ENTSO-E Overview of transmission tariffs in Europe: Synthesis 2013

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1. Background

- Transmission tariffs are one of the key elements of the International Electricity Market. There is no single "correct solution" applicable within the European Union for recovering costs related to electric energy transmission such as costs of infrastructure, energy losses, ancillary services, system balancing and re-dispatching or costs not directly related to TSO activities. Some cost categories may not be, or be only partially, covered by TSOs' tariffs (e.g. according to market arrangements in force, only some ancillary services may be paid for, while others may be supplied by producers without remuneration, energy to cover losses may be purchased by TSO or market participants). Different methods will therefore work side-by-side. For this reason direct comparison of tariff rates will not be possible. 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 a comparative overview of 2013 transmission tariffs for 33 European countries including the components of the transmission tariffs and other regulatory charges recovered or invoiced by TSOs, but not directly related to TSOs' activities. This overview is made not to compare the individual tariff rates, but to compare calculated unit transmission tariffs expressed in €/MWh for so called "**base case"** (for definition and details for "base case" see *"Methods and hypotheses chosen for ENTSO-E overview").*
- In order to make the overview comparable as far as possible, the tariffs taken into account in the calculation of the unit transmission tariff cover all of the energy transmission charges including not only components related to TSO activities, but also other regulatory charges not directly related to transmission costs which are covered through different mechanisms in each country that has been taken into account. The comparison covers the following components:
    - Infrastructure costs (operation and capital),
    - Losses compensation costs,
    - Internal congestion costs (but no costs of auctions or market splitting),
    - Costs of supply of system services,
    - Costs of system balancing,
    - Other regulatory charges, e.g. stranded costs, costs of supporting renewable or cogeneration energy production, regulatory levies, costs of diversification and security of supply if applied…etc.

  Details on the other regulatory charges included in the comparison are provided in Appendix 5 of this Overview.

  Additional information, indicating which of the above cost items are included in the comparison and calculation of the unit transmission tariff, as well as information if these costs are included in TSO's tariff or if an estimation was provided for comparability purposes in Table 2. Costs included in the comparison of the unit transmission tariffs. Comments as well as country specific comments are added below the respective charts and tables in this overview.
- It must be noted that only one aspect of the regulation (tariff) is covered in this overview, i.e. unit transmission tariffs are presented and compared, and this ENTSO-E overview does not take into account the differences between countries in areas such as quality of service, market arrangements, main technical characteristics and environmental aspects of the networks, e.g. consumption density, generation location, that influence the level of such charges.

2. Methods and hypotheses chosen for ENTSO-E overview

- The main goal of this ENTSO-E overview is to present a comparison of the calculated unit transmission tariffs expressed in €/MWh for the so called "**base case"** (pre-defined voltage level which load and generation are connected to, power demand and utilization time).
- The unit transmission tariff is calculated taking into account the «whole» of the tariff: adding the invoices applied to the load (L) and to the generation (G) (in case (G) is charged), and assuming they produce and consume the energy they had in their programs (without individual deviations). Split of the unit transmission tariff i.e. range of G and L components paid in 2013 by producers and consumers across Europe, calculated for the "base case" are shown respectively in Chart 4 and Chart 5.
- Voltage levels:
  - Voltage levels of the transmission networks vary across Europe. In particular the lowest voltage level which is classified as a transmission network varies to a great extent (see Appendix 1: Voltage levels operated by TSO)
  - In order to make a comparison, two main presumptions 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)
    - Since in some countries transmission tariffs are applied to the HV (High Voltage) voltage range 150-50 kV or because no load is connected to EHV network, tariffs for these voltages have been compared for these countries too.
- For the comparison of unit transmission tariff, the following **base case** is taken into account:
  - 5000 h utilization time;
  - The typical load considered has a maximum power demand of 40 MW when it is connected at EHV and a maximum power demand of 10 MW when it is connected at HV;
  - For countries with tariff rates that are differentiated by location (locational signals) an average value has been taken.
- In addition to the base case, some examples are calculated in order to take into account the variation of tariffs according to:
  - The location of the generation and load (south or north of the country, same area / differentiated area);
  - The load's utilization time.
- For countries for which the applicable currency is not €, the exchange rate dated 31 December 2013 was used to calculate the unit transmission tariffs expressed in € (see Appendix 10: Exchange rates).

3. Main characteristics of the TSO tariffs in Europe

Table 1 summarizes the main tariff characteristics of the TSOs included in this overview i.e.:

- Sharing of network charges in % between G and L,
- Seasonal and locational differentiation,
- Information if costs of losses and system services are included in TSOs' tariffs and if they are charged by TSOs

Table 1. Main characteristics

	Sharing of network operator charges		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 (1)	Location		
Austria	30%	70%	no	no	Yes	Yes
Belgium	9%	91%	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
Czech Republic	0%	100%	-	-	Yes	Yes
Denmark	4%	96%	-	-	Yes	Yes
Estonia	0%	100%	X	-	Yes	Yes
Finland	15%	85%	x	-	Yes	Yes
France	2%	98%	- / xxx (5)	-	Yes	Yes
Germany	0%	100%	-	-	Yes	Yes
Great Britain	27% TNUoS Tariff (2) 50% BSUoS Tariff (3)	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	Tariff for ancillary services
Northern Ireland	25%	75%	load has 4 STOD rates	Locational G tariff	No - losses are dealt with in Market	tariff for ancillary services
Norway	34%	66%	via losses (4)	Location	Yes	Yes
Poland	0%	100%	-	-	Yes	Yes
Portugal	7%	93%	xx	-	No, included in energy price	No, included in energy price
Romania	18%	82%	-	Location (both G and L transmission tariffs vary by location; 6G zones and 8 L zones) System services non-locational	Yes (included in the transmission tariff)	Yes (tariff for ancillary services)
Serbia	0%	100%	x	-	Yes	Yes
Slovak Rep.	0%	100%	-	-	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	25%	75%	-	Loacation	Yes	Yes
Switzerland	0%	100%	-	-	by separate tariff for losses	by separate tariff for ancillary services

Remarks:

(1) 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.

(2) TNUoS: Transmission Network Use of System

(3) BSUoS: Balancing Services Use of System

(4) Marginal loss % per connection point

(5) **France:** Time differentiation was implemented on 01/08/2013 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

4. Costs included in comparison of the unit transmission tariffs

Table 2 provides information on different costs items related to energy transmission as well as other regulatory costs 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 calculation or can be included only partially, but are added for comparability purposes – they are indicated with red and blue colors - see the Legend under the table. For additional explanations see country remarks.

Table 2. Costs included in the comparison of the unit transmission tariffs

	Infrastructure				System services									
	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	Losses	Other
		Depreciation	Return on capital invested											
Austria	C	C	C/B	N	N	C/B	C/B	C/B	C	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	C/B	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
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	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	C	C	C/B	C	C	C	C	C/B	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	N	C	N
Luxembourg	C	C	C	C/B	C	C	C	C	C	C	C	C	C	C
FYROM	C	C	C	C	N	C	C	C	C	C	N	C	C/B	C
Netherlands	C	C	C	C/B	N	C/B	C/B	C/B	C/B	C	C	C/B	C	N
Northern Ireland	C	C	C	N	C	C	C	N	N	C	C	N	C	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	N	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	C	C/B	N	C	C	C	B/C	C	C	N	C	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 given cost item is included in 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 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 decreases the unit transmission tariff.
- N if the costs are not included in the unit transmission tariff.
- C or C/B or B/C marked in red color means that the cost item is not re-covered by 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 re-covered only partially covered by TSO and only part of total costs is included in the calculation of the unit transmission tariff.

Country remarks:

- **Austria**:
  - Primary Reserve: According to the Austrian legal framework every generator with a maximum capacity > 5 MW has to provide primary reserve.

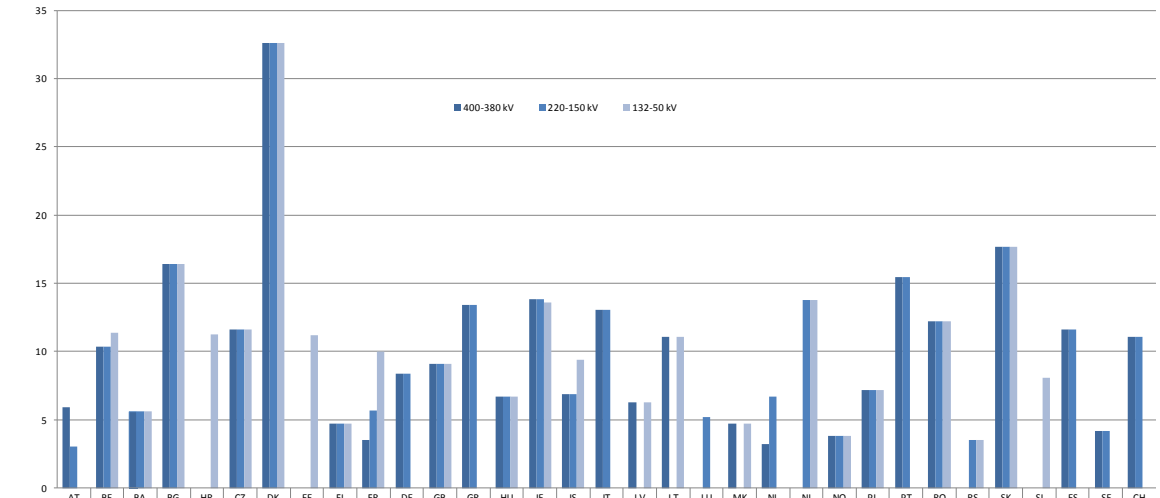
    - System Balancing and Tertiary Reserve: The difference between the two expressions "tertiary reserve" and "balancing energy" is specific to the Austrian system. The TSO has nothing to do with the settlement of the system balancing.
- **Bosnia and Herzegovina**: The synthetic price for transmission system 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.
- **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
- **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 neighboring 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 transmission tariff as they are recovered in the energy price in the market. They 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. Comparison of unit transmission tariffs: sum of generation and load fees

Chart 1 consists on a comparison of the unit transmission tariffs [in €/MWh] which is calculated on the basis of the sum of total transmission invoice charges (including other regulatory charges) of a fictitious transaction between a Generator and a Load, calculated for base case, 5000 h/year utilization time.

Chart 1. Comparison of unit transmission tariffs: sum of generation and load fees.

Euro per MWh



	AT	BE	BA	BG	HR	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
400-380 kV	5.92	10.36	5.60	16.41	-	11.59	32.61	-	4.73	3.53	8.40	9.08	13.42	6.71	13.83	6.88	13.08	6.29	11.10	-	4.73	3.20	-	3.82	7.16	15.48	12.23	-	17.66	-	11.62	4.17	11.05
220-150 kV	3.02	10.36	5.60	16.41		11.59	32.61	-	4.73	5.68	8.40	9.08	13.42	6.71	13.83	6.88	13.08	-	-	5.21	-	6.70	13.75	3.82	7.16	15.48	12.23	3.52	17.66	-	11.62	4.17	11.05
132-50 kV	-	11.37	5.60	16.41	11.23	11.59	32.61	11.20	4.73	9.98	-	9.08	-	6.71	13.57	9.39	-	6.29	11.10	-	4.73	-	13.75	3.82	7.16	-	12.23	3.52	17.66	8.07	-	-	-

Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- In this chart three voltage ranges are taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- For those countries where more than one transmission tariff is applied for the different transmission voltage levels, one different bar for each applied tariff to the corresponding voltage level is represented.
- The cost/benefits components which are taken into consideration in the calculation of the unit transmission tariff in this comparison are presented in the Table 2.
- Other regulatory charges are included – for detailed information about the charges see Appendix 5.

Country remarks:

- **Austria:** L includes the usage of the grid. G however includes secondary control - these are quite different components which should be considered separately.
- **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 existing separate companies: 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.

  Unit transmission tariff in Chart 1 include:

  - Transco tariff (cost related to the maintenance of transmission grid)
  - ISO tariff (cost related to the ISO operation)

- System service cost (this part end user pay directly to the provider of ancillary services)
- Cover of energy of losses (this part end user pay directly to the provider of ancillary services)

- **Bulgaria:** The Bulgarian TSO is not the owner of the grid and the transmission tariff is divided into two components: tariff 1 for "access to the grid" that has to be paid to ESO and tariff 2 for "transmission" that has to be paid to NEK in its capacity of Transmission Company and owner of the transmission assets. The service "Operation of the Transmission network" is performed by ESO on the basis of a service contract with NEK. The figures comprise both tariffs that are valid up to 1-7-2013. As from 01.08.2013 there was a change in the price model, relating to calculation and payment of the costs not directly related to TSO activities. For some market participants these costs are included in the electricity tariffs. For other market participants these costs are paid via extra fee named "society obligation fee". The society obligation fee is 8.39 €/MWh
- **Denmark:** As the PSO-tariff is set quarterly during the year, the non-TSO part of the tariff is estimation
- **France:** For the base case 220-150 kV is used (highest voltage level with statistically representative figures). Figures updated according to the new tariff period starting on August 1st, 2013. 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
- **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. The purchasers pay just the adjustment for losses.
- **Hungary:** The tariff reported is a weighted average of the tariffs in 2013.
- **Ireland**: Transmission losses are accounted for in the market, however, purely for comparison purposes an estimated charge has been included in these figures.
- **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).
- **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).
- **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:** Norwegian Main Grid tariffs are independent of voltage level and utilization time. Norwegian Main Grid Tariffs have the following components:
  - The energy component (Loss element): same for Production (G) and Consumption (L). Calculation energy component (NOK) =
    system price (NOK/MWh) • marginal loss rate (%) • energy consumption (L) or production (G) (MWh);

- Fixed components (cover the remaining costs within the income cap).

Production (G). Settlement basis: Average production per year (MWh)

Consumption (L) and Power-intensive industry (KII). Settlement basis: average total consumption at peak load hour at each individual connection point. Settlement basis for consumption are adjusted with a factor "k" witch are constructed so that consumption in same connection point as production become a lower tariff.

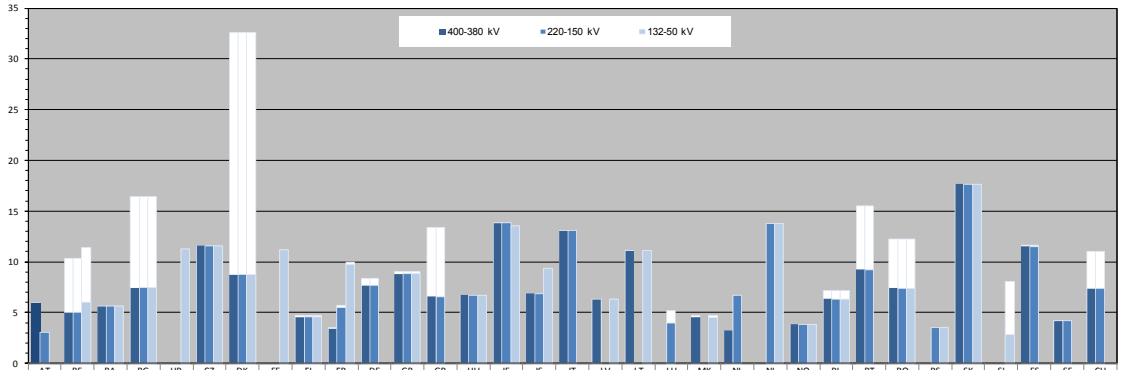
- **Portugal:** Losses costs and system-services costs are not recovered by a regulated tariff. They are recovered in the energy price and have only been included for comparison purposes. This is valid for all the following charts/tables in this Overview.
- **Spain:** According to the legislation the cost of renewable support is included in the main part of access tariffs. It must be noted that this cost is not included in the part of the access tariff dedicated to other cost (in the regulation this part is named “costs with specific allocation” see Appendix 5). System services and losses are not included in the transmission tariff as they are recovered in the energy price in the market. They have been included only for comparison purposes. This is valid for all the following charts/tables in this Overview.

6. Comparison of transmission tariffs: split between components related to TSO activities and other regulatory charges

Chart 2 illustrates the total unit transmission tariffs as presented in Chart 1, in [€/MWh], which has been split into a part related to TSO activities and a part related to other regulatory charges.

Chart 2. Comparison of transmission tariffs: split between components related to TSO activities and other regulatory charges

Euro per MWh



	AT	BE	BA	BG	HR	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
400-380 kV	5.92	10.36	5.60	16.41	-	11.59	32.61	-	4.73	3.53	8.40	9.08	13.42	6.71	13.83	6.88	13.08	6.29	11.10	-	4.73	3.20	-	3.82	7.16	15.48	12.23	-	17.66	-	11.62	4.17	11.05
220-150 kV	3.02	10.36	5.60	16.41		11.59	32.61	-	4.73	5.68	8.40	9.08	13.42	6.71	13.83	6.88	13.08	-	-	5.21	-	6.70	13.75	3.82	7.16	15.48	12.23	3.52	17.66	-	11.62	4.17	11.05
132-50 kV	-	11.37	5.60	16.41	11.23	11.59	32.61	11.20	4.73	9.98	-	9.08	-	6.71	13.57	9.39	-	6.29	11.10	-	4.73	-	13.75	3.82	7.16	-	12.23	3.52	17.66	8.07	-	-	-
400-380 kV	5.92	5.02	5.60	7.44	-	11.59	8.73	-	4.56	3.41	7.65	8.80	6.55	6.71	13.83	6.88	13.08	6.29	11.10	-	4.52	3.22	-	3.82	6.33	9.24	7.38	-	17.66	-	11.49	4.17	7.38
220-150 kV	3.02	5.02	5.60	7.44	-	11.59	8.73	-	4.56	5.47	7.65	8.80	6.55	6.71	13.83	6.88	13.08	-	-	3.96	-	6.70	13.75	3.82	6.33	9.24	7.38	3.49	17.66	-	11.49	4.17	7.38
132-50 kV	-	6.04	5.60	7.44	11.22	11.59	8.73	11.20	4.56	9.70	-	8.80	-	6.71	13.57	9.39		6.29	11.10	-	4.52	-	13.75	3.82	6.33	-	7.38	3.49	17.66	2.79	-	-	-

Costs related to TSO activities: infrastructure (capital and all operation charges), losses, system services, congestion.

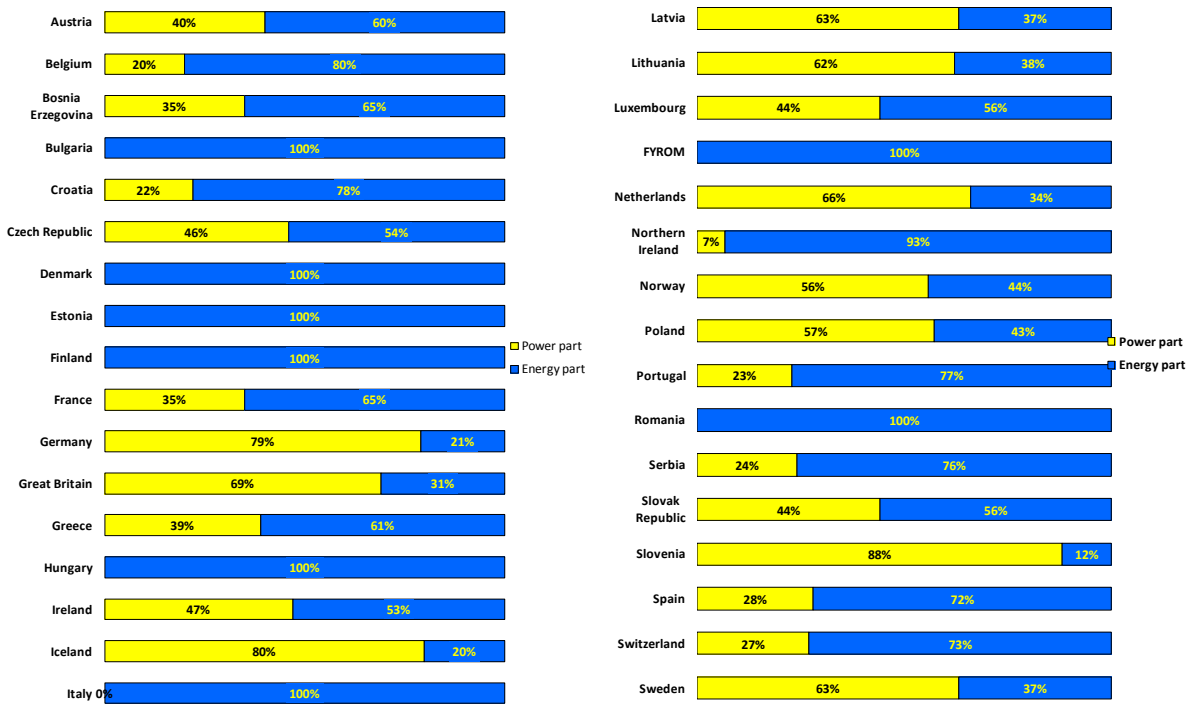
Other regulatory charges not directly related to TSO activities: stranded costs, public interest contribution, renewable energy and other. Detailed in appendix 5.

7. Energy-related components and power-related components in the transmission tariff

Main revenue drivers for transmission tariff charges are power (capacity), energy or both.
Chart 3 presents the shares of power and energy related components of the unit transmission tariffs as calculated and presented in

Chart 1. For countries for which the split provided is different, country specific remarks are included under the Chart.

Chart 3. Energy-related components and power-related components in the transmission tariff



Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.
- The values have been rounded.

Country remarks:

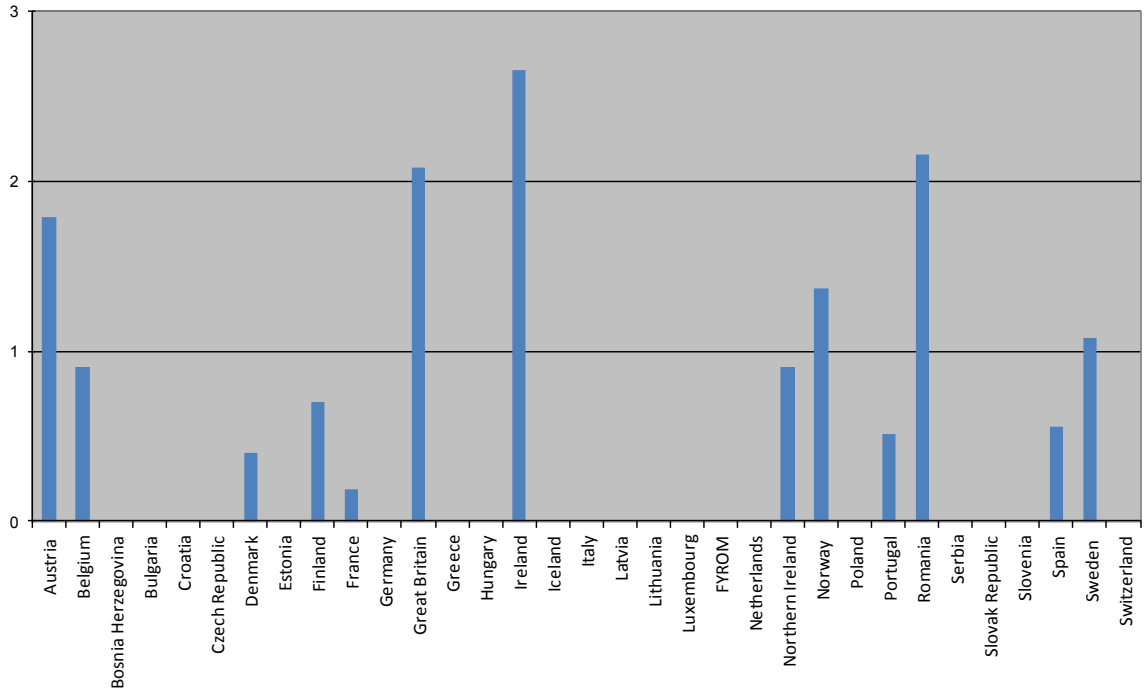
- **Belgium**: The cost of losses has been added, but is not included in the TSO-tariffs for users connected at EHV.
- **Bosnia and Herzegovina**: Ratio according to the Tariffs methodology.
- **Germany**: Weighted average, KWK-G-surcharge (CHP-combined heat and power) not included.
- **Iceland**: The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

8. Range of G components paid in 2013 by producers across Europe

The unit transmission tariff is calculated adding the charges applied to the generation (G) and load (L). Chart 4 provides the part of the unit transmission tariff that corresponds to generators.

Chart 4. Range of G components paid in 2013 by producers across Europe.

Euro per MWh



Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.

Country remarks:

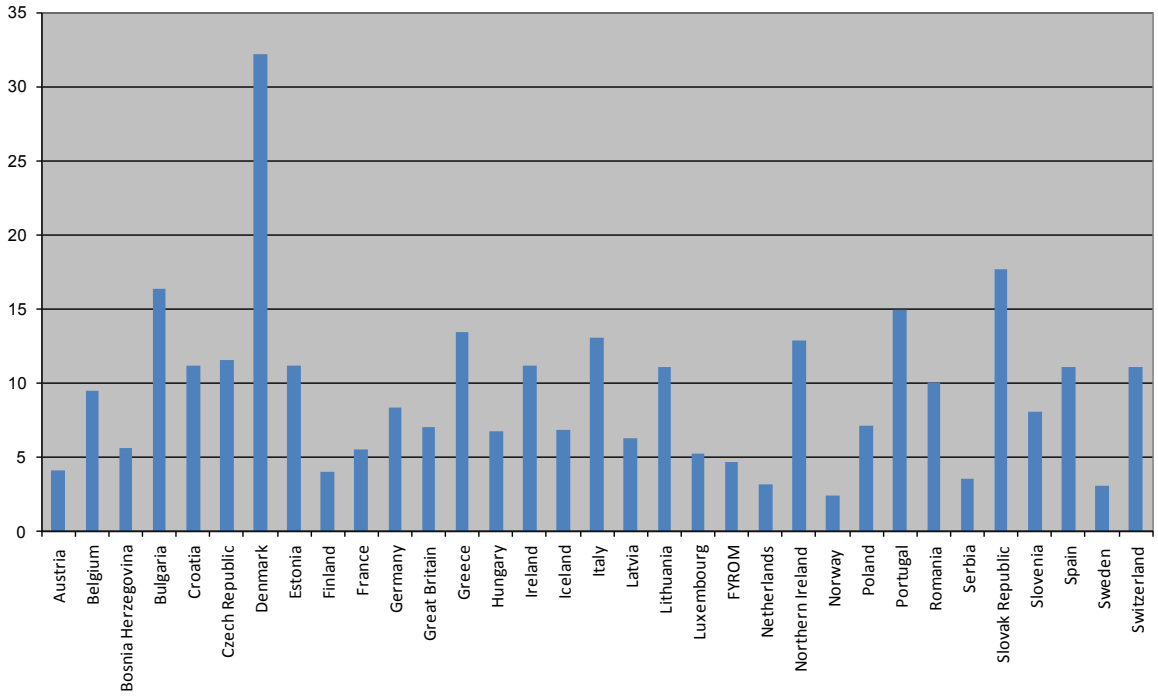
- **France:** Generation tariff is 0.19€/MWh for voltages higher than 130 kV, 0 for lower voltages.
- **Great Britain**: Generation tariffs range from 27.04 €/kW in Western Highland and Skye in Scotland to -16.37 €/kW in Central London. The average weighted TNUoS generation tariff is around 5.99 €/kW. 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.
- **Ireland:** Includes an estimate of losses.
- **Romania:** G tariff in Romania (as defined by EC Regulation 838/2010 i.e. by exclusion of grid losses and ancillary services) is not subject to the standard 0.5 Eur/MWh ceiling as set by EC Regulation 838/2010 i.e. by exemption the G ceiling for Romania was set at 2.0 Eur/MWh (whereas the chart above displays the full G charge i.e. including grid losses).
- **Spain:** There are two charges for generators:
    - The charge corresponding to the access tariff for generators established in 0.5 €/MWh.
    - Generators above 1 MW of capacity installed pay a fee which depends on their available capacity to finance system operator´s activities.

9. Range of L components paid in 2013 by load across Europe

The unit transmission tariff is calculated adding the charges applied to the generation (G) and load (L). Chart 5 provides the part of the unit transmission tariff that corresponds to the load.

Chart 5. Range of L components paid in 2013 by load across Europe

Euro per MWh



Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.
- Other charges not directly related to TSO activities are included.

Country remarks:

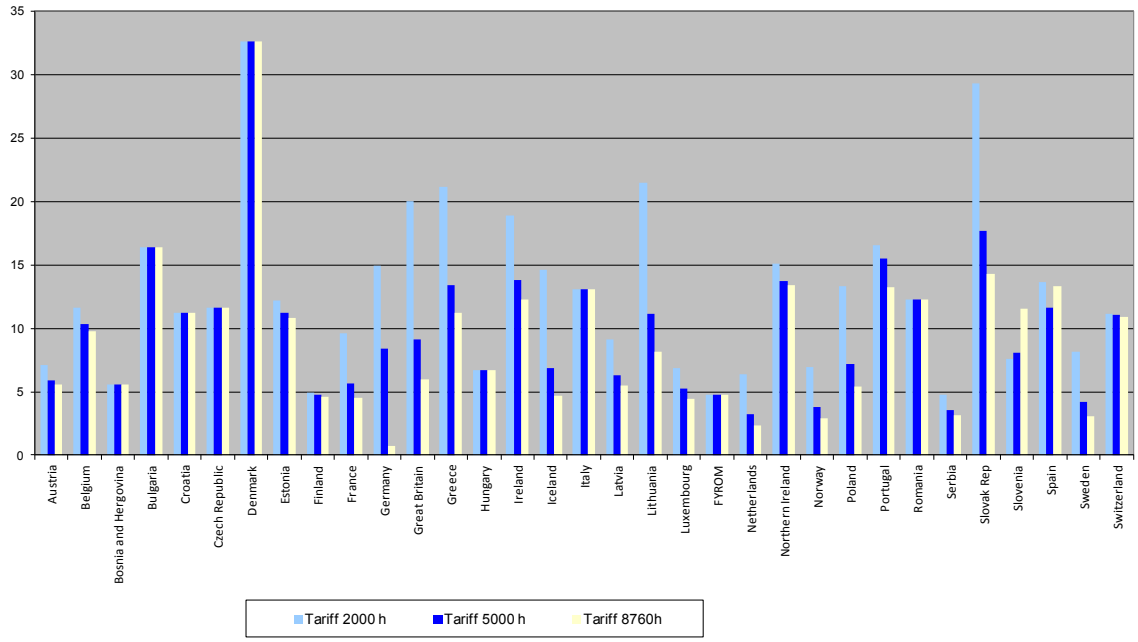
- **Great Britain**: Demand tariffs range from 12.97 €/kW in the North of Scotland to 38.03 €/kW in the Central London zone. The weighted average TNUoS demand tariff is around 31.15 €/kW. The contribution from BSUoS charges has not been included.
- **Ireland:** Includes an estimate of losses

10. Comparison of transmission tariffs G+ L: impact of utilisation time

Transmission charges paid by network users and subsequently unit transmission tariff change due to the utilization time if the applied tariffs include fixed rates in their structure for which tariff revenue driver is power (capacity). Chart 6 shows the impact of the utilization time on the unit transmission tariff.

Chart 6. Comparison of transmission tariffs G+ L: impact of utilisation time

Euro per MWh



Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5) however the effect of the utilization time is taking into account.
- For any transmission system user connected to the highest voltage level in each country.
- Other charges not directly related to TSO activities are included.
- For most TSOs a typical customer is a DSO with a seasonal load profile. Neither full annual utilization time of 8760h nor low utilization time 2000h are cases that occur in the grid. Results for these utilization times are presented for hypothetical and comparison purposes only, to illustrate how fixed components of the tariffs impact the average transmission charges.

Country Remarks:

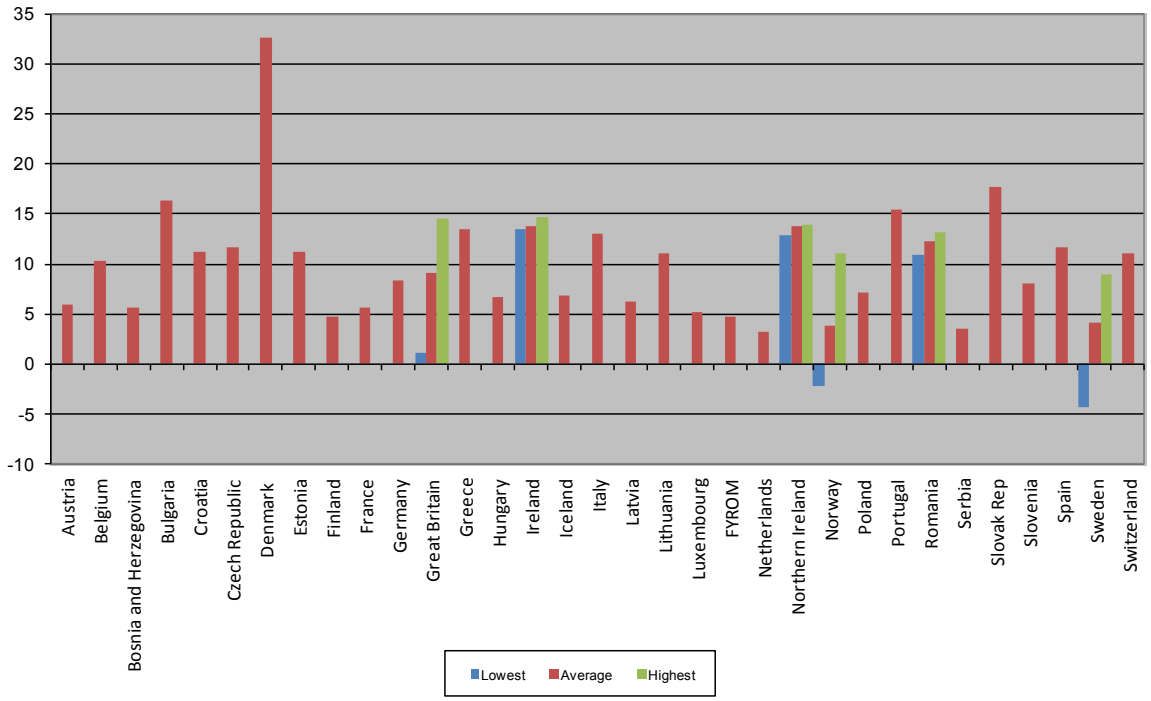
- **Estonia**: Seasonal tariff only for 110 kV.

11. Comparison of transmission tariffs G+ L: impact of location

Some TSOs apply in their tariffs rates that are differentiated by location. Chart 7 illustrates the impact of location on the unit transmission tariff.

Chart 7. Comparison of transmission tariffs G+ L: impact of location

Euro per MWh



Remarks:

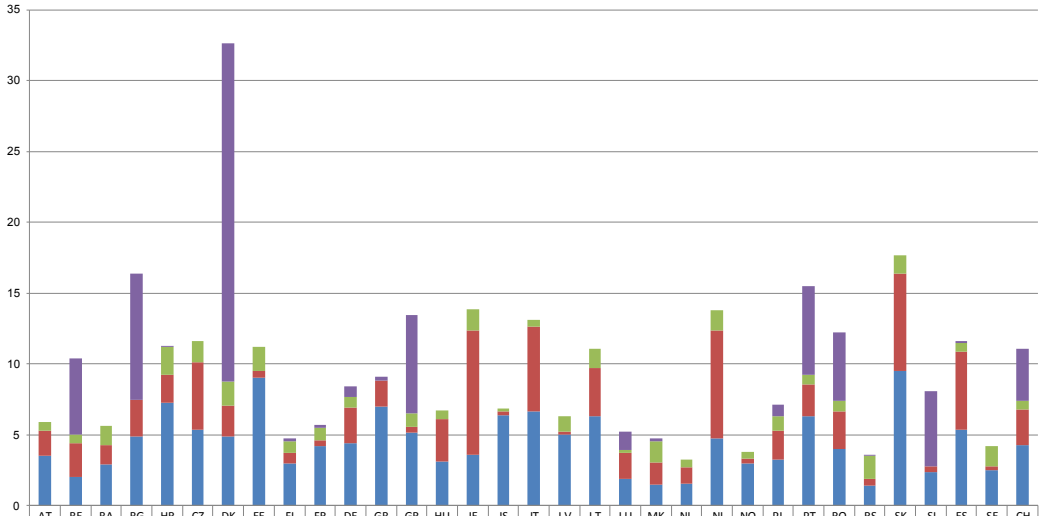
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.
- Other charges not directly related to TSO activities are included.
- For more details about locational differentiation of transmission tariffs see also Appendix 4. Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation.

12. Components of transmission tariffs

Chart 8 provides the split of the different components of the unit transmission tariff that is calculated in this report.

Chart 8. Components of transmission tariffs

Euro per MWh



	AT	BE	BA	BG	HR	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	5.33	0.00	8.97	0.01	0.00	23.88	0.00	0.17	0.21	0.75	0.28	6.88	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.21	0.00	0.00	0.00	0.82	6.24	4.85	0.02	0.00	5.28	0.14	0.00	3.67
Losses	0.61	0.60	1.32	0.00	1.99	1.45	1.66	1.70	0.86	0.86	0.75	0.00	0.99	0.62	1.45	0.26	0.44	1.07	1.38	0.24	1.49	0.53	1.39	0.49	1.05	0.69	0.75	1.58	1.26	0.00	0.60	1.37	0.57
System Services	1.79	2.37	1.40	2.53	1.96	4.82	2.18	0.50	0.72	0.45	2.49	1.81	0.40	2.99	8.78	0.23	5.96	0.19	3.44	1.82	1.56	1.11	7.60	0.32	2.02	2.23	2.67	0.49	6.87	0.42	5.53	0.32	2.53
Infrastructure	3.52	2.06	2.88	4.90	7.27	5.33	4.89	9.00	2.98	4.17	4.41	6.99	5.15	3.10	3.60	6.39	6.68	5.03	6.28	1.90	1.47	1.58	4.77	3.01	3.27	6.32	3.97	1.42	9.53	2.37	5.36	2.49	4.28

Remarks:

- The figures in the chart are estimations of the value of each final price component.
- The base case is taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- System services include system balancing if applicable.
- For any transmission system user connected to the highest voltage level in each country.
- In some countries it is not possible to split the tariff as it is done in this chart so in some cases some assumptions and estimations have been made.

Country remarks:

- **Belgium**: Tariffs for OSP 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 (cost of 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). There is no specific allocation of system services or losses cost to any specific tariff, the values here are purely indicative.
- **Great Britain**: Data for losses are not available.
- **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.
- **Netherlands**: The tariffs include an estimate of the costs for losses. Differences between realized and budget losses are settled in the tariffs (t+2).

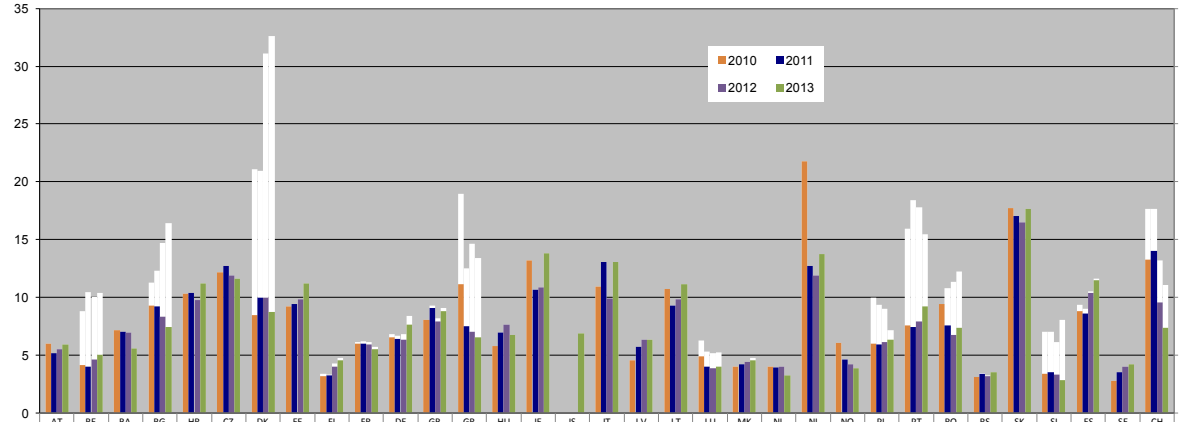
- **Ireland**: Transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.
- **Italy:** The tariff component “System Services” includes the pass-through component “Uplift” related to charge for provision of dispatching service. 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.
- **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:** System services and losses are not included in the transmission tariff as they are recovered in the energy price in the market. They have been included only for comparison purposes.

13. Transmission tariffs evolution including non TSO costs

Transmission tariffs change over years. Chart 9 shows the evolution of unit transmission tariff over 2010 – 2013 in Euros of 2013.

Chart 9. Transmission tariffs evolution including non TSO costs

Constant Euros of 2013



	AT	BE	BA	BG	HR	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
2010	5.97	8.80	7.14	11.26	10.34	12.17	21.09	9.18	3.38	6.15	6.82	8.05	18.98	5.77	13.16	-	10.90	4.51	10.73	6.25	4.01	4.00	21.78	6.02	9.94	15.92	9.43	3.09	17.70	7.04	9.35	2.77	17.63
2011	5.17	10.43	7.01	12.30	10.35	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	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	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
2010	5.97	4.14	7.14	9.26	10.33	12.17	8.43	9.18	3.18	5.97	6.55	8.05	11.09	5.77	13.16	-	10.90	4.51	10.73	4.89	4.01	4.00	21.78	6.02	6.00	7.53	9.43	3.08	17.68	3.39	8.80	2.77	13.28
2011	5.17	4.00	7.01	9.18	10.35	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	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	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	4.52	3.22	13.75	3.82	6.33	9.24	7.38	3.49	17.66	2.79	11.49	4.17	7.38

■ Costs related to TSO activities: infrastructure (capital and all operation charges), losses, system services, congestion.

□ Other regulatory charges not directly related to TSO activities: stranded costs, public interest contribution, renewable energy and other. Detailed in appendix 5.

Remarks:

- The base case is taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- Prices 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 CPI official data from the country is taken.
- For countries not in the Euro zone the exchange rate to € 31 December 2013 is used.
- For any transmission system user connected to the highest voltage level in each country.

Country remarks:

- **Bosnia:** In 2013 first time regulatory authority calculated as benefit of transmission company:
  - Benefit from Auction of cross border capacities
  - Interest from accumulated cash fund

  As result, the transmission tariff was decreased for 1.35 EUR/MWh in 2013
- **Bulgaria:** The costs related to TSO are reduced because of changing the methodology for reserve capacity payments. The charges not directly related to TSO are increased because of new RES capacities connected to the grid.
- **Croatia**: Transmission tariffs were changed (increased) in Croatia from 1 May 2012 due to cost of capital.
- **Denmark:** The tariff related to TSO activities: The decrease in TSO-tariff is mainly due to expected change in over-/undercoverage, change in costs for losses (estimated higher than in 2012), changes in CMR (estimated higher in 2012) and costs for reserves (estimated lower than in 2012).

Tariff not related to TSO-activities:

- Change is due to lower market prices in 2013 than in 2012 => Direct subsidies to RES increases mainly due to feed-in tariffs to RES
- Change is due to higher RES production – primarily due to new off-shore wind farm (Anholt) and to increase in land-based wind turbine capacity.

- **Estonia**: There are two reasons for the increase in 2013: First time purchase of energy losses from the power exchange, until 31.12.2012 at regulated price. And an increase in regulated assets.
- **Finland:** Fingrid raised grid transmission tariffs in 2013 due to a rise in market-based costs and because of the company's investment program.
- **France:** Charges corresponding to the "220-150" voltage level (highest voltage level with statistically representative data).
- **Germany:** The increase of transmission tariffs is mainly driven by investments in offshore grid connections as well as investments in the onshore grid development. Changes in the regulatory framework led to the effect that in 2013 for the first time planned cost as well as actual cost for investment projects were taken into consideration (disposal of t+2 time lag). Furthermore the costs for re-dispatch measures had a significant impact on the tariffs
- **Great Britain:** Change in 2013 mainly due to increased revenue allowances for NGET and the Scottish TOs in the Rollover price control which was in effect for the year in question (the old price control ended in March 2012 and the new regulatory framework, RIIO, only commences in April 2013 so an interim "rollover" price control was agreed). There was also a slight under-recovery the previous year (due to milder weather than was forecasted for during December and January) which required correcting this year.
- **Greece:** 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 only reason for the decrease of transmission tariff in 2013 is the increasing Net Revenues from congestion management on interconnections which is a pass-through element in the tariff.
- **Ireland:** The reasoning for charge in 2013 is an increase in the revenue requirements.
- **Italy:** Increase in 2013 is mainly due:
  - For ancillary services to the increase of costs for provision of dispatching services, demand reduction and consequent increase in the unitary cost of dispatching services.
  - For infrastructure tariff component both to the decreasing volume of energy taken into account to calculate the unitary cost and to the increase of allowed costs stemming from new transmission investment.
- **Lithuania:** Increase in 2013 due to increased costs of system services.
- **Netherlands:** The decrease in tariffs is mainly caused by settlements of previous periods (volumes losses and the purchase of energy and power).
- **Northern Ireland.** The explanation for the increase in 2013 values is as a result of a step change in required revenue recovery.
- **Portugal:**
  - Cost related to TSO activities: In 2012 the tariff's adjustments from previous year favored consumers and in 2013 the adjustment penalized the consumer; the demand for 2013 decreased by 4.5% in comparison with the demand for 2012.
  - Other regulatory charges not directly related to TSO activities: The tariff structure for voltage level has changed in 2013 and the Islands' tariff convergence costs were not charged to customers in very high voltage.
- **Poland:** Main reasons of changes unit prices between years 2012 and 2013:
  - Costs related to TSO activities: an increase of prices +0.69 €/MWh (+12.1%). The main reason of the change is increase in 2013 costs of system services, congestion management and other costs related to system security and balancing.
  - Other charges not directly related to TSO activities: a decrease in average charge -1.83 €/MWh (-68.7%). The main reason of such decrease is decreased number of producers keeping right to receive compensations and level of stranded costs

calculated for year 2013 according to the stranded costs compensation mechanism in force."

- **Romania:** The increase in total transmission invoice in 2013 vs 2012 was primarily due to increased charges in TSO-related activities (the increase in transmission and system services tariffs accounts for about 70% of the total increase)Serbia: Reason of change in comparison to 2012 is change of settlement of active power in 2013.
- **Slovenia:** Final figure is increased due to substantial increase of renewable fees up to 300 %.
- **Spain:** Increase in 2013 tariff compared to 2012 is mainly due to an increase in system services costs.
- **Switzerland:** The decrease in the overall tariff in 2013 is due to decrease in the tariff components for ancillary services and losses by 1/3.

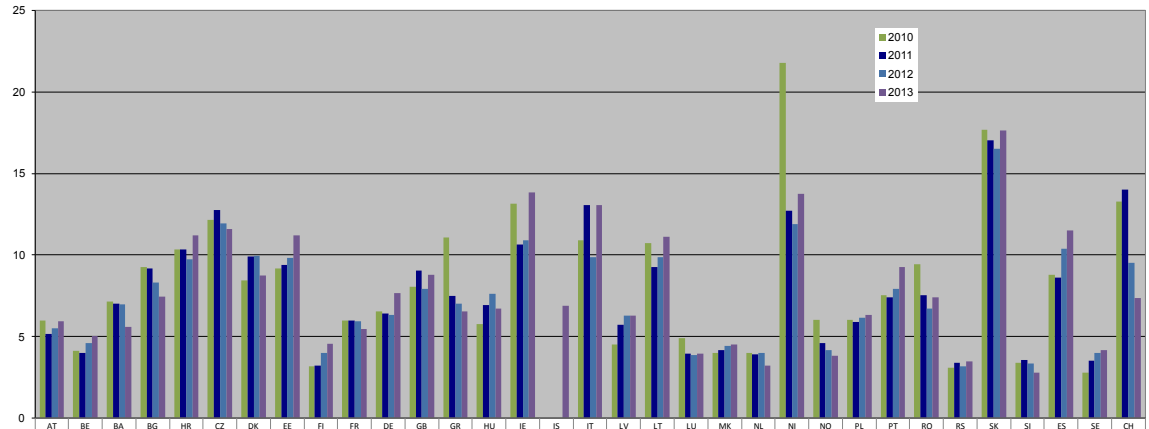
14. Transmission tariffs evolution only TSO costs

Transmission tariffs change over years. Chart 10 shows the evolution of unit transmission tariff over 2010 – 2013 in Euros of 2013.

Chart 10. Transmission tariffs evolution only TSO costs

Constant Euros of 2013

Euro per MWh



	AT	BE	BA	BG	HR	CZ	DK	EE	FI	FR	DE	GB	GR	HU	IE
2010	5.97	4.14	7.14	9.26	10.33	12.17	8.43	9.18	3.18	5.97	6.55	8.05	11.09	5.77	13.16
2011	5.17	4.00	7.01	9.18	10.35	12.74	9.93	9.40	3.21	5.99	6.39	9.05	7.50	6.91	10.65
2012	5.51	4.61	6.96	8.30	9.72	11.92	9.95	9.80	4.00	5.94	6.32	7.93	7.01	7.61	10.88
2013	5.92	5.02	5.60	7.44	11.22	11.59	8.73	11.20	4.56	5.47	7.65	8.80	6.55	6.71	13.83

	IS	IT	LV	LT	LU	MK	NL	NI	NO	PL	PT	RO	RS	SK	SI	ES	SE	CH
2010	-	10.90	4.51	10.73	4.89	4.01	4.00	21.78	6.02	6.00	7.53	9.43	3.08	17.68	3.39	8.80	2.77	13.28
2011	-	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	-	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	6.88	13.08	6.29	11.10	3.96	4.52	3.22	13.75	3.82	6.33	9.24	7.38	3.49	17.66	2.79	11.49	4.17	7.38

Remarks:

- The base case is taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- Prices 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 CPI official data from the country is taken.
- For countries not in the Euro zone the exchange rate to € 31 December 2013 is used.
- For any transmission system user connected to the highest voltage level in each country.

15. Appendixes

1. Voltage level operated by TSO
2. Comparison of network losses: sum of producer and consumer fees connected at EHV, for a utilisation time of 5,000 h
3. Comparison of system services: sum of producer and consumer fees connected at EHV, for a utilisation time of 5,000 h
4. Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation
5. Other regulatory charges not directly related to TSO activities
6. First connection charges
7. Special Tariffs
8. Treatment Final Customers *versus* Distribution System Operators
9. Reactive Energy
10. Exchange rates

Appendix 1: Voltage levels operated by TSO

Table 3. Voltage levels operated by TSO

% km	400-380 kV	220 -150 kV	132-50 kV
Austria (Verbund)	32%	48%	20%
Belgium (Elia)	14%	47%	38%
Bosnia and Herzegovina	14%	24%	62%
Bulgaria (NEK)	16% (+1% 750kV)	19%	64%
Croatia	17%	16%	67%
Czech Republic (CEPS)	68%	31%	1%
Denmark (Energinet.dk)	28%	48%	24%
Estonia (Elering)	30%	3%	67%
Finland (Fingrid)	30%	18%	52%
France (RTE)	20%	26%	53%
FYROM	28%	0%	72%
Germany	58%	42%	0%
Great Britain (NGT)	52%	27%	21%
Greece (ADMIE)	28%	72%	0%
Hungary (Mavir)	61% (+6% 750kV)	29%	4%
Ireland (EirGrid)	10%	29%	61%
Iceland (Landsnet)	0%	27%	73%
Italy (Terna)	19%	81%	0%
Latvia Augstsprieguma Tikls)	24%		76%
Lithuania (Litgrid)	25% (330 kV)	0%	75%
Luxembourg	0%	100%	0%
Netherlands (TenneT)	29%	71%	0%
Northern Ireland (SONI)	0%	38%	62%
Norway (Statnett)	73%	0%	27%
Poland (PSE Operator)	40% (+1% 750 kV)	58%	1%
Portugal (REN)	27%	73%	0%
Romania (Transelectrica)	55%	45%	0%
Serbia (EMS)	17%	21%	62%
Slovak Republic (SEPS)	67%	31%	2%
Slovenia (Eles)	19%	12%	69%
Spain (REE)	49%	45%	6%
Sweden (Svenska K.)	73%	27%	0%
Switzerland	27%	73%	0%

Remarks:

- Percentages are calculated as the ratio between the kilometers of circuits for each voltage level and the 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**: sum isn't equal to 100% as 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.

Appendix 2: Comparison of network losses

Table 4. Comparison of network losses

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

Remarks:

- The base case is taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).

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 transmission tariff as they are recovered through the energy market. They have been included only for comparison purposes.

Appendix 3: Comparison of system services

Table 4. Comparison of system services

System Services (€/MWh)	COUNTRY
Below 0.5	**Latvia**
	Iceland
	Sweden
	Norway
	Greece
	Slovenia
	France
	Serbia
	Estonia
0,5<---<1	**Finland**
1<---<3	**Netherlands**
	Bosnia and Herzegovina
	FYROM
	Austria
	Great Britain
	Luxembourg
	Croatia
	Poland
	Denmark
	Portugal
	Belgium
	Germany
	Bulgaria
	Switzerland
	Romania
	Hungary
Above 3	**Lithuania**
	Czech Republic
	Spain
	Italy
	Slovak Rep
	Northern Ireland
	Ireland

Remarks:

- The base case is taken (see Methods and hypotheses chosen for ENTSO-E overview on page 5).
- These figures cover the system services listed on table 2

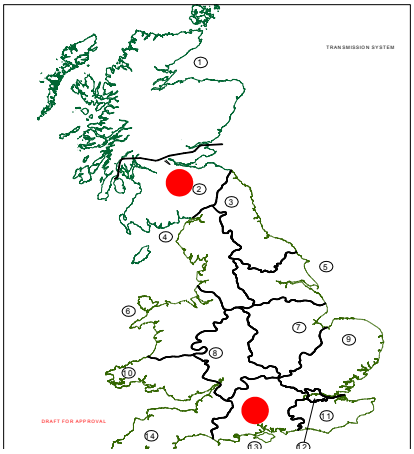
Country remarks:

- **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 transmission tariff as they are recovered through the energy market. They have been included only for comparison purposes.

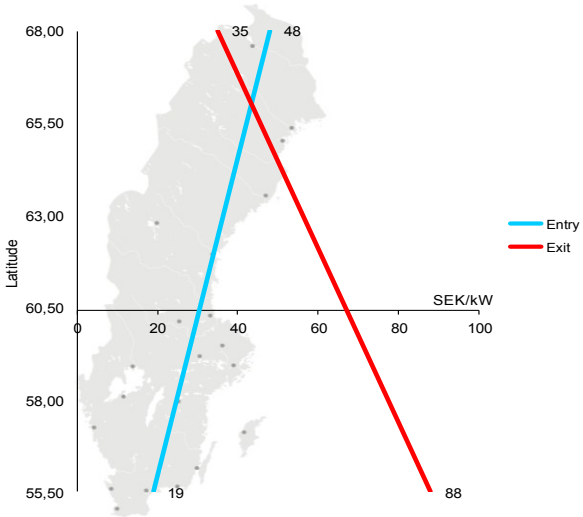
Appendix 4: Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation (i)

England and Wales



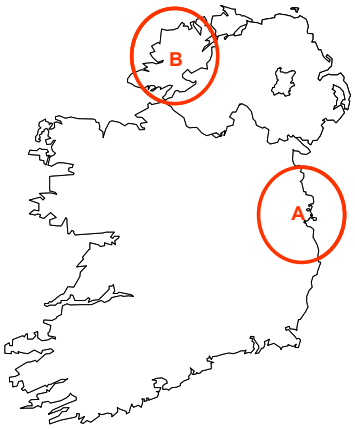
North area: Northern Scotland
South area: South of England

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



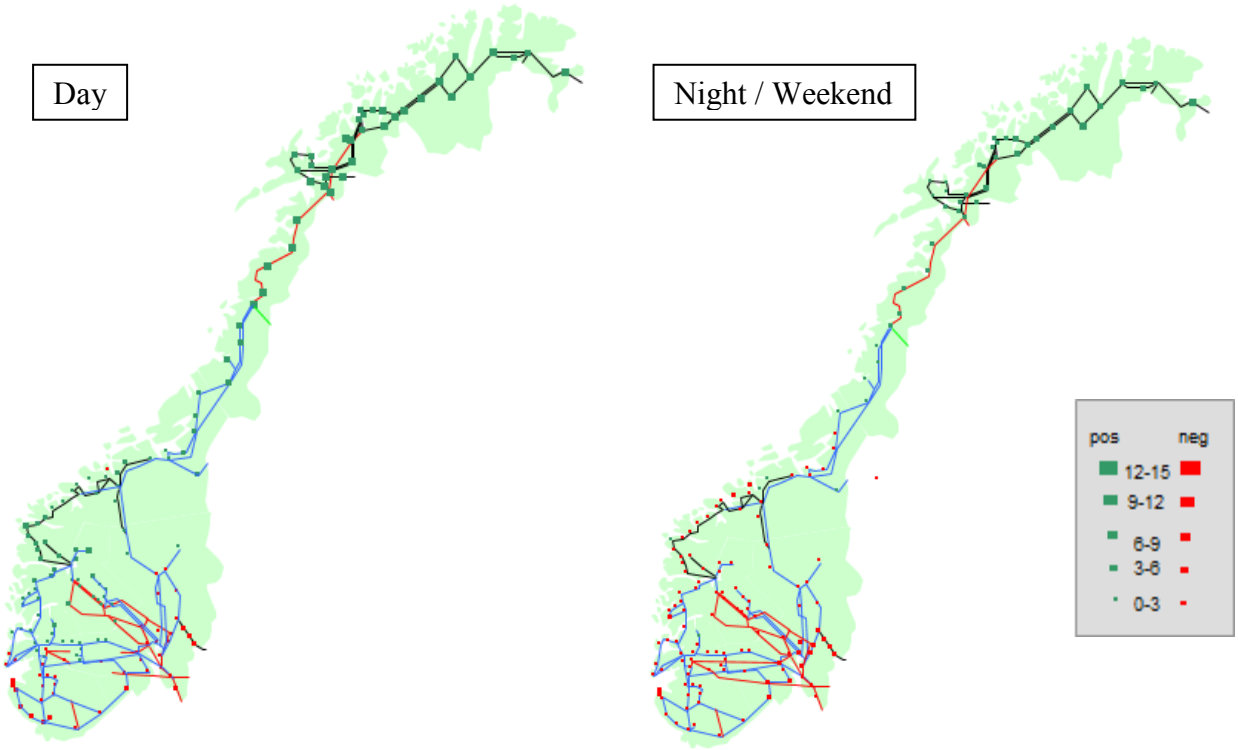
Highest case (A): G located in Dublin (surplus area)
Lowest case (B): G located in Donegal (shortage area)

Norway

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

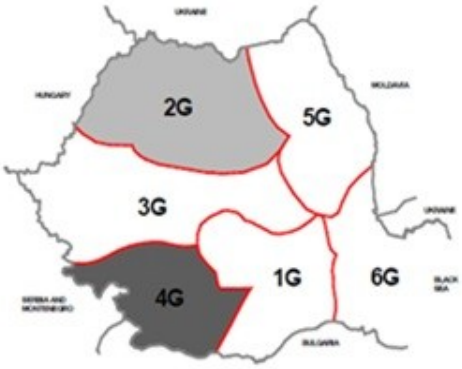
MLFs are symmetrical, i.e. MLF*input* = - MLF*output*

The MLFs below represent MLF*input*



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

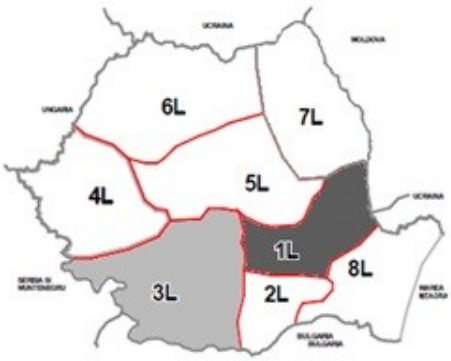
Romania



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 obligations are put on TSOs to recover costs resulting from internal law regulations. These costs are different in scope and are recovered by TSOs either through their tariffs or through separate charging mechanisms applied by TSOs.

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

Table 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	5,3309 €/MWh	L	• Levy for federal contribution • Levy for financing connection of offshore wind turbine parks • Levy for financing green certificates
Bosnia and Herzegovina	N/A		
Bulgaria	5.69 €/MWh 1.96 €/MWh 1.74 €/MWh	L, DSO L, DSO L, DSO	The charge for green energy was introduced in 2009 and covers the difference between the feed in tariffs for RES and the base price determined by the Regulator The charge for cogeneration was introduced in 2011 and covers the difference between the feed in tariffs for CHP and the base price determined by the Regulator The charge for stranded cost was introduced in 2012 and covers the difference between the prices in Long Term Purchase Agreements and the base price determined by the Regulator Total charges not directly related to TSO activities: 9.39 €/ MWh The figures are valid up to 01 August 2013 After 01 August 2013, the charges not directly related to TSO activities are paid by a different methodology All free charges are combined in one charge – "society obligation fee" paid by customers in the free market. This fee is 8.39 €/MWh For tariff customers this fee is part of the electricity tariff. The yearly average is 8.97 €/MWh
Croatia	0,0066 €/MWh	L	Regulator's activities: 0,0066 €/MWh (percentage of revenues of the previous year)
Czech Republic	21,25 €/MWh 0,27 €/MWh	L	Support of Renewable energy sources and Combined generation of electricity and heating Charges for Market Operator + Energy Regulatory Office activities
Denmark	23,34 €/MWh 0,33 €/MWh 0.21 €/MWh	L via DSO	The PSO (Public Service Obligation) tariff was 23,34 €/MWh on average: • Direct subsidies to producers of environmentally friendly energy (92%). • Indirect subsidies (3%) • Research & development into environmentally friendly energy (3%). • Different public charges and other expenses (2%) Administration costs regarding the PSO are due to Danish legislation allocated to the System tariff (0.33 €/MWh). Payment to the Danish Energy Regulatory Authority and to the Danish Energy Agency to cover their administrations costs (0.21 €/MWh)
Estonia	N/A		
Finland	0.17 €/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 an average value charged in 2013.
France	0,21 €/MWh	L/DSO	For the base case it is 0.21 €/MWh in 2013. 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 0,75 €/MWh (each 0,25 € /MWh)	L	Three 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 Wind farms to the grid. Due to german legislation (§ 17 f para. 5 of the German Energy Industry Law "Energiewirtschaftsgesetz (EnWG)") TSOs shall reflect compensation payments to Offshore Wind farm operators in the tariffs. The level of this charge here is max. 0.25 €/MWh applied to all utilization times and voltage levels.
Great Britain	0,282 €/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	2.67€/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	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	0,209 €/MWh	L	Market use charge
Netherlands	N/A		
Northern Ireland	N/A		
Norway	N/A		
Poland	0,82 €/MWh	L, DSO	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). Amounts received are sent to a separate company that makes settlement directly with the producers.
Portugal	0,54 €/MWh 1,61 €/MWh 4,49 €/MWh 0,29 €/MWh 0,22 €/MWh -0,92 €/MWh	L	Hydro power station land (Ministerial order 542/2010) Interrumptibility (Ministerial order 1309/2010) Surplus costs for the remaining Power Purchase Agreements (PPAs) (Decree law 172/2006) Incentives related with consumption efficiency (tariff code) Regulator costs (tariff code) Capacity payments (Ministerial order 251/2012)
Romania	4,766 €/MWh 0,083 €MWh	L L	<u>Cogeneration incentivization scheme</u> End-users pay a contribution to qualified highly-efficient CHP generators. The contribution flows upstream via energy supplier and further via TSO to reach the qualified CHP generators. The TSO is positioned at the center of the cash flow stream having the role to secure an uninterrupted cash flow to CHP generators (the TSO is the administrator of the scheme). <u>Market operator fee</u> The fee is collected by the TSO and passed-through to the operator of the wholesale power market.
Serbia	0,0229 €/MWh	L/DSO	This is a charge for Regulator activities. In 2013 new tax for Renewable energy was put into force with level of 0,384 €/MWh. This tax is to be collected by TSO via transmission tariff for those end customers without full-supply contract and forwarded to Public Supplier eligible to purchase renewable energy. For those end customers with full-supply contract their supplier is eligible to collect this tax and forward it to Public Supplier. Since in 2013 all end customers in Serbia are having full supply contract, these renewable tax in 2013 will not be implemented on end customer transmission charge.
Slovak Republic	N/A		
Slovenia	4,9817 €/MWh 0,13 €/MWh 0,17 €/MWh	L L L	Aid for Renewable Energy Fee for Market Operator's activities Fee for Regulatory Agency's active
Spain	0,14€/MWh	L	It must be noted that according to the legislation the cost of renewable support is included in the main part of access tariffs and not in the part of the access tariff dedicated to other costs which is named "costs with specific allocation". These costs are established as a % of the access tariff for demand and are classified into three groups as follows: Cost / % of access tariff / Charge base case (€/MWh) Permanent costs • NRA costs / 0.15 / 0.01 Diversification and security of supply cost • Nuclear moratorium • 2nd part of nuclear fuel cycle / 0.536 0.001 / 0.03 Deficit surcharge / 2.101 / 0.10 [2013 weighted average values from *Orden IET/221/2013* and *Orden IET/1491/2013*]
Sweden	N/A		
Switzerland	2,86 €/MWh 0,82 €/MWh	L L	Surcharge on the transmission costs to cover the costs arising from cost-covering feed-in remuneration Surcharge for the protection of waters (water-conservation).

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 charged to 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 doesn't 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 respective explanation.

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

Table 6. First connection charges

Country	Charge Type (Super Shallow/Shallow/Deep)	Description
Austria	Super Shallow / Shallow	Super Shallow: for pump storage, and DSO; Shallow: for Generators (except pump storage generators) The charges for first connection are: Austria (APG) Area: - Network Level 1 - 8,70 EUR/kW - Network Level 2 - 9,80 EUR/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 extensions in existing network L – pays according to formula NVN = cVN . P (capacity kW * 1.350,00 HRK = 178,9 EUR/kW or actual costs if difference between formula and real costs is more/less than 20%.
Czech Republic	Shallow	Connection charges are not related to the real costs of the particular investment and also not based on actual tariffs. It is a standard fee, set up by Regulatory office, not changed in the last 8 years. Connection fees: • 7 293 €/MW for energy withdrawal (load) • 18 232 €/MW for energy injection (generation) No locational differentiation.
Denmark	Shallow to partially Shallow	In most cases the actual connection costs are socialized in the tariffs – if not the charges to the grid user are based on actual costs. 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.
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	G, L, DSOs: Shallow. RES : regional mutualisation	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	The categorization of Super Shallow / Shallow 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. These connection charges apply predominately for connecting distribution networks to the transmission grid but also apply to directly connected generation and demand and to interconnector connections. Charging is based on a methodology document developed by NGET which sets out the principles of how charges are applied and includes formulas, worked examples. It also contains some standard charges for specific assets and services. Unlike the wider Use of System charge there is no locational element to Connection charges and there is no explicit differentiation between different types of user (e.g. generation and load or distribution network).
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 EUR/MVA, exchange rate: 296,91 HUF/EUR), 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	Shallow to Partially Deep	The connection charge is based on the Least Cost Chargeable shallow connection method. However the Least Cost Chargeable shallow connection method depends on the availability of appropriate transmission infrastructure in the area e.g. voltage level etc. Charges can also include station common costs or station extension costs (if higher). Generators pay G-Tariffs which are locational in nature and are calculated on an all-island cross border basis. Demand customers pay only 50% of the charge, generators 100%.
Italy	Shallow	<u>Connection of production plants - G</u> 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 labor 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. Charging is based only on actual costs. 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.
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, 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	Connection charges based on actual costs have to be paid in order to be connected to the grid. The Dutch tariff system does not distinct between L, G and DSO – no differentiation. There is no locational differentiation of connection charges.
Northern Ireland	Shallow	Connectees pay actual cost of connection assets
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. No locational differentiation.
Portugal	G, L: Shallow DSO: Super-shallow	The grid user, either generator (G) or consumption 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	<u>Connection equipment:</u> The connecting entity pays for the equipment that connects their installation to the transmission grid. <u>Related upstream grid reinforcement:</u> Although the legal framework sets out the possibility of TSO and connecting entity sharing the cost of upstream grid enhancement caused by the respective connection, additional regulations defining clear detailed rules on cost sharing still need to be drafted by the NRA.
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: 16030 € per approved power in MW for 110kV level, and 20360 € 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	Costs for connection are set forth at 32,97€/kW. 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. The connection facilities can be developed and paid by the promoter. If the promoter wants the TSO to develop the connection facility, a contract is arranged between the TSO and the promoter where the cost of the connection is included. There are not standard connection fees. No differentiation for L, G, DSO. No locational differentiation
Sweden	Deep	First connection charging based on actual costs. Generators or consumers connecting to the grid pay costs related to this (lines, sub stations etc.). If a 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. Connection charges are set the same way for L and G - equal treatment. DSO treated as L in general - no special treatment. No locational differentiation.

Switzerland		The cornerstones for the first connection charges for consumers and power plants have to be clarified by the NRA.

Appendix 7: Special tariffs

Special tariffs 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

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

Table 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: Load: Cent 0,080 /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
Czech Republic	Only lower price of system services for producers local technological consumption (1,81 €/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. The agreement on both for individual tariffs and grid fee exemption requires the approval of the regulator.

Great Britain	- Small Generators' Discount: €0.200/kW discount to generation tariff and €0.280/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: €0.215/MWh
Greece	None
Hungary	None
Iceland	Interruptible load (curtailable transmission) Customers with curtailable transmission pay the same energy charge as DSOs but no capacity charge is levied 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: 1. For energy produced in power plants under 1,42 MW, no out-feed charge is paid. 2. 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. 3. 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; 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 connections with a utilization time of less than 600 hours/year
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. The special tariff is based on the so called k-factor model described in the Excel sheet.
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 2013, the discount is 0.31€/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	Small-sized generators with installed capacity of up to 10MW are not charged transmission fee (the G component of the transmission tariff doesn't apply to such generation units).
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 network pay in 2013 tariff for system services discounted by 95% if their utilization of maximum contractual capacity in 2011 were higher than 6800 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.
Slovenia	Special tariffs for Public Lighting and alarming systems.
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: Total energy production which is fed into the system. Eb: Energy consumed during the pumping process for exclusive use of the generation of electricity. r: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: 0.02 cents/kWh (regular: 0.25 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 Final Customers vs Distribution System Operators

Both DSOs and final customers are seen from 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 size of a load of a given network user, number of connection points to the transmission grid (simultaneous off take), network configuration conditions and co-operation of distribution network with transmission network (often DSOs' network plays a role of sub transmission grid).

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

Table 8. Treatment Final Customers vs Distribution System Operators

Country	Different treatment between final customer and distributor	Difference with the total charge applied to the base case (%)
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
Czech Republic	None	
Denmark	None	
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: 3.72 €/MWh -transmission and system operation charge for distributor: 9.44 €/MWh. Income of the positive difference of Transmission and system operation charge for distributors is paid back for the distributors in percentage as a rebate since 2010.Calculation: [(injection /kWh/ * 572.0 c €) * (n1+n2+n3+… %)], where Σ n = 100 % Charge for ancillary services is the same for every company	153.8 % on transmission and system operation tariff, on both tariff elements 85.2 % before rebate
Iceland	None	
Ireland	Customers are categorized according to whether they connect to the Distribution or Transmission systems. Distribution connected customers are further categorized by load size greater than 0.5Mva treated differently. Autoproducers and some others are treated separately. Demand tariffs are recover through suppliers.	
Italy	In Italy distributors invoice to the final consumers the transmission component TRAS, differentiated according to	N/A

	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.	
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 65% of the charge paid by DSO in "network PoDs".
Portugal	None REN as TSO does not charge any final client. REN only charges DSO, who then charges the clients, even those directly 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, TSO apply charges for reactive energy.
The tariff rates may be applied to every Mvarh of measured reactive energy or charging is applied only in pre-defined conditions.

Two charging schemes for reactive energy exist:

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

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

Table 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 j=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>N</td><td>Y</td><td>The tariff for excessive take-on of reactive power is paid by eligible customers connected to the transmission network. The tariff set on 5.56 EUR/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.
No charges are applied to capacitive reactive energy.</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:
$Erp = Erconsumed - 0.49 Eaconsumed$

Where,
Erp – Q-ty of reactive power for which the tariff is imposed
$Erconsumed$ - Q-ty of consumed reactive</td></tr>
</table>

			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 0,0212 EUR/kvarh It is paid by L directly connected to the 110 kV transmission network. According to TSO's 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. Furthermore, a price stamp method is applied. There is no location differentiation. For customers with dual-tariff meters, tariff items depend on the hour: summer/winter (higher daily rates between 7 am an 9 pm in winter, and between 8 am and 10 pm in summer; lower night rates between 9 pm and 7 am – winter, and 10 pm and 8 am in summer)
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 1,78EUR/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: * 3000 €/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. http://www.fingrid.fi/en/customers/Customer%20attachments/Grid%20service/appendix_4.pdf
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): - Under tariff conditions valid until 31/07/2013: * 1.3 c€/kvarh is invoiced for 400-380 kV customers * 1.39 c€/kvarh is invoiced for 220-150 kV customers * 1.55 c€/kvarh is invoiced for 132-50 kV customers - Under tariff conditions valid from 01/08/2013: * 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 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	N	N	
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	There is no reactive power tariffication between TSO and DSO. Reactive power tariff exists 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
Luxembourg	N	N	
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 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 MVahr 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, Crk – 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, tgφo – 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 Crk 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: 6,963 €/MVArh, if 0,3<= tgφ <0,4 21,1 €/MVArh, if 0,4<= tgφ <0,5 63,3 €/MVArh, if tgφ >=0,5 Tariff: The reactive energy received by the transmission network in the off-peak hours, is charged to 15,8 €/MVArh
Romania	Y	N	The difference of the quantity between cosφ=0.92 and cosφ=0.65
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 level of cosφ=0.95 the charge for the exceeding reactive energy is double. The base reactive energy tariff is 1,22EUR/MVArh The reactive energy tariff for cosφ<0.95 is 2,44EUR/MVArh These tariffs are applied both to capacitive and inductive reactive energy.
Slovak Republic	N	N	
Slovenia	N	Y	If Cos fi < 0,95 a penalty is charged in amount of 6,26 €/Mvarh The charges are applied to L and DSO. In case of cos φ<0,95 inductive. Only inductive energy is charged. There is no differentiation about voltage levels, time/period, location. The charges are applied for all connection points of given user.
Spain	Y	Y	A charge in €/MVArh is applied to the reactive energy consumption exceeding the 33% of active energy consumption. Applicable to consumers connected above 1 kV. With few exceptions, this charge is the following for all tariff periods: cos φ | €/kVArh 0.80≤cos φ<0.95 | 0.041554

			cos φ<0.80 | 0.062332 [*Orden IET/3586/2011*] Charges are applied both for inductive and capacitive reactive energy.
Sweden	N	N	
Switzerland	Y	N	Individual ancillary services tariff for reactive energy for active participants non-compliant with requirements (distribution system operators and power plants in the transmission system): 0.76 cents/kvarh Individual ancillary services tariff for reactive energy for passive participants (distribution system operators in the transmission system): 0.76 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

Appendix 10: Exchange rates

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

The table below summarizes exchange rates applied.

Table 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	1ROL=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 the 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 the Member States, 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.