusting them to environmental standards. Those costs are recovered by a transitory charge in the Tariff.
- **Portugal**: Costs for losses and system-services costs are not recovered by a regulated tariff, but are recovered in the energy price. They have been included in this overview only for comparison purposes.
- **Romania:** Congestion management (cross-border) refers solely to congestion rents earned by the TSO (there are no costs associated with cross-border congestion management as no inter-TSO re-dispatch mechanisms are run between the control areas of the Romanian and neighbouring countries TSOs). Congestion income (which used to be incorporated in the transmission tariff calculation as a discount) now has no such impact on tariffs, instead it is used as funding source for cross-border investments (as provided by EC Regulation 714/2009)
- **Spain**: System services and losses are not included in the Spanish transmission tariff because they are recovered through the energy market. 2013 figures for system services and losses in Spain have been included in the overview only for comparison purposes.
- **Sweden**: Costs of Primary reserve - 2/5 of the total costs are included in TSO tariff.
- **Switzerland**: The category "Other" includes the cost-covering feed-in remuneration fee for renewable energy and water conservation.

5. Split of the unit transmission tariffs between components related to TSO activities and other regulatory charges

Chart 5.1 illustrates total unit transmission tariffs when the base case is modified by varying the voltage level. Charges related to TSO activities are coloured whereas other regulatory charges not directly related to TSOs´ activities are marked in white.

Chart 5.1. Split of the unit transmission tariffs between components related to TSO activities and other regulatory charges

Euro per MWh



		AT	BE	BA	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GB	GR	HU	IE	IS	IT	LV	LT	LU	MK	NL	NI	NO	PL	PT	RO	RS	SK	SI	ES	SE	CH
Total	400-380 kV	5.13	12.22	5.60	11.93	-	-	10.06	37.14	5.20	5.07	3.62	9.93	10.25	12.66	7.47	15.23	6.78	10.64	6.29	8.57	-	4.92	3.04	-	4.42	8.45	17.25	12.23	-	17.25	-	12.02	3.99	15.91
	220-150 kV	2.68	12.22	5.60	11.93	-	-	10.06	37.14	-	5.07	5.56	9.93	10.25	12.66	7.47	15.23	6.78	10.64	-	-	5.04	-	6.92	13.99	4.42	8.45	17.25	12.23	3.59	17.25	-	12.02	3.99	15.91
	132-50 kV	-	13.47	5.60	11.93	11.40	16.40	10.06	37.14	10.00	5.07	10.30	-	10.25	-	7.47	14.89	9.61	-	6.29	8.57	-	4.92	-	13.99	4.42	8.45	-	12.23	3.59	17.25	5.05	-	-	-
TSO	400-380 kV	5.13	5.78	5.60	3.54	-	-	10.06	8.70	5.20	4.97	3.50	9.09	9.88	6.66	7.47	15.23	6.78	10.64	6.29	8.57	-	4.41	3.04		4.42	6.68	9.05	8.29	-	17.25	-	11.88	3.99	11.01
	220-150 kV	2.68	5.78	5.60	3.54	-	-	10.06	8.70	-	4.97	5.34	9.09	9.88	6.66	7.47	15.23	6.78	10.64	-	-	3.79	-	6.92	13.99	4.42	6.68	9.05	8.29	3.56	17.25	-	11.88	3.99	11.01
	132-50 kV	-	7.03	5.60	3.54	11.39	16.40	10.06	8.70	10.00	4.97	10.00	-	9.88	-	7.47	14.89	9.61	-	6.29	8.57	-	4.41	-	13.99	4.42	6.68	-	8.29	3.56	17.25	2.27	-	-	-

Charges related to TSO activities: infrastructure (CAPEX and OPEX), losses, system services, congestion.

Other regulatory charges not directly related to TSO activities: stranded costs, public interest contribution, renewable energy and others. Details in Appendix 5.

Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview) modified by considering different voltage levels.
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- Those countries for which certain elements of the 2014 unit transmission tariff are estimations are marked in red colour.

Country remarks:

- **Belgium:** The cost of losses has been added, but is not included in the TSO-tariffs for users connected at EHV.
- **Bosnia and Herzegovina:** In Bosnia & Herzegovina separate companies exist: ISO (system operation) and Transco (owner of transmission grid). System services and losses are not purchased by the ISO. Those services are part of end user price and the end user pays it directly to the provider of ancillary services.
- **Bulgaria:** Tariff approved by the regulator, but for the new regulatory period starting as from 01 July, the tariffs will be changed**.**
- **Denmark:** As the PSO-tariff is set quarterly during the year, the non-TSO part of the tariff is estimation.
- **Estonia:** For 330kV transmission network.

- **France:** Provisional figures, which are subject to annual re-evaluation every 1st August. For the base case 220-150 kV is used (highest voltage level with statistically representative figures). Grid access tariffs do not include tertiary reserve, which is managed via the Balancing Mechanism. Therefore the figures provided for France exclude tertiary reserve. However, every Balancing Responsible party has to pay 0.15 €/MWh to RTE for every physical extraction from its perimeter to cover the cost of contracting fast reserve and industrial load-shedding capacities. Other regulatory charges refer to costs related to CTA (Additional Tariff Contribution).
- **Germany:** Weighted average of the TSOs operating in Germany, KWK-G-surcharge (CHP-combined heat and power) is included. For Energy intensive customers (typically heavy industry customers) with energy consumption that exceeds 7 000 full load hours per year and 10 GWh there is a fee reduction. Depending on full load hours, the grid fee has to be at least 10, 15 or 20 % of the normal grid fee.
- **Great Britain**: Cost of losses are not included.
- **Greece**: Transmission losses are paid by those who inject energy in the transmission system (generators and importers), however an estimated cost has been included here for comparison purposes.
- **Iceland**: Landsnet's tariff is prepared in accordance with the revenue cap determined by the National Energy Authority of Iceland. The tariff applies to Distribution System Operators (DSOs) on the one hand and power-intensive industries on the other hand. Transmission fees are independent of the distance travelled by the power through the grid as well as the distance between the sites where the power is injected into and drawn from it.

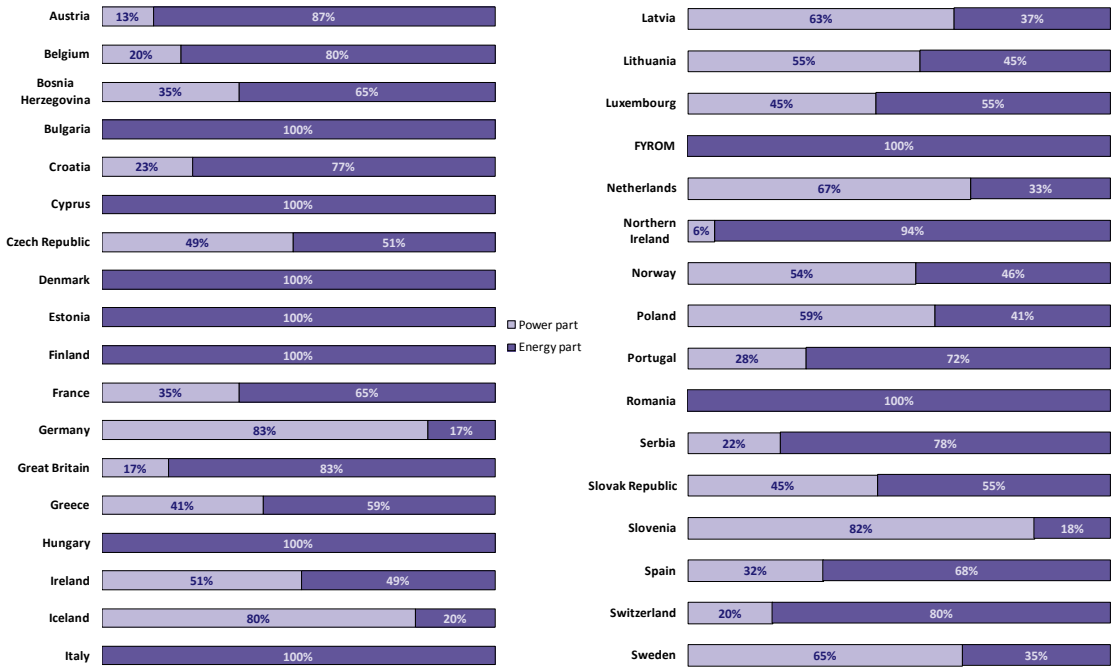
  A special charge is applied for ancillary services and transmission losses, at a fixed amount per each kWh drawn from the grid.

  The tariff for consumption by power-intensive industries is denominated in US dollars while the tariff for DSOs, as well as for other items, is denominated in Icelandic kronur (ISK).
- **Ireland**: Transmission losses are accounted for in the market, however, purely for comparison purposes an estimated charge has been included in these figures.
- **Italy:** This figure includes as "System services" the pass through component "Uplift" related to the charge for provision of dispatching services. Transmission losses are accounted for in the market, however, purely for comparison purposes an estimated charge has been included in these figures.
- **Latvia:** For 330kV transmission network (Latvia does not have 400kV networks).
- **Lithuania:** Voltage level 330kV.
- **Luxembourg:** Charge corresponding to consumers other then users that use electricity for the chemical reduction and the electrolysis as well as in the metallurgical procedures.
- **Northern Ireland:** Transmission losses are accounted for in the market however purely for comparison purposes an estimate is included.
- **Norway:** It is very difficult to give numbers of the Norwegian tariffs in advance. The tariff charged during the year to network users depends on both the actual price (vary on a daily basis) and the actual marginal loss rates (varies every week through the year), and on the volume produced/consumed and volume of import/export. The numbers given in this report are based on estimations and must be handled with care. The actual numbers will be different than the figures provided.
- **Portugal:** Losses costs and system-services costs are not recovered by a regulated tariff. They are recovered in the energy price and have only been included for comparison purposes. This is valid for all the following charts/tables in this Overview.
- **Romania:** Transmission charge doesn't vary across different voltage levels or different utilization timeframes. Transmission tariffs send locational signals (for both G and L) but there is no time-of-use differentiation in tariffs.
- **Spain:** Apart from some costs detailed in Appendix 5, it is not possible to split the Spanish unit transmission tariff into TSO and non-TSO related charges. The reason is that according to the Spanish legislation some non-TSO costs (e.g. those due to renewable support schemes) are allocated through the access tariffs without any specific differentiation. Therefore, the Spanish unit transmission tariff shown in Chart 5.1 as coloured (i.e. as TSO-related) also includes regulatory charges not directly related with TSO activities.
- **Sweden:** Forecasted values are provided.

6. Energy-related components and power-related components of the unit transmission tariff

Main revenue drivers for unit transmission tariffs are power (capacity), energy or both. Chart 6.1 presents the shares of power and energy components of the unit transmission tariffs as for the base case.

Chart 6.1. Energy-related components and power-related components of the unit transmission tariff



Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- Values have been rounded.

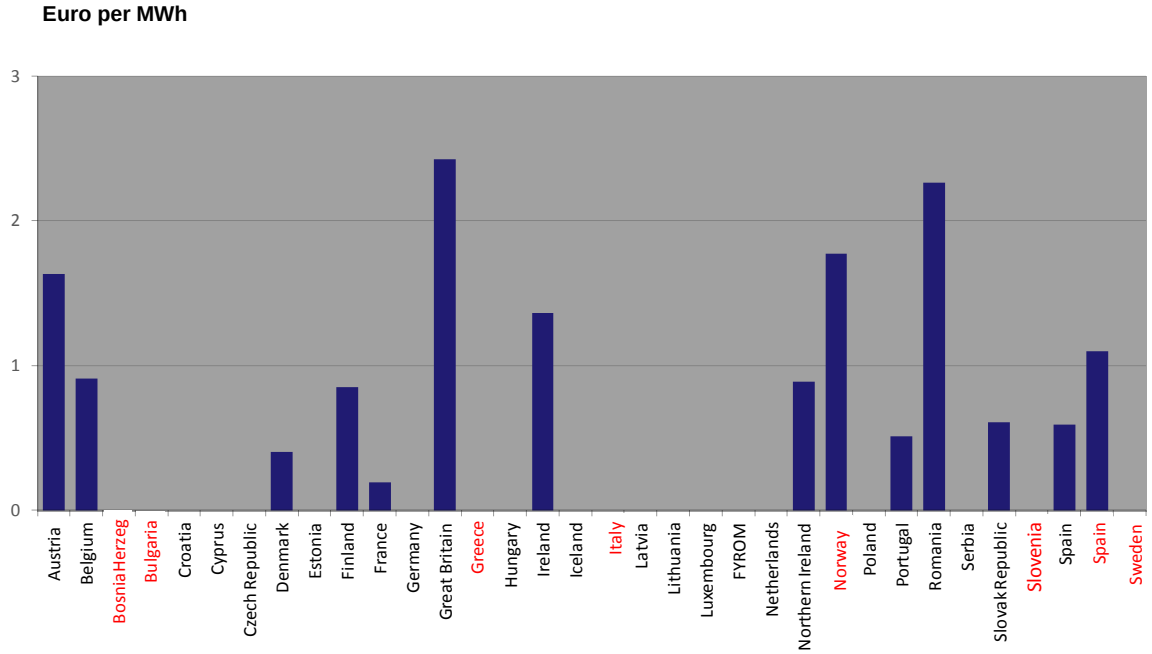
Country remarks:

- **Belgium**: The cost of losses has been added, but is not included in the TSO-tariffs for users connected at EHV.
- **Bosnia and Herzegovina**: Ratio according to the Tariffs methodology
- **Germany**: Weighted average, KWK-G-surcharge (CHP-combined heat and power) not included.
- **Iceland**: The calculated ratio according to Iceland's Tariffs methodology is 70% power / 30% energy for Landsnet.
- **Spain**: Percentages correspond only to access tariffs without losses and system services.
- **Switzerland:** Power part in this calculation includes charge for connection point.

7. G components of the unit transmission tariff

The unit transmission tariff is calculated by adding the charges applied to the generation (G) and load (L). Chart 7.1 provides the part of the unit transmission tariff that corresponds to generation.

Chart 7.1. G components of the unit transmission tariffs in 2014



Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- Those countries for which certain elements of the 2014 unit transmission tariffs are estimations are marked in red colour.

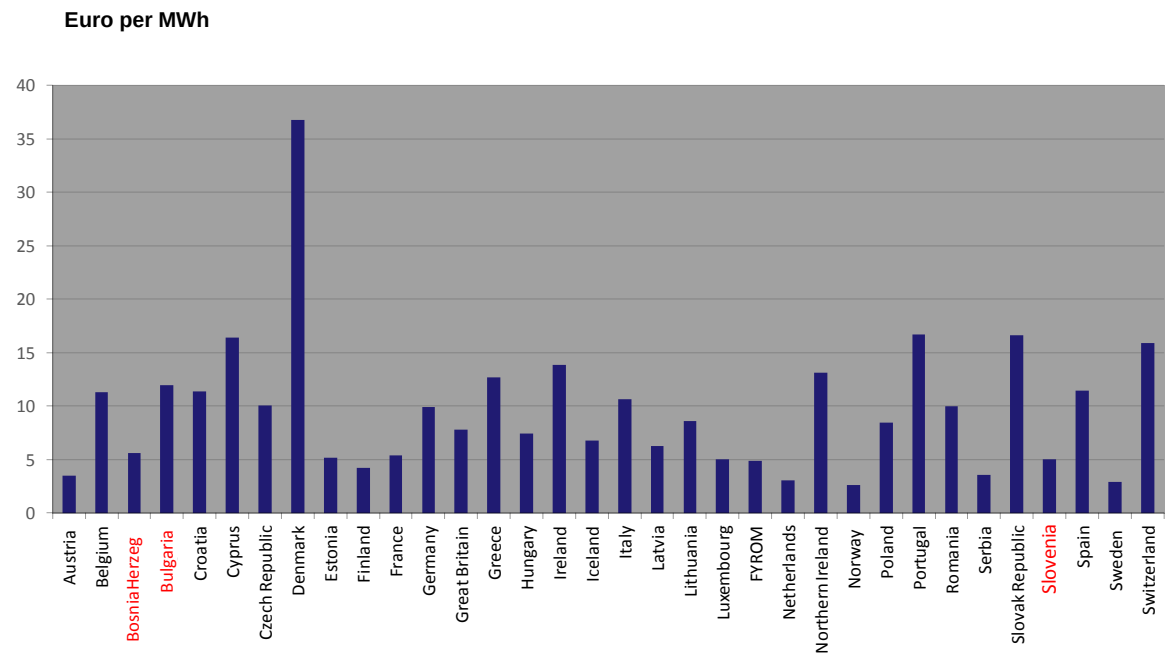
Country remarks:

- **France:** Generation tariff is 0.19 €/MWh (without yearly re-evaluation) for voltages higher than 130 kV, 0 for lower voltages.
- **Great Britain**: Generation tariffs range from 36.31 €/kW in Skye and Lochalsh to -6.20 €/kW in West Devon and Cornwall. The average weighted TNUoS generation tariff is around 6.65 €/kW. The contribution from BSUoS charges has not been included.
- **Greece**: Producers pay for transmission losses, however, this is done through the energy market and not through tariffs and uplift accounts.
- **Spain:** There are two charges for generators:
    - The charge corresponding to the access tariff for generators (0.5 €/MWh), shown in chart 7.1;
    - Generators above 1 MW of installed capacity pay a fee in order to finance system operator´s activities. The fee depends on their available capacity.

8. L components of the unit transmission tariff

The unit transmission tariff is calculated by adding the charges applied to the generation (G) and load (L). Chart 8.1 provides the part of the unit transmission tariff that corresponds to load.

Chart 8.1. L components of the unit transmission tariffs in 2014



Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- Those countries for which certain elements of the 2014 unit transmission tariffs are estimations are marked in red colour.

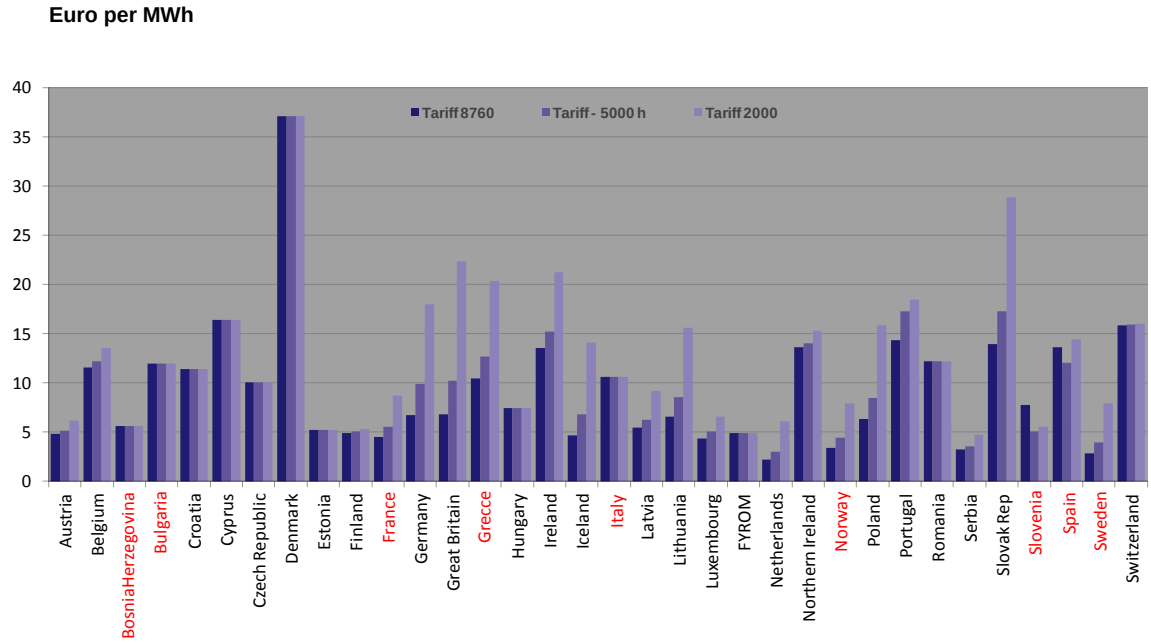
Country remarks:

- **Great Britain**: Demand tariffs range from 13.03 €/kW in the North of Scotland to 40.68 €/kW in the Central London zone. The weighted average TNUoS demand tariff is around 33.69 €/kW. The contribution from BSUoS charges has not been included.

9. Impact of utilization time on the unit transmission tariffs

Transmission charges paid by network users, and subsequently unit transmission tariffs, change due to the utilization time if the applied tariffs have power (capacity) as a revenue driver. Chart 9.1 shows the impact of the utilization time on the unit transmission tariff.

Chart 9.1. Impact of utilization time on the unit transmission tariffs



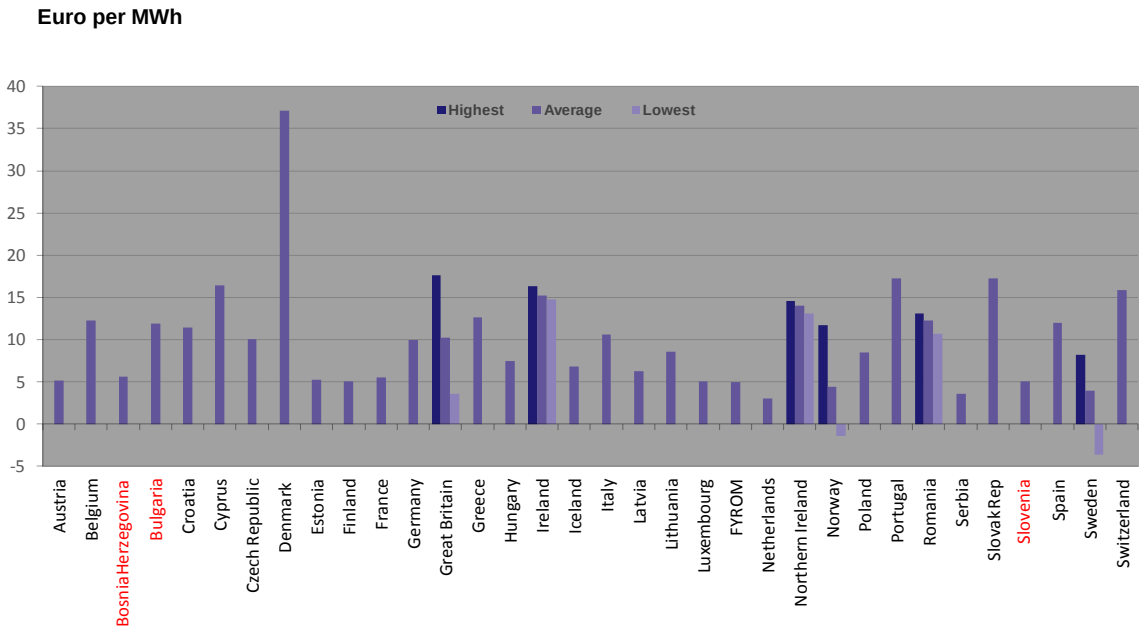
Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview) modified by considering different utilization times.
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- For most TSOs, a typical customer is a DSO with a seasonal load profile. Neither full annual utilization time of 8,760 h nor low utilization time of 2,000 h are cases that occur in the grid. Results for these hypothetical utilization times are presented for comparison purposes only, in order to illustrate how fixed components of the tariffs impact on the average transmission charges.
- Those countries for which certain elements of the 2014 unit transmission tariffs are estimations are marked in red colour.

10. Impact of location on the unit transmission tariffs

Some transmission tariffs are differentiated by location. Chart 10.1 illustrates the impact of location on the unit transmission tariff.

Chart 10.1. Impact of location on the unit transmission tariffs



Remarks:

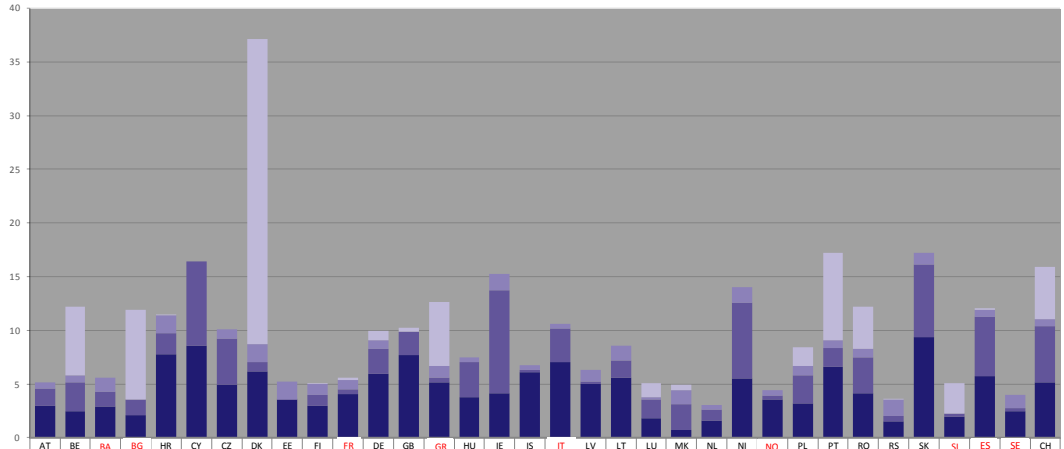
- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview) modified by considering different locations.
- Other charges not directly related to TSO activities **are included** in the calculation of the unit transmission tariff.
- For more details about locational differentiation of transmission tariffs see Appendix 4. Tariff areas in countries with generation/consumption tariffs with locational differentiation.
- Those countries for which certain elements of the 2014 unit transmission tariffs are estimations are marked in red colour.

11. Components of the unit transmission tariffs

Chart 11.1 provides the split of the different components of the unit transmission tariff that is calculated in this report.

Chart 11.1. Components of the unit transmission tariffs

Euro per MWh



	AT	BE	BA	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GB	GR	HU	IE	IS	IT	LV	LT	LU	MK	NL	NI	NO	PL	PT	RO	RS	SK	SI	ES	SE	CH
Other regulatory charges	0.00	6.45	0.00	8.39	0.01	0.00	0.00	28.44	0.00	0.10	0.22	0.84	0.38	6.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.50	0.00	0.00	0.00	1.77	8.20	3.94	0.03	0.00	2.78	0.13	0.00	4.89
Losses	0.53	0.61	1.32	0.00	1.68	0.00	0.81	1.63	1.63	1.02	0.83	0.81	0.00	1.10	0.41	1.53	0.44	0.44	1.07	1.37	0.23	1.28	0.46	1.45	0.50	0.90	0.72	0.79	1.54	1.14	0.00	0.60	1.26	0.65
System Services	1.63	2.71	1.40	1.41	1.97	7.80	4.35	0.90	0.03	1.00	0.44	2.34	2.18	0.42	3.31	9.56	0.27	3.17	0.19	1.60	1.74	2.41	1.01	7.02	0.40	2.61	1.74	3.35	0.53	6.75	0.34	5.53	0.26	5.22
Infrastructure	2.97	2.46	2.88	2.13	7.74	8.60	4.90	6.16	3.54	2.95	4.07	5.94	7.69	5.14	3.74	4.14	6.07	7.03	5.03	5.60	1.82	0.73	1.57	5.52	3.52	3.17	6.60	4.16	1.49	9.36	1.93	5.76	2.47	5.14

Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- The figures in the chart are estimations of the value of each final price component.
- For countries where it is not possible to split the tariff as it is done in this chart, some assumptions and estimations have been made. System services include system balancing if applicable.
- Those countries for which certain elements of the 2014 unit transmission tariffs are estimations are marked in red colour.

Country remarks:

- **Belgium**: Tariffs for “Public Service Obligations” and "Taxes and Levies" are not related to TSO activity.
- **Bosnia and Herzegovina**: Infrastructure cost (Transco tariff), System services (ISO tariff and cost of system services), Losses (losses).
- **Croatia:** Charges correspond to 110 kV level, as there are no eligible load customers paying transmission tariffs above that level.
- **France:** Charges corresponding to the "220-150" voltage level (highest voltage level with statistically representative data). Provisional figures, subject to annual re-evaluation every 1st August. There is no specific allocation of system services or losses cost to any specific tariff, the values here are purely indicative.
- **FYROM:** MEPSO is obliged to buy the total amount of energy which is produced by renewable sources, and after that all these expenses are included in the transmission tariff.
- **Great Britain:** Data for losses are not available.
- **Greece:** In the non TSO related costs, costs related to RES payments that are completely irrelevant to IPTO are also included.
- **Hungary:** Losses are part of transmission system operation tariff. It is set in the justified cost of losses by the Regulator in the yearly tariff.

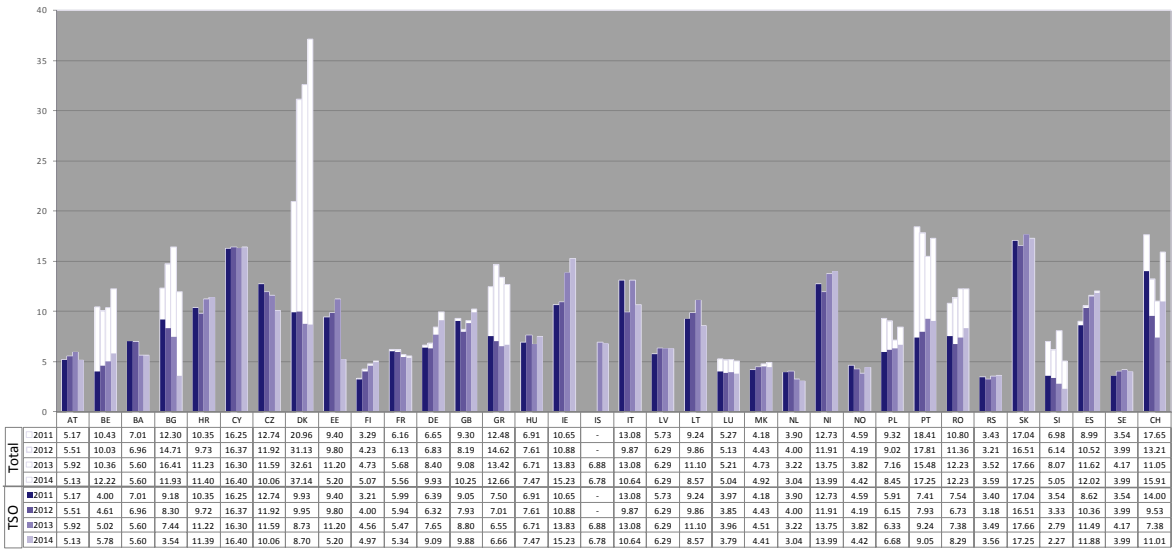
- **Ireland**: Transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.
- **Italy**: Transmission losses are accounted for in the market, however, purely for comparison purposes an estimated charge on the basis of the average electricity price of January and December 2013 has been included in these figures. The pass through component of system services "Uplift" provided for 2014 is a forecast of system services unitary cost for the first quarter of 2014.
- **Netherlands**: The tariffs include an estimate of the costs for losses. Differences between realized and budget losses are settled in the tariffs (t+2).
- **Serbia**: Charges correspond to 220 kV level, as there are no eligible customers paying transmission tariffs at 400 kV level
- **Slovenia**: Losses included in the transmission fee, no splitting available.
- **Spain**: The "Other regulatory charges" part is detailed in Appendix 5. The "Losses" and "System services" parts show 2013 figures that have been provided only for comparison purposes despite the fact that they are not included in the Spanish transmission tariff (they are recovered through the energy market). Finally, the part of the Spanish Transmission Unit marked as "Infrastructure" includes both TSO and non-TSO related charges. As explained in Section 5, the reason is that according to the Spanish legislation some non-TSO costs (e.g. those due to renewable support schemes) are allocated through the access tariffs without any specific differentiation.

12. Evolution of the unit transmission tariffs

Transmission tariffs change over years. Chart 12.1 shows the evolution of unit transmission tariffs over 2011 – 2014 in Euros of 2013. Charges related to TSO activities are coloured whereas other regulatory charges not directly related to TSOs´ activities are marked in white.

Chart 12.1. Evolution of the unit transmission tariffs

Constant Euros of 2013



		AT	BE	BA	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GB	GR	HU	IE	IS	IT	LV	LT	LU	MK	NL	NI	NO	PL	PT	RO	RS	SK	SI	ES	SE	CH
Total	2011	5.17	10.43	7.01	12.30	10.35	16.25	12.74	20.96	9.40	3.29	6.16	6.65	9.30	12.48	6.91	10.65	-	13.08	5.73	9.24	5.27	4.18	3.90	12.73	4.59	9.32	18.41	10.80	3.43	17.04	6.98	8.99	3.54	17.65
	2012	5.51	10.03	6.96	14.71	9.73	16.37	11.92	31.13	9.80	4.23	6.13	6.83	8.19	14.62	7.61	10.88	-	9.87	6.29	9.86	5.13	4.43	4.00	11.91	4.19	9.02	17.81	11.36	3.21	16.51	6.14	10.52	3.99	13.21
	2013	5.92	10.36	5.60	16.41	11.23	16.30	11.59	32.61	11.20	4.73	5.68	8.40	9.08	13.42	6.71	13.83	6.88	13.08	6.29	11.10	5.21	4.73	3.22	13.75	3.82	7.16	15.48	12.23	3.52	17.66	8.07	11.62	4.17	11.05
	2014	5.13	12.22	5.60	11.93	11.40	16.40	10.06	37.14	5.20	5.07	5.56	9.93	10.25	12.66	7.47	15.23	6.78	10.64	6.29	8.57	5.04	4.92	3.04	13.99	4.42	8.45	17.25	12.23	3.59	17.25	5.05	12.02	3.99	15.91
TSO	2011	5.17	4.00	7.01	9.18	10.35	16.25	12.74	9.93	9.40	3.21	5.99	6.39	9.05	7.50	6.91	10.65	-	13.08	5.73	9.24	3.97	4.18	3.90	12.73	4.59	5.91	7.41	7.54	3.40	17.04	3.54	8.62	3.54	14.00
	2012	5.51	4.61	6.96	8.30	9.72	16.37	11.92	9.95	9.80	4.00	5.94	6.32	7.93	7.01	7.61	10.88	-	9.87	6.29	9.86	3.85	4.43	4.00	11.91	4.19	6.15	7.93	6.73	3.18	16.51	3.33	10.36	3.99	9.53
	2013	5.92	5.02	5.60	7.44	11.22	16.30	11.59	8.73	11.20	4.56	5.47	7.65	8.80	6.55	6.71	13.83	6.88	13.08	6.29	11.10	3.96	4.51	3.22	13.75	3.82	6.33	9.24	7.38	3.49	17.66	2.79	11.49	4.17	7.38
	2014	5.13	5.78	5.60	3.54	11.39	16.40	10.06	8.70	5.20	4.97	5.34	9.09	9.88	6.66	7.47	15.23	6.78	10.64	6.29	8.57	3.79	4.41	3.04	13.99	4.42	6.68	9.05	8.29	3.56	17.25	2.27	11.88	3.99	11.01

Charges related to TSO activities: infrastructure (CAPEX and OPEX), losses, system services, congestion.

Other regulatory charges not directly related to TSO activities: stranded costs, public interest contribution, renewable energy and others. Details in Appendix 5.

Remarks:

- The example taken for this comparison is the base case (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- Prices have been updated to 2013 by using the annual average rate of change in the Harmonised Index of Consumer Prices (HICP) as provided by Eurostat. If it is not available, the official CPI data from the country is taken.
- For countries not in the Euro zone the exchange rate as for 31 December 2013 is used.
- See Country remarks for details on the reasons for annual changes of more than 10% or 0.5 €/MWh compared to last year.

Country remarks:

- **Austria:** Decline in tariffs is mainly due to an increase in volumes (especially valid for losses and ancillary services). As well as the application of congestion income for investment in interconnection capacities according to regulation (EC) 714/2009.
- **Belgium:** The rise in tariff is due to a revision of the tariffs starting from June 2013 onwards following a court ruling. By this ruling a major part of G-tariffs – of which the application started as from 1 January 2012 - were abolished. This has as a consequence that for the current tariff period 2012-2015 the resulting difference in total revenue has to be recovered via an increase of L-tariffs, mainly starting from 1 January 2014. The rise in non-TSO costs is mainly due to the rise of the levy for financing green certificates.
- **Bulgaria:** The costs related to TSO are reduced because of changing the methodology for reserve capacity payments - for slow tertiary reserve and secondary reserve. The costs not directly related to TSO are reduced because of introducing new price model for covering these charges and temporarily termination of new connections.

- **Czech Republic:** Lower price of electricity for covering losses, lower costs of ancilary services, correction factors from i-2.
- **Denmark:** Tariff not related to TSO-activities:
    - Change is due to lower expected market prices in 2014 than in 2013 => Direct subsidies to RES increases mainly due to feed-in tariffs to RES.
    - Change is due to higher RES production – primarily due to increase in land-based wind turbine capacity.
- **Estonia:** The decrease in 2014 is caused by using the tariffs at different voltage levels in the chart. In the previous years, the highest reported voltage level was 110kV, since 2014 it is 330kV.
- **France**: All 2014 figures are provisional except G tariff which is set at 0.19 €/MWh until the end of the current regulation period (July 2017)
- **Germany**: The grid fees 2014 compared with the grid fees 2013 are mainly increased due to the following facts:
    - Increased costs for offshore investments
    - Increased costs for the grid security, i. e. cold reserve
    - Reduced amount of delivered energy due to increased decentralized energy generation
- **Great Britain:** The total tariff has changed by just over the stated threshold (i.e. 10% or €0.5) which is due to increased revenue allowances for NGET and the Scottish TOs under the new RIIO price control arrangements reflecting increased investment coming into effect from April 2013.
- **Greece:** The decrease in tariff since 2012 is due to the decrease of non-TSO related costs and, more specifically, to the decrease of the tariff related to the compensation of RES Units. In the non-TSO related costs, costs related to RES payments that are completely irrelevant to IPTO are also included for uniformity reasons only.
- **Hungary:** The primal explanation for the high change is the fall of the measure of the pass-through elements (congestion rents and ITC) and the correction from the previous years, which increase the tariffs.
- **Ireland:** While losses showed an increase of approx. 5.5%, it was system services at 8% and infrastructure at 15% that showed the greatest increase over the 2013 figures. As system services includes constraints for the purposes of the study, this contributed to the sizeable increase. The infrastructure increase is expected given the large scale upgrade of the grid which is currently underway in Ireland.
- **Italy:** Regarding the difference between 2014 and 2013 tariff figures mainly due to the cost of systems services: Figure provided for 2014 is a forecast of system services unitary cost for the first quarter 2014 and is not comparable with the average unitary cost paid by dispatching users in 2013.
- **Lithuania:** Decrease in 2014 due to decreased cost of system services (by 1.84 €/MWh) and reduced by excess profit of previous years.
- **Netherlands:** The decrease in tariffs is mainly caused by settlements of previous periods (volumes losses and the purchase of energy and power).
- **Norway:** Increase of the fixed G-tariffs from 1 €/MWh in 2013 to 1.4 €/MWh in 2014. The reason behind this is the substantial level of investments during the next 10-15 years. All customers should contribute in covering the costs.
- **Poland:** Main reasons of changes unit prices between years 2013 and 2014:
    - Costs related to TSO activities: an increase of TSO costs results from increase of costs of ancillary services purchased by TSO.
    - Other charges not directly related to TSO activities: increase in 2014 of stranded costs calculated by NRA according to law regulations in force.
- **Portugal:** Other charges not directly related to TSO activities: The tariff structure for voltage level is published by legislation every year. In 2013 the Islands' tariff convergence costs was not charged to very high voltage customers. The impact in 2014 is 2.17 €/MWh.
- **Romania:** The transmission total invoice (all activities included) remained virtually flat in 2014 vs 2013 as a net result of (i) a 12% increase in charges directly related to transmission

(accounting for 60% of total invoice in 2013) and (ii) a 19% decrease in charges not directly related to transmission (accounting for 40% of total invoice in 2013)

- **Slovenia:** Main reasons of decrease unit prices between years 2013 and 2014:
  - Cost related to TSO activities: The main reason is decrease in costs of system services.
  - Other regulatory charges not directly related to TSO activities: The main reason is decrease of renewable fees up to 50 %.
- **Switzerland:** As a result of several Swiss Federal Supreme Court rulings, tariffs for ancillary services as well as tariffs for grid usage rise in 2014.

  Tariffs for ancillary services:
  - Following a ruling by the Federal Supreme Court, costs previously borne by generators are now reimbursed. Therefore, Swissgrid has to charge the AS tariffs with these costs in 2014.

  Tariffs for grid usage:
  - Following a ruling by the Federal Supreme Court, cuts by the NRA in previous years in this tariff category have been revised.
  - Special effects: adjustments in amortisation and depreciation, adjustment in the basis of calculation (more grid elements according to rulings of courts).

13. Appendixes

1. Voltage levels operated by TSOs
2. Comparison of network losses prices
3. Comparison of system services prices
4. Tariff areas in countries with generation/consumption tariffs with locational differentiation
5. Other regulatory charges not directly related to TSO activities
6. First connection charges
7. Special Tariffs
8. Treatment of Final Customers *versus* Distribution System Operators
9. Reactive Energy
10. Exchange rates

Appendix 1: Voltage levels operated by TSOs

Table A1. Voltage levels operated by TSOs

% km	400-380 kV	220 -150 kV	132-50 kV
Austria	35%	48%	17%
Belgium (Elia)	14%	47%	38%
Bosnia and Herzegovina	14%	24%	62%
Bulgaria (NEK)	16% (+1% 750kV)	19%	64%
Croatia	17%	16%	67%
Cyprus	-	-	100%
Czech Republic (CEPS)	68%	31%	1%
Denmark (Energinet.dk)	28%	48%	24%
Estonia (Elering)	29%	3%	68%
Finland (Fingrid)	31%	16%	52%
France (RTE)	21%	26%	53%
FYROM	28%	-	72%
Germany	59%	41%	-
Great Britain (NGT)	59%	21%	21%
Greece (ADMIE)	27%	72%	0%
Hungary (Mavir)	61% (+6% 750kV)	29%	4%
Ireland (EirGrid)	10%	29%	61%
Iceland (Landsnet)	0%	26%	74%
Italy (Terna)	19%	81%	-
Latvia Augstsprieguma Tikls)	24%	-	76%
Lithuania (Litgrid)	25%	-	75%
Luxembourg	-	100%	-
Netherlands (TenneT)	28%	72%	-
Northern Ireland (SONI)	-	38%	62%
Norway (Statnett)	73%	-	27%
Poland (PSE Operator)	40% (+1% 750kV)	58%	1%
Portugal (REN)	28%	72%	-
Romania (Transelectrica)	55%	45%	0%
Serbia (EMS)	17%	21%	62%
Slovak Republic (SEPS)	68%	29%	3%
Slovenia (Eles)	24%	12%	65%
Spain (REE)	49%	45%	5%
Sweden (Svenska K.)	69%	26%	5%
Switzerland	27%	73%	-

Remarks:

- Percentages are calculated as the ratio between the kilometers of circuits for each voltage level and total kilometers of circuits operated by each TSO.
- Values have been rounded.

Country remarks:

- **Denmark**: About 6% of the total circuits under the operation of Energinet.dk are within the range 380-220kV.
- **France**: RTE operates few 45 kV lines.
- **Iceland**: About 2% of the total circuits under the operation of Landsnet are 33 kV (included in the 132-50 kV range).
- **Latvia**. Highest voltage level operated in Latvian TSO is 330kV.
- **Netherlands:** EHV in the Netherlands includes 220/380kV.
- **Sweden**: The figure of the last column corresponds to HVDC not at 132-50 kV.

Appendix 2: Comparison of network losses prices

Table A.2. Comparison of network losses prices

Losses (€/MWh)	COUNTRY
Above 1	Croatia
	Denmark
	Estonia
	Serbia
	Ireland
	Northern Ireland
	Lithuania
	Bosnia and Herzegovina
	FYROM
	Sweden
	Slovak Rep
	Greece
	Latvia
	Finland
Below 1	Poland
	France
	Czech Republic
	Germany
	Romania
	Portugal
	Switzerland
	Belgium
	Spain
	Austria
	Norway
	Netherlands
	Iceland
	Italy
	Hungary
	Luxembourg
	Bulgaria
	Cyprus
	Great Britain

Remarks:

- The base case is taken (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).

Country remarks:

- **Bosnia and Herzegovina**: End users (through Balance responsible parties) pay to the providers of ancillary services energy for recover of network losses.

- **France**: There is no specific allocation of costs for losses to any specific tariff. The values here are purely indicative.
- **Ireland**: Transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.
- **Italy**: In Italy, cost of network losses is recovered through the energy price. However an estimated cost has been included here purely for comparison purposes.
- **Netherlands**: Losses are part of transmission tariff; the value given is only an estimation.
- **Portugal**: Losses costs are not recovered by a regulated tariff they are recovered in the energy price. They have been included only for comparison purposes.
- **Slovenia:** Losses included in the transmission fee, no splitting available.
- **Spain**: Losses are not included in the Spanish transmission tariff, as they are recovered through the energy market. 2013 figures have been included only for comparison purposes.

Appendix 3: Comparison of system services prices

Table A.3. Comparison of system services prices

System Services (€/MWh)	COUNTRY
above 3	Ireland
	Cyprus
	Northern Ireland
	Slovak Rep
	Spain
	Switzerland
	Czech Republic
	Romania
	Hungary
	Italy
1<---<3	Belgium
	Poland
	FYROM
	Germany
	Great Britain
	Croatia
	Luxembourg
	Portugal
	Austria
	Lithuania
	Bulgaria
	Bosnia and Herzegovina
	Netherlands
	Finland
0.5<---<1	Denmark
	Serbia
below 0.5	France
	Greece
	Norway
	Slovenia
	Iceland
	Sweden
	Latvia
	Estonia

Remarks:

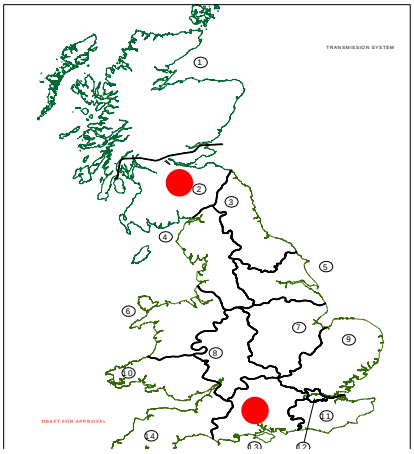
- The base case is taken (see Section 2. Methodology and hypotheses considered in this ENTSO-E overview).
- These figures cover the system services listed in Table 4.1

Country remarks:

- **Bosnia and Herzegovina**: End users pay system services directly to the provider of ancillary services. System balancing is not included in the system services.
- **France**: There is no specific allocation of system services to any specific tariff. The values here are purely indicative.
- **Portugal**: System-services costs are not recovered by a regulated tariff they are recovered in the energy price. They have been included only for comparison purposes.
- **Spain**: System services are not included in the Spanish transmission tariff, as they are recovered through the energy market. 2013 figures have been included here only for comparison purposes.

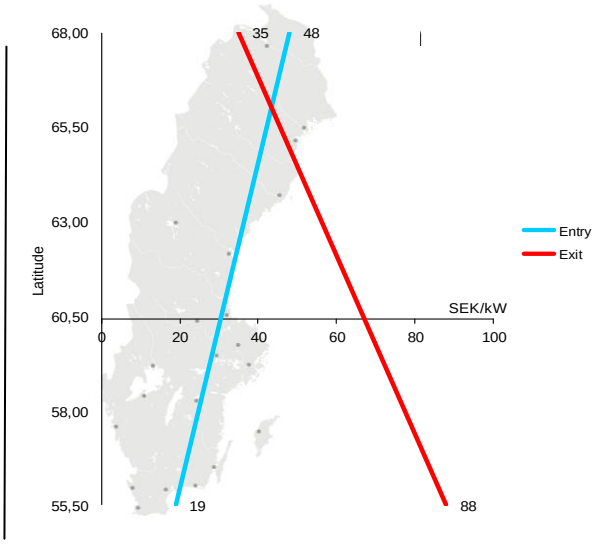
Appendix 4: Tariff areas in countries with generation/consumption tariffs with locational differentiation

England and Wales



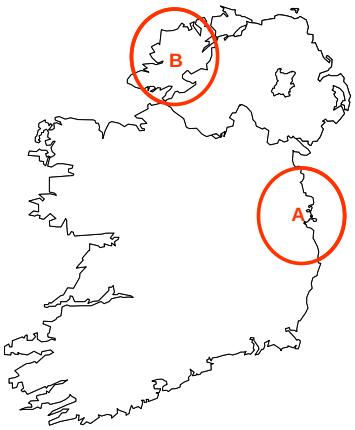
North area: Northern Scotland
South area: South of England

SWEDEN



The annual entry fees decreases linearly with the latitude to SEK 19/kW in the south. For the exit fees the reversed principle applies.

Ireland



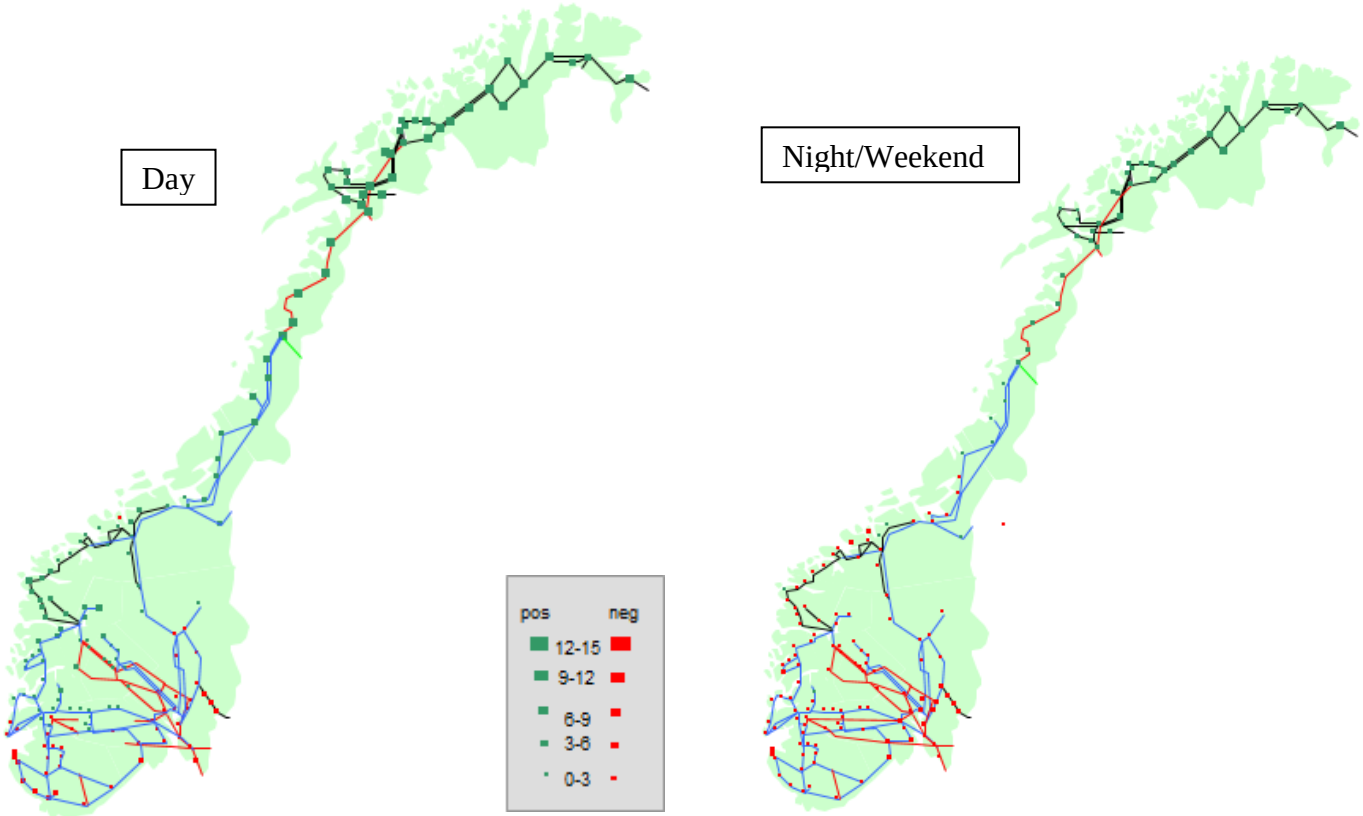
Highest case (A): G located in Dublin (surplus area)
Lowest case (B): G located in Donegal (shortage area)

Norway

(Marginal loss factors (MLF) Average-2012-13)

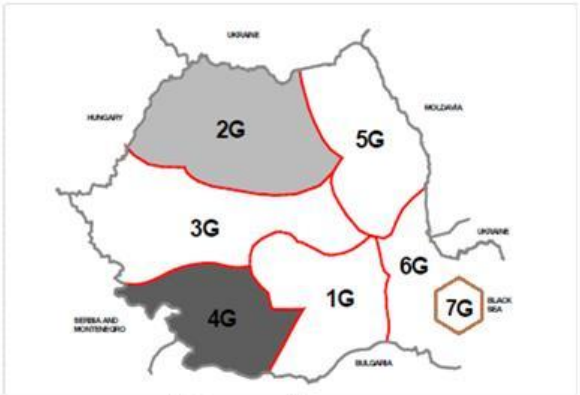
MLFs are symmetrical, i.e. MLF*input* = - MLF*output*

The MLFs below represent MLF*input*



The energy element (€/MWh) = *Marginal loss factors (%)* * *market price (€)*

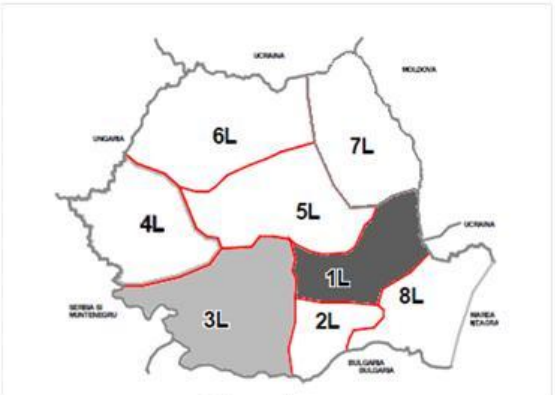
Romania



7 Generation areas

4G – highest G tariff (excess generation area)

2G – lowest G tariff (deficit generation area)



8 Load areas

3L – lowest L tariff (deficit load area)

1L – highest L tariff (excess load area)

Appendix 5: Other regulatory charges not directly related to TSO activities

In some countries TSOs are obliged to recover costs that are not directly related to TSO's activities but result from national/local regulation. These costs are different in scope and are recovered by TSOs either through their tariffs or through separate charging mechanisms.

The table below summarizes the main features of the charges/costs not directly related to TSO activities and the charging mechanisms in force. These charges/costs are included in the comparison of the unit transmission tariffs.

Table A.5. Other regulatory charges not directly related to TSO activities

Country	Other regulatory charges not directly related to TSO activities		
	Charge level [€/MWh] or [€/MW]	**Paid by (who cover the cost L/G/DSO)**	**Description**
Austria	N/A		
Belgium	6.45 €/MWh	L	• Levy for federal contribution. However, for final customer: Cap of 250K€ (+1.1%) by consumption site and by year, degressivity by off-take tranche, only if sector agreement or covenant (Kyoto). For non-final customer (non DSO) cap of 250K€ (+0.1%) by off-take point and by year, no degressivity • Levy for financing connection of offshore wind turbine parks • Levy for financing green certificates (For final customer: Cap of 250K€, degressivity by off-take tranche, only if sector agreement or covenant (Kyoto))
Bosnia and Herzegovina	N/A		
Bulgaria	8.39 €/MWh	L	The society obligation fee The figures are valid up to 01 July 2014 As from 01 August 2013 all free charges (green energy tax, cogeneration tax, stranded costs tax) are combined in one charge – "society obligation fee" paid by customers in the free market. For tariff customers these costs are part of the electricity tariff.
Croatia	0.01 €/MWh	L	Regulator's activities: 0.01 €/MWh (percentage of revenues of the previous year)
Cyprus	N/A		
Czech Republic	18.05 €/MWh 0.28 €/MWh	L	Support of RES, CHP and secondary energy sources Charges for Market Operator + Energy Regulatory Office activities These charges are not applied by TSO as no customers are connected directly to the transmission grid. Charges are recovered through DSOs' tariffs.
Denmark	28.44 €/MWh	L via DSO	In 2014 the PSO-tariff is estimated to be 27.86 €/MWh on average. The PSO-tariff consists of: • Direct subsidies to RES - 94% • Indirect subsidies to RES - 2% • R&D into RES - 3% • Different public charges and other expenses - 1% The PSO-tariff is highly dependent on the prices due to feed-in-tariffs. The increase in estimated tariff vs. 2013 is mainly due to lower forward prices and therefore higher subsidies. Administration costs regarding the PSO are due to Danish legislation allocated to the System tariff (0.37 €/MWh). Payment to the Danish Energy Regulatory Authority and to the Danish Energy Agency to cover their administrations costs (0.20 €/MWh)
Estonia	N/A		
Finland	0.10€/MWh	L/DSO	The peak load capacity secures the supply security of electricity in situations of the Finnish power system where the planned electricity procurement is not sufficient to cover the anticipated electricity consumption. Fingrid is obligated by law to administer the peak load capacity arrangement and it is funded through a separate fee based on the utilization of the high-voltage transmission grid, and the fee is levied

			from electricity consumption. Peak load power fee for consumption is a preliminary estimate for the year 2014..
France	0.22 €/MWh	L/DSO	For the base case it is 0.22 €/MWh in 2014. In 2005, the pensions system of people working in the gas and electricity industry was globally reformed. For the transmission tariff, it implied the creation of what is called in French, CTA, Contribution Tarifaire Additionnelle (Additional Tariff Contribution). It is calculated on the fixed part of the tariff (power part of the transmission tariff). All the customers pay the "CTA" which does not cover any RTE cost. The order of 29/12/2005 set the percentage applied to the fixed part at 8.20% for the transmission activity. The order of 26/04/2013 increased this percentage to 10.14 % from 01/05/2013.
Germany	Total 0.84 €/MWh 1-3. each 0.25 €/MWh 4. 0.09 €/MWh	L	Four different charges which are not directly related to TSO activities are applied: 1. Extra charge for extra costs according to the German law "Gesetz für die Erhaltung, die Modernisierung und den Ausbau der Kraft-Wärme-Kopplung" (KWK-G), Modified Law for Combined Heat and Power Production Promotion. The level of this charge here is at least 0.25 €/MWh applied to all utilization times and voltage levels. 2. Extra charge for extra costs according § 19 para. 2 for fee exemptions and individual tariffs of the German Grid Tariff Regulation Ordinance "Stromnetzentgeltverordnung" (StromNEV), The level of this charge here is at least 0.25 €/MWh applied to all utilization times and voltage levels. 3. Extra charge related to the connection of Offshore Windfarms to the grid. Due to german legislation (§ 17 f para. 5 of the German Energy Industry Law "Energiewirtschaftsgesetz (EnWG)") TSOs shall reflect comsensation payments to Offshore Windfarm operators in the tariffs. The level of this charge here is max. 0.25 €/MWh applied to all utilization times and voltage levels. 4. Extra charge related to the Ordinance on Interruptible Load Agreements (AbLaV). In accordance with the ordinance a federal cost sharing mechanism is implemented through the surcharge for interruptible loads. The level of this charge here is 0.09 €/MWh applied to all utilization times and voltage levels.
Great Britain	0.39 €/MWh	L – split 27% generation and 73% load	The non-TSO costs comprise of the "Assistance for Areas with High Electricity Distribution Costs (AAHEDC) Scheme" and the Licence fees paid to Ofgem by the Electricity Transmission companies. The intention of the AAHEDC Scheme is to reduce the costs to consumers of the distribution of electricity in certain areas. Currently the only Specified Area is the North of Scotland. National Grid therefore recovers an Assistance Amount through the Scheme, which is passed to the Relevant Distributor in the Specified Area, Scottish Hydro Electric Power Distribution Ltd. This enables distribution charges to be reduced.
Greece	1.79 €/MWh 4.14 €/MWh 0.07 €/MWh	L L L	Costs related to the compensation of RES Units Public Service Obligations Costs related to the Regulatory Authority
Hungary	N/A		
Iceland	N/A		
Ireland	N/A		
Italy	N/A		
Latvia	N/A		
Lithuania	N/A		
Luxembourg	1.25 €/MWh	L	The tax "Fonds de compensation "(0.75 €/MWh for customers ≥ 65kW) serves to encourage and subsidize national energy production projects based on renewable sources or cogeneration. The tax "Taxe Electricité" is used to finance the "Assurance dependence" 0.50 €/MWh (consumers cat. B)* 0.10 €/MWh (consumers cat. C)** * Cat. B: consumers > 25 MWh, except belonging to cat. C ** Cat. C: consumers > 25 MWh, electricity mainly used for chemical reduction, electrolysis or in metallurgical processes.
FYROM	0.50 €/MWh	L/DSO	MEPSO is obliged to buy the total amount of energy which is produced by renewable sources, and after that all these expenses are included in

<table>
<tr><td></td><td></td><td></td><td>the transmission tariff. This part is ‘market use charge.</td></tr>
<tr><td>Netherlands</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Northern Ireland</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Norway</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Poland</td><td>1.77 €/MWh</td><td>L, DSO</td><td>Stranded costs i.e. cost resulting from compensations paid to energy producers for dissolving (early termination) long term energy sales contracts concluded in the past with a single buyer company. The long term contracts obliged energy producers to modernize their production units, adjusting them to environmental standards. Those costs are recovered by a transition charge in the Tariff. Charge rates are calculated by NRA.
TSO charges final consumers connected to transmission network and DSOs at any voltage level (then DSO charge their final consumers).</td></tr>
<tr><td>Portugal</td><td>0.34 €/MWh
1.81 €/MWh
4.15 €/MWh

0.30 €/MWh
2.17 €/MWh
0.15 €/MWh
-0.72 €/MWh</td><td>L</td><td>Hydro power station land (Ministerial Order 301A/2013)
Interruptibility (Ministerial Order 215A/2013)
Surplus costs for the remaining Power Purchase Agreements (PPAs) (Ministerial Order 215B/2013)
Incentives related with consumption efficiency (tariff code)
Islands' tariff convergence costs (Ministerial Order 13186A/2013)
Regulator costs (tariff code)
Capacity payments (Ministerial Order 251/2012)</td></tr>
<tr><td>Romania</td><td>3.94 €/MWh</td><td>L</td><td><u>Cogeneration incentivization system</u>
Government-designed support scheme under which end-users pay a specific regulatory-set fee to support the development of highly-efficient CHP generation. The end-user fees are collected by energy suppliers and passed through to qualified CHP generators via the TSO.</td></tr>
<tr><td>Serbia</td><td>0.02 €/MWh</td><td>L/DSO</td><td>This is a charge for Regulator activities.
In 2014 tax for Renewable energy is increased up to the level of 0.71 €/MWh. This tax is collected either by TSO via transmission tariff (for those transmission grid customers without Full Supply contract) or by Supplier (for those transmission grid customers with Full Supply contract). This tax is forwarded to Public Supplier eligible to purchase renewable energy. Since in 2014 all end customers on transmission grid in Serbia are having Full Supply contract, these renewable tax will not be implemented within transmission charge for transmission grid customers in 2014.</td></tr>
<tr><td>Slovak Republic</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Slovenia</td><td>2.48 €/MWh
0.13 €/MWh
0.17 €/MWh</td><td>L
L
L</td><td>Aid for Renewable Energy
Fee for Market Operator’s activities
Fee for Regulatory Agency’s active</td></tr>
<tr><td>Spain</td><td>0.13 €/MWh</td><td>L</td><td>A percentage of the access tariff invoiced to demand is explicitly dedicated to finance the following costs:
<table>
<tr><td>Cost</td><td>% of access tariff</td><td>Charge base case (€/MWh)</td></tr>
<tr><td>Permanent costs:
• NRA costs</td><td>0.15</td><td>0.01</td></tr>
<tr><td>Diversification and security of supply costs:
• Nuclear moratorium
• 2nd part of nuclear fuel cycle</td><td>
0.45
0.001</td><td>0.02</td></tr>
<tr><td>Deficit surcharge</td><td>1.96</td><td>0.10</td></tr>
</table>
[Orden IET/107/2014]</td></tr>
<tr><td>Sweden</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Switzerland</td><td>4.08 €/MWh

0.82 €/MWh</td><td>L

L</td><td>Surcharge on the transmission costs to cover the costs arising from cost-covering feed-in remuneration
Surcharge for the water conservation</td></tr>
</table>

Appendix 6: First connection charges

The connection charges types are characterized by costs that are taken into account to calculate the connection charge. For the purpose of this Overview, first connection charges are defined as:

- **Super-shallow**: All costs are socialized via the tariff, no costs are charged to the connecting entity;
- **Shallow**: grid users pay for the infrastructure connecting its installation to the transmission grid (line/cable and other necessary equipment);
- **Deep**: shallow + all other reinforcements/extensions in existing network, required in the transmission grid to enable the grid user to be connected.

In case applied charging rules do not exactly suit any of the three above definitions, but are between any of them, it is reported as e.g. Super–shallow/Shallow, Shallow/Deep etc. with the corresponding explanation.

The table below summarizes the main features of charging mechanisms in force for first connection to transmission grid.

Table A.6. First connection charges

Country	Charge Type (Super Shallow/Shallow/Deep)	Description
Austria	Super Shallow / Shallow	Super Shallow: for load; The charges for first connection are: Austria (APG) Area: • Network Level 1 - 8.70 €/kW • Network Level 2 - 9.80 €/kW
Belgium	Shallow	• Onshore: Everything is socialized, except all installations between the grid user and the substation and the connection bay at the substation. • Offshore: Idem. However, a support mechanism foresees in an additional subsidy for the cable connection up to 25 M€.
Bosnia and Herzegovina	Shallow	Charges are based on the actual costs. No differentiation of charges for L, G and DSO. No locational differentiation.
Bulgaria	Shallow	The users pay for the infrastructure connecting its installation to the transmission grid, but the reinforcement/extension of the grid is the responsibility of the transmission operator. All users have to submit application for assessment of the possibility for connection. In case of approval by the grid operator, the way of connection is stipulated in the preliminary connection contract. The user is obliged to cover all costs of the infrastructure up to the point of connection. No differentiation of charges for L, G and DSO. No locational differentiation. As from 2014 the charge type is Deep for RES generators, who join the market at freely negotiated prices, it means that these generators have to pay Shallow costs + costs for reinforcement and extension of the grid.
Croatia	Deep	G: pays for the infrastructure connecting its installation to the transmission grid and extentions in existing network. L: pays according to formula $N_{VN} = c_{VN} . P$ (capacity kW * 1,350 HRK = 176.8 €/kW or actual costs if difference between formula and real costs is more/less than 20%.
Cyprus	Shallow	If deeper network reinforcement is required it will be included in the 10-year Network Development Plan. This cost will be accounted for in the TUoS.
Czech Republic	Shallow	Connection fees are standard fees, set up by Regulatory office, differentiated for L and G: • 7.293 €/MW for energy withdrawal (load)

		• 18.232 €/MW for energy injection (generation) No locational differentiation.
Denmark	Super-Shallow to partially Shallow	In some cases charges are calculated to a fictitious point that can be closer than the physical connection point. Charges are not differentiated for L, G or DSO's and there is no locational differentiation. In most cases the costs are socialized in the tariffs – if not the charges to the grid user are based on actual costs.
Estonia	Deep	Charging based on actual costs. All the connection installations + all reinforcements elsewhere in the grid, brought about by the connection are included in the connection fee. No differentiation of charges for L, G and DSO. No locational differentiation.
Finland	Shallow	Standard fee based on average costs of connection infrastructure is applied. No differentiation of charges for L, G, DSO. No locational differentiation.
France	Shallow	• G, L, DSOs: The connection is made to the nearest substation where the appropriate voltage level is available and where this connection is technically possible. No locational differentiation, charges based on actual costs. Generators pay 100 % of the cost, consumers pay 70 % of the cost of their main connection. • RES: Network development costs due to RES integration are mutualized on a regional basis. No locational differentiation, charges based on actual costs.
Germany	Shallow to Super shallow	Charging is generally based on actual costs. Grid users pay for their own connection line and substation. General reinforcements of the grid are socialized via tariffs. No differentiation of charges for L, G or DSO.
Great Britain	Super Shallow / Shallow	This applies to both generation and load and means that connection charges relate only to the costs of assets installed solely for, and only capable of use by, an individual user. All other assets are assumed to be shared and their costs are included in the wider locational transmission tariff.
Greece	Shallow	Grid users pay for the infrastructure connecting its installation to the transmission grid. The charge includes studies, materials check, construction, supervision and delivery costs. The costs depend on distance or voltage level and they differentiate according to the installation location characteristics (e.g. ground morphology) or any other special project requirements.
Hungary	Shallow/Deep	Charging is based on actual costs. Establishing a new connection for a generator incurs a maximum 100% of investment costs charged, same for a single customer is a maximum 70% or 1 million HUF/MVA (3.368 €/MVA, exchange rate: 296.91 HUF/€), whichever larger. Multiple generators and/or customers on the new connection are charged proportionally. If the generator declares it used at least 70 % of renewable energy-source for its production per year, it pays only 70 % of the investment costs, and if this value is at least 90 %, it pays only 50 % of the investment costs. No locational differentiation.
Iceland	Shallow / Deep	Charges are based on actual costs and borne by the Producer (G).
Ireland	Semi Deep Locational Charges	Both Ireland and Northern Ireland share an integrated semi deep charging approach. All connecting parties pay for the connection to the system (using a Least Cost Chargeable methodology) and for a certain share of the deep assets on the system on a locational basis. Demand customers only pay 50% while generators pay 100% of allocated costs.
Italy	Shallow	Connection of production plants - G

		When first requesting, the connection applicants pay upfront Terna a fixed amount of 2,500 € to get a general appraisal of the possible connection solution. Once obtained the authorization, applicants pay upfront Terna an amount of 2,500 €+ 0.5 €/kW (max 50,000 €) for a more detailed project plan. Grid user bears costs for building the grid connection plant, for his own connection line. Enhancements of the NTG are socialized in tariff. Connection of consumption units – L Applicants pay Terna a connection fee equal to 50% of the expenditure for building grid connection plant including cost of the materials and labour costs as well as overheads, assumed equal to 20% of these amounts. Connection of DSO The DSO/TSO that implements the connection plant recovers the incurred costs through tariff.
Latvia	Deep	Grid users builds own connection line. All connection equipment and reinforcement are included in the connection fee. Producer (G) always has to compensate 100% from new connection charge. DSO must compensate 100% from new connection charge. For load increasing of existing connection DSO must compensate connection fee pro-rata with load increasing. Consumer (L) must compensate 100% of new connection charge and must compensate existing connection load increasing by pro-rata with load increasing, except consumers, who have special connection status issued by National Authority (Regulations on the Special Connection to the Electricity Transmission System). The Special Connection to the Electricity transmission system is allocated by Cabinet of Ministers. If the Consumer has the special connection case, then compensation costs from consumer side are: • 66% with load ≥50MW and consumption ≥100000MWh in the nearest two years; • 33% with load ≥75MW and consumption ≥150000MWh in the nearest two years; • 0% with load ≥100MW and consumption ≥200000MWh in the nearest two years. Other charges are compensated from TSO side. No locational differentiation. Charging is based only on actual costs.
Lithuania	Deep	Charging based only on actual costs. 100% of all connection costs, exception for renewable generators - 40% of all connection costs. No any other differentiation.
Luxembourg	Shallow	Grid users (L, G, and DSO) pay the actual costs for their own connection line and substation. General reinforcements of the grid are socialized in the tariffs.
FYROM	Deep	Grid users have to pay shallow costs and all another reinforcements/extensions in existing network, required in the transmission grid to enable the grid user to be connected. There is no difference between the charges among users: First connection charge is the same for all grid users.
Netherlands	Shallow	Charges are based on the actual costs. In addition a fee has to be paid in order for the connection to be maintained or replaced. The Dutch tariff system does not distinct between L, G and DSO. The actual connection charges have to be paid in order to be connected to the grid. There is no locational differentiation made.
Northern Ireland	Shallow	Load and generation over 1MW pay 100% shallow connection costs. Connection costs will be base on out turn cost or a fixed quotation.

Norway	Super-Shallow	Charges are based on the actual costs. No differentiation of charges for L, G and DSO. No locational differentiation. First connection charges are hardly ever charged by the Norwegian TSO, but TSO do have the opportunity to charge if certain conditions are met.
Poland	Shallow	The enterprise which is going to be connected pay for all the expenditures to build the connection site which contains the direct line and extension or rebuilding costs for the substation (if necessary) where connection takes place. The reinforcement and development of existing network is performed by TSO. Connection charges are: • Final customers (load) pay 25% of total investment expenditures. • RES units of installed capacity <=5MW pay 50% of total investment expenditures. • Co-generation units of installed capacity <=1MW pay 50% of investment expenditures. Other generators and distribution companies pay 100% of total investment expenditures. RES units of installed capacity <=40 kV don't pay connection charges.
Portugal	G, L: Shallow DSO: Super-shallow	The grid user, either generator (G) or consumer unit (L), has to pay for the cost of the infrastructure needed to connect its installation to the transmission grid but the internal reinforcement/expansion of the grid is endorsed to TSO's responsibility. The connection is made to the nearest substation where it is technically possible and where available capacity exists. For G, the available network capacities are defined in the NDP (National Development Plan) and in the annual document "Network Characterization", according to Decree Law nº 215A and 215B/2012 from October 8th. After built, the connection facilities (lines, cables, equipment at substations, etc.) will be integrated in TSO asset; thus TSO is in charge of their O&M costs. Concerning the DSO reinforcement needs (there is just one in Portugal) all the costs are socialized via the tariff. The charges are based on the actual costs and no locational differentiation is applied.
Romania	Shallow to Deep	Connection infrastructure: The connecting entity (generator/load) pays for the equipment that connects their installation to the transmission grid. Related upstream grid reinforcement: Costs related to upstream grid reinforcements required to safely connect new users (generators/loads) are: • Shared between the network operator and generators connecting to the grid; • Not shared by the network operator with loads connecting to the grid.
Serbia	Shallow/Deep	Shallow: Generators and distributors pay for connection lines aimed at meeting security criteria (the most frequent case is the building of 'in-out' connection toward an existing line) and for substation. Deep: Industrial customers, in addition to payment for connection lines and substations, have to pay connection fees aimed at supporting further network development. Connection fees are: 16,030 € per approved power in MW for 110kV level, and 20,360 € per approved power in MW for 220kV level. Note: Generally, in 110 kV network, grid users keep ownership over 110/x kV substations.
Slovak Republic	Partially Deep	Distribution companies pay 40% actual costs at a connection. Direct customers connected on the TSO pay 100% actual costs at a connection.
Slovenia	Shallow	L: Pays the costs of the first connection for all power consumption.

		G: Pays the costs for the first connection in accordance to the consumed power. DSO: Does not pay the costs for the first connection. There is no locational differentiation. In case of disproportionate costs the user has to pay the costs in accordance with the Energy Law.
Spain	Shallow	Promoter (generator or consumer) pays for the infrastructure necessary to be connected to the transmission grid. All reinforcements that are needed as a consequence of this new connection are included in the National Planning and thus socialized via tariffs.
Sweden	Deep	Generators or consumers connecting to the grid will pay costs related to this (lines, sub stations etc.). If reinforcement in the grid which is linked to a new connection has got a positive/beneficial impact on the existing grid it may be socialized to that extent. Every first connection is analyzed individually in order to decide whether any part of it will be socialized to any degree.
Switzerland		Charging of connection cost is not yet defined.

Appendix 7: Special tariffs

Special tariff conditions can exist in some countries e.g.:

- Special tariff conditions for low utilization (auto production or own production units behind the connection site, second connection used for emergency situations, pumping stations…);
- Special tariff conditions for high consumption (for instance over 100 GWh per year);
- Special tariff conditions for users fulfilling defined technical criteria of its production/connection site;
- Special tariff conditions for any group of users (e.g. any public utilities, army, etc).

The table below summarizes different charging rules/tariff conditions or exemptions from rules defined as "standard" and applied by TSO's for specific groups of network users.

Table A.7. Special tariffs

Country	Special Tariff Conditions
Austria	For pump storage: The grid usage charge for pumped storage plants for all areas of the network is determined as follows: • Energy: Cent 0.070 /kWh • Power: Cent 100.00 /kW
Belgium	Grid users with a local production unit (off-take and injection at the same access point) can introduce a special yearly subscription for maximum 75 MW that gives them 30% reduction on the price. This subscription will only be applied for maximum 1,000 hours a year. For the mobile charges of the railway company, the price for subscribed power is reduced with 7%.
Bosnia and Herzegovina	None
Bulgaria	None
Croatia	None
Cyprus	None
Czech Republic	No special tariff conditions. Only lower price of system services for so-called "local consumption" – electricity produced and consumed out of TSO or regional DSOs (1.63 €/MWh).
Denmark	1) For grid companies with autoproducers with net settlement, an adjusted settlement basis is applied that takes into account that the autoproducers shall not pay a grid tariff or a system tariff for the part of their consumption that they cover by their own production. 2) Customers with their own 132 kV transformers with settlement on the 132 kV side pay a reduced grid tariff. 3) A reduced PSO tariff is used for autoproducers for the part of their consumption that they cover by their own production. The reduction corresponds to the costs relating to subsidies for renewable energy and local CHP units. 4) For customers with consumption of more than 100 GWh/year per place of consumption, a reduced PSO tariff is used for the part of their consumption that exceeds 100 GWh/year per place of consumption. The reduction corresponds to the costs relating to subsidies and balancing costs relating to renewable energy.
Estonia	None
Finland	None
France	• Specific tariff for a second connection used for emergency situations. • Specific tariff for multi-locations customers .This tariff considers a unique virtual site, summing all load of the concerned sites, and calculating an annual fee proportional of the necessary length of network to connect these sites. • A DSO directly connected to the lowest voltage level of a transformer that belongs to the TSO can use the tariff of the highest voltage level of this transformer. • A DSO owning lines of the same voltage level as the lines of the TSO it is connected to benefits from a discount. • When the actual temperatures are very low compared to average temperatures, DSOs may benefit from a discount on their capacity overrun. • Occasional planned overrun of contracted capacity: during summer, a customer can benefit

	from a discount on its tariff during 2 weeks, provided it informs the TSO in advance.
Germany	• Monthly power price: For final customers with a temporary high power consumption and an obvious lower or no power consumption in the remaining time, a monthly price instead of a yearly price for the power component is offered. • Individual tariff: For final customers with a peak load occurring at a different time period than the maximal power in the grid, an individual tariff is offered. The individual tariff must not be lower than 20 % of the published regular tariff. • Grid fee reduction: For Energy intensive customers (typically heavy industry customers) with energy consumption that exceeds 7 000 full load hours per year and 10 GWh there is a fee reduction. Depending on full load hours, the grid fee has to be at least 10, 15 or 20 % of the normal grid fee. • Grid fee exemption: For pump-storage power stations a grid fee exemption is possible for 10 years if the amount of storage-energy has increased by 5% minimum. The agreement on both for individual tariffs and grid fee reduction and exemption requires the approval of the regulator.
Great Britain	• Small Generators' Discount: 0.233 €/kW discount to generation tariff and 0.324 €/MWh discount to energy charge for generators below 100MW. • The Assistance for areas with high electricity distribution costs special tariff recovers an assistance amount, which is passed to the Relevant Distributor in certain areas with high distribution costs: 0.228 €/MWh.
Greece	None
Hungary	None
Iceland	Interruptible load (curtailable transmission) If an end user that has a utilization time that exceeds 4,500 hours/year for at least a full calendar year, an energy charge of 2.40 €/MWh will be charged. If the utilization time has been below 4,500 hours/year for two calendar years in succession, an energy charge of 6.31 €/MWh will be charged. The utilization time of new end users shall be calculated at the end of the first calendar year of connection. Until then, the capacity charge shall be 6.31 €/MWh. No capacity charge is levied on curtailable transmission and a 17% discount is granted on the charge for ancillary services. Supply voltage discount A discount of 5% is granted on the capacity charge and energy charge pursuant to where electricity is delivered to distributors at a nominal voltage over 66 kV. Delivery charge discount. A discount is granted on the out-feed delivery charge if the maximum power out-feed is as follows: • In the range of 3.0 – 6.0 MW the discount is 40%. • In the range of 1.0 - 3.0 MW the discount is 70 %. DSO Delivery charge discount Distribution system operators shall pay out-feed charges for electricity produced in power plants connected to Landsnet through a distribution system, as follows: • For energy produced in power plants under 1.42 MW, no out-feed charge is paid. • For electricity produced in power plants in the size range of 1.42-3.1 MW, no out-feed charge is paid at the lower limit of the range, but the charge then increases proportionally up to 60% of the full out-feed charge at the upper limit. • For energy from power plants of 3.1 – 10 MW, 60% of the full out-feed charge is paid.
Ireland	Autoproducers pay capacity based TUoS charges on the greater of either their contracted Maximum Import Capacity or contracted Maximum Export Capacity, not both.
Italy	Energy withdrawals for generation plants' auxiliary services and for hydro pumping storage plants are exempt from transmission and distribution fees.
Latvia	None
Lithuania	Zero tariff for hydro pump storage producer (pumping mode) . Zero system services tariff for DSO grid losses.
Luxembourg	Distribution companies don't have the binominal tariff respecting their simultaneity factor related to the power peak of the grid.
FYROM	None
Netherlands	A reduced tariff is used for a spare connection with a utilization time of less than 600 hours/year. Load that supports the stability of the system can receive a volume discount.
Northern Ireland	None
Norway	Interruptible load Special tariffs are offered for interrupt load according to agreements.

	The tariffs are from 5% to 75 % of the regular L-tariff level depending on the kind of agreement. Power intensive industry Load of 15 MW+ and utilization time of 7000+ hours receive a reduced load tariff. The reduction is about 50% compared to regular load.
Poland	A final consumer is entitled to pay 10% of the quality charge if in the preceding year he fulfilled the following technical and economic conditions: • Yearly consumption was not less than 400 GWh, • Utilization of the contractual power was not less than 50%, • Overall costs related to electric energy (purchase and transportation) constitute not less than 15% of the total production costs. A final consumer is entitled to pay 27% of the transition charge (covering stranded costs) if in the preceding year he fulfilled the following technical and economic conditions: • Yearly consumption was not less than 400 GWh, • Utilization of the contractual capacity was not less than 60%, • Overall costs related to electric energy (purchase and transportation) constitute not less than 15% of the total value of their production. Storage facilities connected to transmission network are considered as generators (as a whole) and the same as other generating facilities are not charged transmission charges.
Portugal	Social tariff for vulnerable costumers (domestic consumers with a contracted power less than 4.6 kVA, who benefit from social insertion income, invalidity and old age social pension). For 2014, the discount is 0.40 €/kVA at the fixed term of the access tariffs. Storage facilities: the grid access tariffs aren't applied to the consumptions of pumped hydro storage.
Romania	Grid fee exemption for small-sized generators (no injection charge for generators with installed capacity of up to 5MW).
Serbia	For Railways power is charged by total maximum demand, not by maximum demand per substation. Pump storage HPP are not subject of transmission tariff for load they consume. Generator's ancillary supply is subject of transmission tariff but only for its active energy part.
Slovak Republic	Consumers connected directly to transmission system pay in 2014: • Tariff for system services discounted by 95% if their utilization of maximum contractual capacity in 2012 were higher than 6,800 hours (average utilization of the contractual capacity was not less than 77.63%) and perpetual deviation of the subject of settlement was lower than 0.025. • Tariffs for access to transmission system and its management: - Discounted by 30% if their maximum contractual capacity in 2014 is higher than 200 MW and their energy supplied over transmission system in 2012 was higher than 1 TWh, - Discounted by 50% if their maximum contractual capacity in 2014 is higher than 250 MW and their energy supplied over transmission system in 2012 was higher than 2 TWh, - Discounted by 70% if their maximum contractual capacity in 2014 is higher than 350 MW and their energy supplied over transmission system in 2012 was higher than 2,5 TWh.
Slovenia	None
Spain	There is a special access tariff (€) for pumped hydro electricity storage facilities. This tariff equals the normal access tariff for generation (0.5 €/MWh) multiplied by a correction factor (MWh) that takes into account both the electricity production and the energy consumed during the pumping process, as follows: AccessTariff_forPumpedHydroStorage = AccessTariff_forGenerators * [Ept+(Eb*(1-r))] Where Ept is the total energy production which is fed into the system; Eb is the energy consumed during the pumping process for exclusive use of the generation of electricity; and r is the efficiency of the storage facility, which has been established at a value of 0.7. [*Disp. Adicional Segunda, Real Decreto 1544/2011*]
Sweden	None
Switzerland	General ancillary services tariff for merchant line operators: 0.05 cents/kWh (regular tariff: 0.52 cents/kWh). Storage facilities connected to transmission network are considered as generators (as a whole) and the same as other generating facilities are not charged transmission charges

Appendix 8: Treatment of Final Customers vs Distribution System Operators

Both DSOs and final customers are seen as Load (L) from TSO's perspective.

There might be different tariffs, charges calculation procedures or settlement rules for final customers and distribution system operators. Justification for different treatment might be the load volume of a given network user, the number of connection points to the transmission grid (simultaneous off-take), the network configuration conditions and the co-operation scheme of DSOs with the TSO (often DSOs' network plays a role of sub-transmission grid).

The table below summarizes the main features of different treatment /charging mechanisms of final customers and distribution system operators per TSO.

Table A.8. Treatment Final Customers vs Distribution System Operators

Country	Different treatment between final customer and distributor	Difference with the total charge applied to the case base (%)
Austria	None	
Belgium	No tariffs for DSOs for the studied voltage levels.	
Bosnia and Herzegovina	None	
Bulgaria	None	
Croatia	TSO charges only transmission fees for eligible customers directly on TSO network. For customers that are not directly connected to TSO network transmission fee is collected by DSO and transferred to the TSO.	N/A
Cyprus	None	
Czech Republic	None	
Denmark	The TSO does not charge the costumer directly. It is the DSO that charges the costumers.	
Estonia	None	
Finland	None	
France	• A DSO directly connected to the lowest voltage level of a transformer that belongs to the TSO can use the tariff of the highest voltage level of this transformer. • A DSO owning lines of the same voltage level as the lines of the TSO it is connected to benefits from a discount. • When the actual temperatures are very low compared to average temperatures, DSOs may benefit from a discount on their capacity overrun.	N/A
Germany	None	
Great Britain	None	
Greece	Presently ADMIE does not charge final customers but load representatives. It is the load representative who charges final customers connected to the transmission network.	
Hungary	The transmission and system operation tariff is regulated by the type of costumers. Distributors pay a higher tariff to MAVIR. The TSO's income of the additional part is repaid in another sum – which is calculated with a predetermined percentage by Regulator's decision (HEO) - for the distributors. Thus: • Transmission and system operation charge for eligible costumer 4.15 €/MWh, • Transmission and system operation charge for distributor 9.83 €/MWh. Income of the positive difference of Transmission and	136.9 % on transmission and system operation tariff, on both tariff elements 75.9 % before rebate

	system operation charge for distributors is paid back for the distributors in percentage as a rebate since 2010. Calculation: [(injection /kWh/ * 567.5 c €) * (n1+n2+n3+… %)], where Σ n = 100 % Charge for ancillary services is the same for every company.	
Iceland	None	
Ireland	None	
Italy	In Italy distributors invoice to the final consumers the transmission component TRAS, differentiated according to the voltage level of the grid to take into account losses, and pay back to Terna the CTR (infrastructure component of Transmission Tariff) for withdrawal of energy from NTG. The other tariff components are invoiced by Terna directly to the dispatching users.	N/A
Latvia	None	
Lithuania	None	
Luxembourg	Distribution companies have a tariff respecting their simultaneity factor related to the power peak of the grid.	N/A
FYROM	None	
Netherlands	None	
Northern Ireland	None	
Norway	None	
Poland	There is no differentiation between final consumers and distributors but between kinds of points of delivery (PoD). There are two different rates for access to the transmission network: one called “final” PoD (where end consumption is connected) and other called “network” PoD (which are PoD of DSOs having more than two PoDs, and these PoDs are nodes of meshed distribution network 110 kV). In final PoD contractual capacity is reserved by and extra charges applied in case of exceeding, in network PoD contractual capacity is determined based on actual energy flows, no extra charges in case of exceeding.	The total charge (without stranded costs) for users connected in “final PoDs” amounts to 66% of the charge paid by DSO in “network PoDs”.
Portugal	None The TSO charges to the distribution all the energy delivered and is the distributor who charges costumers connected to the transmission network.	
Romania	None. The same transmission pricing schedule applies to both DSOs and non-DSO customers. DSOs are charged by the TSO only against the fraction of the total energy taken off the TSO grid corresponding to distribution losses. The TSO charges G and L transmission fees to grid-connected users and non-grid entities: • G fees: generators (both those connected to TSO grid and those connected to DSOs’ grids). • L fees: - Loads connected to TSO network, - DSOs (only against the fraction of the total energy taken off the TSO grid corresponding to distribution losses), - Energy sales companies (against the energy taken off the distribution grids by end-users).	
Serbia	None	
Slovak Republic	None	
Slovenia	None	
Spain	None	

Sweden	None	
Switzerland	None	

Appendix 9: Reactive Energy

In some countries, charges for reactive energy are applied.

The tariff rates may be applied to every MVArh of measured reactive energy or only under pre-defined conditions.

Two charging schemes for reactive energy exist:

- **Reactive Tariff:** A regular tariff rate is applied to each MVArh of reactive energy produced and/or consumed.
- **Penalty:** Reactive energy produced and/or consumed is charged only if some pre-defined conditions are met. Examples can be excesses of energy off-taken/fed-in during a given period or excess levels of cos φ or tg φ.

The table below summarizes main features of charging mechanisms applied by TSO's for reactive energy for users connected to transmission network.

Table A.9. Reactive Energy

<table>
<tr><th>Country</th><th>Reactive Tariff (Y/N)</th><th>Penalty (Y/N)</th><th>Quantity/Conditions of application</th></tr>
<tr><td>Austria</td><td>N</td><td>N</td><td></td></tr>
<tr><td>Belgium</td><td>N</td><td>Y</td><td>

Elia System Operator makes quarter-hourly deliveries of reactive power that exceed tg φ =0.329 per off-take point. This leads to a term for supplementary deliveries of reactive energy, according to the article 209 §4 and §5 of the Technical Code. This term is function of the time of the day and the reactive regime of the customer.
In case the off taken active energy does not exceed, on a quarterly basis, 10% of the valid subscriptions at any given point, the additional delivery of reactive energy will be defined as the excess in respect of 32.9% of the 10% of the valid subscriptions at that point.
In case the capacitive reactive power of the customer being in off-take regime doesn't exceed the following limit values, penalty for supplementary deliveries of reactive energy equals 0 €/MVArh.

<table>
<tr><th>Voltage level (kV)</th><th>Limit values capacitive reactive power (MVAr)</th></tr>
<tr><td>400- 380</td><td>9</td></tr>
<tr><td>220-150</td><td>9</td></tr>
<tr><td>132-50</td><td>2.5</td></tr>
</table>
</td></tr>
<tr><td>Bosnia and Herzegovina</td><td>Y</td><td>N</td><td>The tariff for excessive take-on of reactive power shall be paid by eligible customers connected to the transmission network. The tariff set on 5.56 €/MVArh.
Excessive take-on of reactive power shall be a positive difference between the measured reactive power and reactive power which corresponds to the power factor cos φ=0.95 inductivity, i.e. it is the reactive power exceeding 33% of active power which is taken over.</td></tr>
<tr><td>Bulgaria</td><td>Y</td><td>N</td><td>The tariff is imposed to users with connection capacity ≥ 100 kW in case they off-take electricity from the grid and distribution companies
The calculation of the quantity of reactive power consumed for which the tariff is imposed is according to formula:</td></tr>
</table>

			$Erp = Erconsumed - 0.49Eaconsumed$ Where, • Erp: Q-ty of reactive power for which the tariff is imposed. • Erconsumed: Q-ty of consumed reactive power by the user. • 0.49: coefficient, corresponding to cos φ = 0.9 • Eaconsumed: Q-ty of consumed active power by the user. The tariff for consumed reactive power is 10% from the base wholesale price of the active power. The tariff for injected reactive power is 100% of the base wholesale price of the active power.
Croatia	Y	N	Reactive energy is paid monthly according to metered consumption. Tariff for reactive energy is 0.0209 €/kVArh It is paid by L directly connected to the 110 kV transmission network. According to Tariff system tariff item for excess reactive energy, both induction and capacitive, is the same for all voltage levels, but excess reactive energy is calculated as positive difference between the actually measured reactive energy and reactive energy that corresponds to an average power factor lower than 0.95 which equals approximately 33% of reactive energy. It is charged to customers on monthly basis.
Cyprus	N	N	
Czech Republic	N	N	
Denmark	N	N	
Estonia	Y	N	Charge is based on both consumed and generated reactive energy. No limits, restrictions or differentiation etc. Not dependent on cos φ. The rate is 1.67 €/Mvarh for each unit of reactive energy.
Finland	N	Y	Agreed limits based on yearly off-take energy on use of reactive energy for each group of connection points. If the limits are exceeded, the penalties are used: • 3,000 €/MVAr for excess reactive power (monthly maximum). • 10 €/MVArh for excess reactive energy. For capacitive energy the limit is 1/4 * inductive limit. Charges are applied to all customers (G, L, DSOs). There is no locational differentiation.
France	N	Y	If reactive energy/active energy (tg φ) >0.4 for each connection point from 01/11 to 31/03 (from Mondays to Saturdays from 6h to 22h): • 1.33 c€/kVArh is invoiced for 500-350 kV customers. • 1.42 c€/kVArh is invoiced for 350-130 kV customers. • 1.59 c€/kVArh is invoiced for 130-50 kV customers (these values apply from 01/08/2013 to 31/07/2014). Customers having tariffs with time differentiation (i.e. connection voltage lower than 350 kV) have to pay only if their tg φ is higher than 0.4 during peak and winter mid-peak hours.
Germany	Y/N	Y/N	Charging schemes for reactive energy are not equally applied due to different contractual arrangements between TSOs and customers. In particular circumstances customers are charged for reactive power usage (charge up to 8.70 €/MVArh). Power Plants are reimbursed for the provision of reactive power.

Great Britain	N	N	
Greece	N	N	
Hungary	N	N	
Iceland	N	Y	Landsnet's tariff scheme assumes a minimum average power factor of cos φ 0.9 at the out-feed for distribution system operators and cos φ 0.98 for power intensive users, at each point of delivery. In the event that the average power factor of a single month falls below the limits above, the energy charge and capacity charge shall increase by 2% for each 1% that the power factor falls below the limit.
Ireland	Y	Y	Leading Lagging Charges included in Generator Performance Incentives. Reactive Power Leading 0.30 €/ MWh. Reactive Power Lagging 0.30 €/ MWh. See Other System Charges in Statement of Charges.
Italy	N	Y	A charge in €c/KVArh is applied for reactive energy (inductive) withdrawn from the transmission/distribution grids where cos φ exceeds a set threshold. Cos φ is calculated for each connection point unless there is a HV distribution connection between points; in such a case cos φ is calculated on the aggregation of connection points. In both cases charges applied are: • Reactive energy between 50% and 75% of active energy: 0.86 €c/KVArh. • Reactive energy over than 75% of active energy: 1.1 €c/KVArh. Then DSOs pay Terna for reactive energy withdrawn from the transmission grid and Terna pays DSOs for reactive energy withdrawn from the distribution grid. The difference paid/received by Terna increases/decreases the amount of the ancillary services. There is also a charge paid to DSOs by final consumers with an available capacity higher than 16.5 kW for reactive energy withdrawn from the distribution above a set cos φ threshold.
Latvia	Y	N	Reactive power tariffication between TSO and DSO not applied in Latvia. Reactive power tariff exist only for consumers, in cases where phase factor tgφ is above 0.4: reactive power tariff for consuming is 4.27 €/MVArh (if tgφ≥0.4). Tariff for reactive power generation to the transmission network is 12.81 €/MVArh.
Lithuania	Y	N	Applied to all consumers for each connection point: 0.487 €/MVArh for consumption and 0.973 €/MVArh for generation of reactive energy.
Luxembourg	N	Y	Reactive energy produced or consumed is charged if cos φ falls below 0.9.
FYROM	N	Y	Reactive energy penalties are applied for every excessive consumption of reactive energy which corresponds to power factor below cosφ=0.95.
Netherlands	N	N	Cos φ has to be between 0.8 and 1.0. Regulation does not apply to agreements between the TSO and customers/DSO about reactive energy. This subject is included in the connection contract.
Northern Ireland	N	N	
Norway	Y	N	Reactive tariffs are applied in connection points where reactive load creates a problem on the system. Both inductive and capacitive energy is charged. Tariff rate 2014 is 30 NOK (=3.58 €) /kVAr (rounded off to the nearest 20 MVAr). There is no locational differentiation and no differentiation of charges for L and G, but the nature of reactive load makes that G in practice never will be

			charged for these tariffs. Reactive load is settled as follows: After the max and the min load periods, five control hours will be selected. The settlement basis is the max reactive load during these hours.
Poland	N	Y	PSE S.A. apply penalties for excess reactive power by final consumers connected to transmission network in nodes where end consumption is connected and DSOs having only one connection point. The penalty is calculated for each MVahr of passive energy taken-off the HV and EHV network when phase factor tgφ is above 0.4 and for each MVArh of passive energy fed into the transmission network regardless the value of phase factor. The charge for excess take-off passive energy (above tgφ =0.4) is calculated according to the following formula: $$O_b = k \times C_{rk} \times \left(\sqrt{\frac{1+\mathrm{tg}^2\,\varphi}{1+\mathrm{tg}^2\,\varphi_0}} - 1 \right) \times A$$ where: k – coefficient equal 0.5, C_{rk} – unit price of active energy, tgφ – measured value of phase factor in period used for settlement of the charges for excess take-off of passive energy, $tg\varphi_o$ – value of phase factor = 0.4 determined in a Agreement between PSE S.A. and customer, A – Amount of active energy taken-off the transmission network by customer in a settlement period. The charge for passive energy fed into transmission network (capacity reactive energy) is calculated as a product of the amount of passive energy, the price of active energy C_{rk} and coefficient k=0.5.
Portugal	Y	Y	Penalty: The Inductive reactive energy supplied by the transmission network outside the off-peak hours, is charged as follows: • 7.326 €/MVArh, if 0.3<= tgφ <0.4 • 22.2 €/MVArh, if 0.4<= tgφ <0.5 • 66.6 €/MVArh, if tgφ >=0,5 Tariff: The reactive energy received by the transmission network in the off-peak hours, is charged to 16.6 €/MVArh.
Romania	Y	Y	Charges are applied to the final consumers which are directly connected to the transmission network. The reactive tariff has different values for each load zone (8 zones L). The min. value is 1.17 €c/kVArh and the max value is 1.33 €c/kVArh. If 0.65 ≤ cosφ≤ 0.92 the reactive tariffs are applied for: • Recorded capacitive energy, • Inductive energy with the difference between consumed reactive energy and the related reactive energy for cosφ=0.92. If cosφ< 0.65 the penalty applied is three times the reactive tariff for: • Recorded capacitive energy, • Inductive energy with the difference between the consumed reactive energy and the related reactive energy for cosφ=0.92.
Serbia	Y	Y	All users on transmission grid except generators, PSPP and auxiliary power for power plants are charged for reactive energy. If consumed reactive energy exceeds

<table>
<tr><td></td><td></td><td></td><td>level of cosφ=0.95 the charge for the exceeding reactive energy is double.
The base reactive energy tariff is 1.22 €/MVArh.
The reactive energy tariff for cosφ<0.95 is 2.44 €/MVArh.
These tariffs are applied both to capacitive and inductive reactive energy.</td></tr>
<tr><td>Slovak Republic</td><td>N</td><td>N</td><td></td></tr>
<tr><td>Slovenia</td><td>N</td><td>Y</td><td>The charges are applied to L and DSO. In case of cosφ<0.95 inductive.
Only inductive energy is charged.
There is no differentiation about voltage levels, time/period, and location.
The charges are applied for all connection points of given user.</td></tr>
<tr><td>Spain</td><td>Y</td><td>Y</td><td>A charge in €/MVArh is applied to the reactive energy consumption exceeding 33% of the active energy consumption. Applicable to consumers connected above 1 kV.
With few exceptions, this charge is the following for all tariff periods:
<table>
<tr><td>cos φ</td><td>€/kVArh</td></tr>
<tr><td>0.80≤cos φ<0.95</td><td>0.041554</td></tr>
<tr><td>cos φ<0.80</td><td>0.062332</td></tr>
</table>
(Orden IET/3586/2011)</td></tr>
<tr><td>Sweden</td><td>N</td><td>N</td><td></td></tr>
<tr><td>Switzerland</td><td>Y</td><td>N</td><td>Individual ancillary services tariff for reactive energy for active participants non-compliant with requirements (distribution system operators and power plants in the transmission system): 0.78 cents/kVArh
Individual ancillary services tariff for reactive energy beyond a cost-free range for passive participants (distribution system operators in the transmission system): 0.78 cents/kVArh
Remuneration rate for active participants for reactive energy supplied according to requirements (distribution system operators and power plants in the transmission system): 0.24 cents/kVArh</td></tr>
</table>

Appendix 10: Exchange rates

For countries for which currency is not €, the tariff figures in this report were converted into € by using the exchange rate dated 31 December 2013.

The table below summarizes exchange rates applied.

Table A.10. Exchange rates

Country	Exchange rate
Bosnia and Herzegovina	1BAM=0.5113€
Bulgaria	1BGN=0.5115€
Croatia	1HRK=0.1309€
Czech Republic	1CZK=0.0365€
Denmark	1DKK=0.1340€
Great Britain	1GBP=1.2003€
Hungary	1HUF=0.0034€
Iceland	1ISK=0.0063€
Latvia	1LAT=1.4229€
Lithuania	1LTL=0.2896€
FYROM	1MKD=0.0163€
Northern Ireland	1GBP=1.2003€
Norway	1NOK=0.1193€
Poland	1PLN=0.2411€
Romania	1RON=0.2230€
Serbia	1RSD=0.0087€
Sweden	1SEK=0.1119€
Switzerland	1CHF=0.8157€

Glossary of terms

Black-Start

The ability of a generating unit to go from a shutdown condition to an operating condition and start delivering power without assistance from the electric system.

CAPEX

Capital cost.

Cross-border congestion

Congestion produced in the transmission network between countries or TSO control areas.

Energy-related components

Components of charges that are allocated according to the energy consumed, off taken or injected (consumption and off taken energy can be different in case that generation is connected to the same transmission access point).

First Connection charges

Charge for the party (producer or consumer) that wants to be connected to the transmission network.

G component

Transmission tariff component applied to generation (producers).

Internal congestion

Congestion produced in transmission network within a country or TSO control area.

ITC

Inter TSO Compensation, costs or revenues for Transmission System Operators (TSOs) as a result of inducing or hosting cross-border flows of electricity.

L component

Transmission tariff component applied to load (consumers).

Locational signals

Economic signals for efficient location of generation and consumption.

Losses

In this document the term losses refers to transmission losses which are the energy losses that occur in the transmission system as a result of the system operating conditions (MW and MVAr flows, Voltage levels, system topology…). Measured losses can be different, higher or lower than the real losses due to measurement errors and even accounting mistakes.

OPEX

Operational costs.

Other Regulatory Charges

Charges resulting from provisions imposed by national law regulations, recovered or invoiced by TSOs, but not directly related to TSOs' activities. Examples of costs recovered through such charges are: stranded costs, costs of supporting renewable or cogeneration energy production, regulatory levies, costs of diversification and security of supply.

Power-related components

Components of charges that are allocated according to contracted power and/or peak power which is consumed, off taken or injected.

Primary Reserve

Power available in the generators which is reserved to respond to frequency changes and which have a very fast response time. Keeping these reserves creates costs that are charged to the users one way or another.

Public Service Obligation

Public Service Obligations (PSOs) are compulsory services that regulators apply to companies in the public interest.

The transmission system operator and grid owners are subject to a number of PSOs. Examples include:

- Supply security;
- Payment of subsidies for environmentally-friendly electricity; and
- Research and development of environmentally-friendly production technology.

Stranded costs

Stranded costs have to do with the transition from a regulated to a more competitive market.

Seasonal/Time-of-day differentiation

Tariff rate differentiation related to season of year or time-of-day or type of day (working day/holiday).

Secondary reserve

Power available in the generators which is reserved to respond to frequency changes and which have a higher time of response than primary reserves. Keeping these reserves creates costs that are charged to the users one way or another.

System balancing

This system service which involves activating secondary and tertiary reserves is used for correcting in real time, energy deviations from the values specified in contractual schedules of market participants.

System Services or Ancillary Services

Interconnected Operations Services identified as necessary to affect a transfer of electricity between purchasing and selling entities and which a provider of transmission services must include in an open access transmission tariff.

Tertiary reserve

Power available from generators which is reserved to respond to frequency changes which are manually activated. Keeping these reserves creates costs that are charged to the users one way or another.

Voltage Control and Reactive Power

The purpose of this system service is to maintain voltage in the power system within the allowed limits and to control flows of reactive power in the network. Voltage and reactive power control is carried out by producing reactive energy in power plants, by using compensation devices and by changing transformer transmission ratios.

Voltage levels

Voltage levels of the transmission networks vary across ENTSO-E members, in particular the lowest voltage level which is classified as transmission network varies largely. However, in all Member States the voltage levels of 220 kV and above are included as transmission network.