



ETSO Overview of transmission tariffs in Europe: Synthesis 2008

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***Disclaimer:** Concerning Greece, it is underlined that all data available refer to the year 2008. In the year 2009, the legal framework introduced some alterations of the main characteristics of the transmission tariffs. These changes will be presented in the report of the year 2009.*

Table of contents

Background	4
Methods and hypotheses chosen for ETSO overview	5
Main characteristics of the TSO tariffs in Europe	6
Comparison of transmission tariffs: sum of generation and load fees	7
Costs included in the comparison transmission tariffs	9
Comparison of transmission tariffs: split between components related to TSO activities and other regulatory charges	11
Energy-related components and power-related components in the transmission tariff	12
Range of G components paid in 2007 by producers across Europe	13
Range of L components paid in 2007 by load across Europe	14
Comparison of transmission tariffs G+ L: impact of utilisation time	15
Comparison of transmission tariffs G+ L: impact of location	16
Components of transmission tariffs	17
Transmission tariffs evolution only TSO costs	18
Transmission tariffs evolution including non TSO costs	19
Appendices	20
Appendix 1: Voltage level operated by TSO	21
Appendix 2: Comparison of network losses	22
Appendix 3: Comparison of system services	23
Appendix 4: Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation (i)	24
Appendix 5: Other regulatory charges not directly related to TSO activities	26
Appendix 6: First connection charges	28
Appendix 7: Special tariffs	29
Appendix 8: Reactive Energy	30
Glossary of terms	33

Background

- ❑ Transmission tariff is one of the key points for the International Electricity Market. There is no single “right solution”, except for recovering costs. Different methods will have to work side-by-side for the time being. Experience will then determine the possible degree of harmonization of the underlining principles for setting transmission charges to be achieved in the future.
- ❑ This report contains the comparative overview of 2008 transmission tariffs for 25 European countries as a contribution to understand the components in the transmission tariffs and other regulatory charges.
- ❑ In order to be comparable, as far as possible, the tariffs taken into account cover all of the energy transmission charges, meaning that it includes not only components connected to TSO activities but also other regulatory charges not directly related to transmission costs which are covered through different mechanism in each country. The components taken into account are:
 - infrastructure charges (operation and capital),
 - loss compensation costs,
 - internal congestion costs (but no costs of auctions or market splitting),
 - costs of supply of system services,
 - costs of system balancing,
 - stranded costs, incentives for renewable,... if any.
- ❑ It must be noted that only one aspect of the regulation (tariff) is covered and the ETSO overview does not take into account the different situations as far as quality of service, main technical characteristics and environment of the networks are concerned (consumption density, generation location,..).

Methods and hypotheses chosen for ETSO overview

- ❑ Taking into account the «whole» of the tariff: adding, if necessary, both the invoices applied to the load (L) and to the generation (G), assuming they produce and consume the energy they had in their programs (without individual deviations).
- ❑ Voltage levels :
 - voltage levels of the transmission networks vary across Europe, in particular the lowest voltage level which is classified as transmission network varies largely (see Appendix 1: Voltage level operated by TSO)
 - to deal with this circumstance, two main situations are taken:
 - the producer and consumer are both connected to the EHV (Extra High Voltage) network (400 kV- 220 kV)
 - because 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 transmission tariffs, the following **base case** is taken into account:
 - 5000 h utilization time that includes day hours of working days
 - the typical load considered is eligible and 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 location 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 prices according to:
 - the location of the generation and load (south or north of the country, same area / differentiated area)
 - the load's utilization time (the load is considered to first consume during day hours)

Main characteristics of the TSO tariffs in Europe

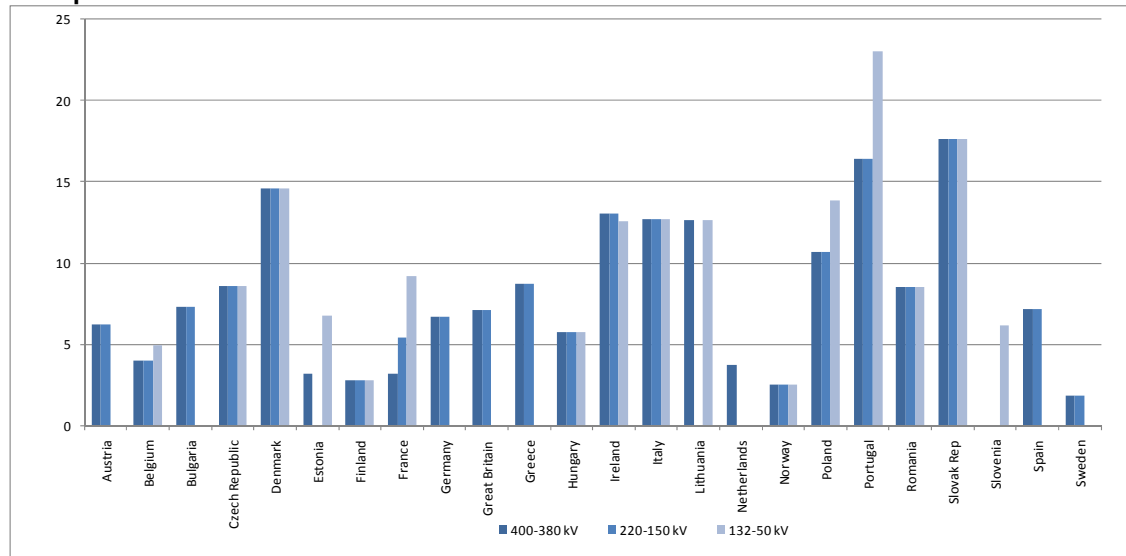
	Sharing of network operator charges		Price signal		Are losses included in the tariffs charged by TSO?	Are system services included in the tariffs charged by TSO?
	Generation	Load	Seasonal / time-of-day (1)	Location		
Austria	18%	82%	-	-	Yes	Through a specific component to generators
Belgium	0%	100%	xxx	-	Not included for grid >=150 kV	Tariff for ancillary services
Bulgaria	0%	100%	-	-	Yes	Yes
Czech Republic	0%	100%	-	-	Yes	Tariff for ancillary services
Denmark	2-5%	95-98%	-	-	Yes	Yes
Estonia	0%	100%	Only in 110kV tariffs	-	Yes	Only in 110kV tariffs
Finland	12%	88%	x	-	Yes	Yes
France	2%	98%	-	-	Yes	Yes
Germany	0%	100%	-	-	Yes	Yes
Great Britain	27% TNUoS Tariff (2) 50% (2) BSUoS Tariff	73% TNUoS Tariff 50% BSUoS Tariff	xx	TNUoS - locational; BSUoS - non-locational	No, recovered in the energy market	Included in BSUoS Tariff
Greece	15 % Use of system 0 % Uplift charges	85 % Use of system 100 % Uplift charges	x	Different generation zones Use of system charges	No, recovered in the energy market	Included in Uplift charges
Hungary	0%	100%	-	-	Yes	Yes
Latvia	0%	100%	-	-	Yes	Yes
Lithuania	0%	100%	-	-	Yes	Yes
Ireland	20%	80%	-	Generation only	No, recovered in the energy market	Yes
Italy	8%	92%	-	-	No	Yes
Netherlands	0%	100%	-	-	Yes	Tariff for ancillary services
Norway	35%	65%	xxx (via losses)	Location	Yes	Yes
Poland	0,50%	99,5%	-	-	Yes	Yes
Portugal	0%	100%	xx	-	No, recovered in the energy market	REN recover system services costs directly from market agents' payments (not through a regulated tariff).
Romania	22,62% use of system 0% system services	77,387% use of system 100% systems services	-	6 G zones =6 G tariffs values 8 L zones =8 L tariffs values	Yes	Tariff for ancillary services
Slovak Rep.	0%	100%	-	-	Through a specific fee	Through a specific fee
Slovenia	0%	100%	xx	-	Yes	Tariff for ancillary services
Spain	0%	100%	xxx	-	No, included in energy price	No, included in energy price
Sweden	25%	75%	xx (via losses)	Location	Yes	Yes

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; BSUoS=Balancing Services Use of System

Comparison of transmission tariffs: sum of generation and load fees

Euro per MWh



Remarks:

- In this chart three voltage ranges are taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- For those countries where it is applied more than one transmission tariff for the different transmission voltage levels, it results one different bar for each tariff applied to the corresponding voltage level.
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- The charges taken into consideration for this comparison are included in the table of next page.
- Other regulatory charges are included.

Country remarks:

- Austria: L concerns the usage of the grid. G however concerns 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.
- 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.
- Denmark: Weighted average between Denmark West and Denmark East.
- France: the numerical values appearing on the graph correspond to the highest voltage level with a significant number of users compared to the total number of users of the network.
- Germany: weighted average, KWKG (combined cycle co-generation) not included.
- Ireland: transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.
- Spain: System services and losses are not included in the transmission tariff because they are recovered in the energy price. Nevertheless they have been included in the comparison.

- Italy: System services, that are a pass through tariff component for Terna, except the component DIS (= 0.13 €/MWh) that is the charge paid to Terna for dispatching activities, are included in L component of transmission tariff. They consist of the following items:

System Services	€/MWh
UPLIFT	6,35
UESS	0,02
DIS	0,13
INT	1,50
CD	0,37
Totale	8,37

Where:

- o UPLIFT: charge for provision of dispatching service
- o UESS: charge paid to mast run Production Units
- o INT: charge paid to final clients which provide service of load interruption
- o CD: charge paid to Production Units for availability of production power

Costs included in the comparison transmission tariffs

	OPEX except system-services, losses and ITC	Losses cost	ITC cost/revenue	System-services									CAPEX		Other
				Primary reserve	Secondary reserve	Tertiary reserve	Internal Congestion management	Congestion management on interconnections	Black -Start	Voltage Control Reactive Power	System Balancing	Depreciation	Return on capital invested		
Austria	C	C	C/B	N	C	N	C	C/B	C	C	N	C	C	N	
Belgium	C	C	C/B	C	C/B	C/B	C	C/B	C	C	N	C	C	C	
Bulgaria	C	C	N	C	C	C	N	N	C	C	N	C	C	N	
Czech Rep.	C	C	C/B	C	C	C	C	N	C	C	N	C	C	C	
Denmark	C	C	C/B	C	C	C	C	C/B	C/B	C	C	C/B	C	C/B	
Estonia	C	C	C	N	N	C (110 kV)	N	N	C (110 kV)	C	N	C	C	N	
Finland	C	C	C	C	N	C	C	C	C	C	N	C	C	C	
France	C	C	C	C	C	N	C	N	C	C	N	C	C	C	
Germany	C	C	C/B	C	C	C	C	C/B	C	C	N	C	C	C	
Great Britain	C	C	N	C	C	C	C	C	C	C	C	C	C	N	
Greece	C	C	N	C	C	N	N	C	N	N	N	C	C	C	
Hungary	C	C	C/B	C	C	C	C	N	C	C	C/B	C	C	N	
Ireland	C	N	N	C	C	C	N	N	C	C	N	C	C	N	
Italy	C	C	N	C	C	C	C	N	C	C	C	C	C	N	
Lithuania	C	C	C	N	C	C	N	N	C	C	N	C	C	N	
Netherlands	C	C	C	C	C	C	C	N	C	C	C	C	C	C	
Norway	C	C	C	C	N	N	C	C	N	N	C	C	C	N	
Poland	C	C	C	C	C	C	C	N	C	C	C	C	C	C	
Portugal	C	C	C/B	C/B	C	C/B	N	N	C/B	C/B	N	C	C	C	
Romania	C	C	C/B	N	C	C	C	C/B	C	C	N	C	C	C	
Slovak Rep	C	C	C/B	C	C	C	N	N	C	C	N	C	C	C	
Slovenia	C/B	C/B	C	N	C	C	N	N	C	C	N	C/B	C/B	C	
Spain	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sweden	C	C	C/B	N	N	C (1/3)	C	C/B	C	C	N	C	C	N	

- Where:

- o C if cost is covered by the transmission invoice
- o C/B if cost less benefit is covered by the transmission invoice (C/B it is just to indicate if a certain cost covered by tariff is also compensated by revenues. The best examples are ITC, congestion costs, balancing. For instance if you have congestion rents and you deduct them from your congestion costs, you obtain the amount to be covered by tariffs. In that case it is C/B and not only C)
- o N if cost is not included in the transmission invoice

Remarks:

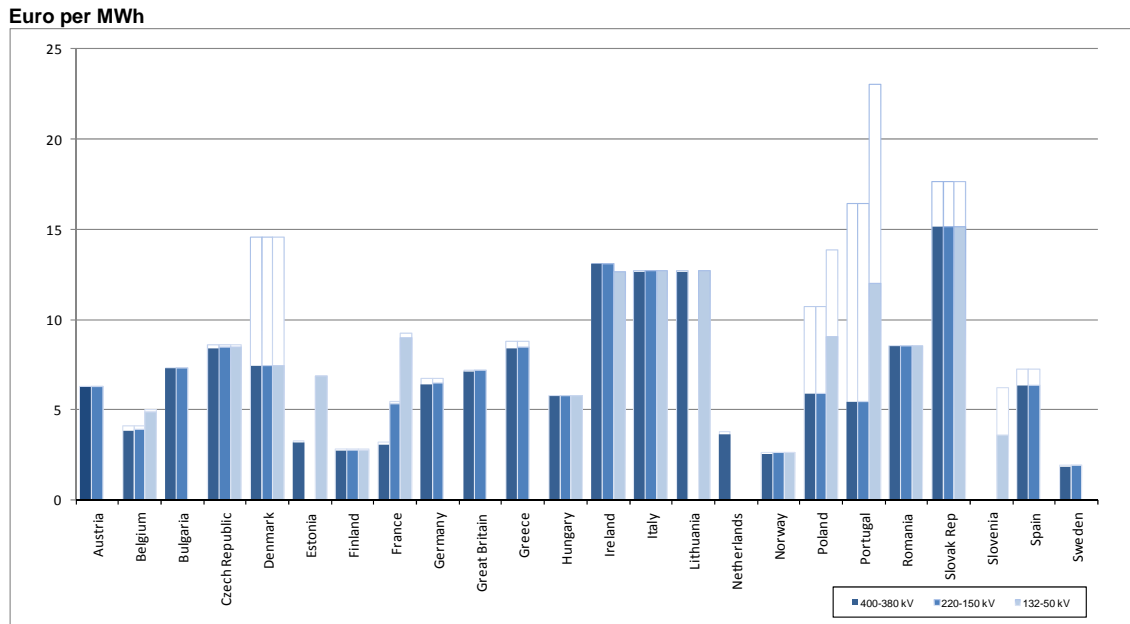
- This table contains indication of different costs covered by charges that have been included in the calculation of the price used for the comparison. Some of these charges may not be included in the TSO transmission tariff.

Country remarks:

- Austria:
 - o Primary Reserve: According to the Austrian legal framework every generator with a max. capacity > 5 MW has to provide primary reserve.
 - o System Balancing and Tertiary Reserve: The border between the two expressions "tertiary reserve" and "balancing energy" is due to the Austrian system blurry. The TSO has nothing to do with the settlement of the system balancing.
- Bulgaria: Primary, Secondary and Tertiary reserves only include cost for capacity.
- Germany: Secondary reserve and Tertiary reserve, covering only costs for capacity.
- Ireland: Internal congestion management and system balancing are not included in the system services transmission tariff, they are recovered by the market operator; nevertheless they have been included in the comparison.
- Hungary: Total congestion rents on inter-connections are taken into account by regulatory authorities when approving the methodology for calculating network tariffs for OPEX of system operation part - not system-services - similar to ITC. This revenue always reduces the next year tariff.

- Nordic countries: "Secondary reserve" does not exist in the Nordic countries, with exception of Denmark West, which is connected to the continental system
- Poland: Stranded costs i.e. cost of the long term contracts signed in the past between TSO and power plants that modernized their production units, adjusting them to environmental standards are recovered and invoiced by TSO and are included in the calculation of the tariff charge. In 2008 there was a change in making settlements regarding covering the stranded costs. Till 31.03.2008 settlements were made based on energy off taken (energy component) and since 1 st of April settlements are done based on maximum yearly contractual capacity (power component).
- Portugal: Losses costs and system-services costs are not recovered by a regulated tariff, they are recovered in the energy.
- Spain: System services and losses are not included in the transmission tariff because they are recovered in the energy price. Nevertheless they have been included in the comparison.

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



- Costs connected 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:

- In this chart three voltage ranges are taken into consideration (see Methods and hypotheses chosen for ETSO overview on page 5).
- For those countries where it is applied more than one transmission tariff for the different transmission voltage levels, it results one different bar for each tariff applied to the corresponding voltage level.
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).

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

	Power part	Energy part		Power part	Energy part
	21%	79%		34%	66%
Austria			Ireland		
	47%	53%		0%	100%
Belgium			Italy		
	0%	100%		72%	28%
Bulgaria			Lithuania		
	15%	85%		67%	33%
Czech Republic			Netherlands		
	0%	100%		58%	42%
Denmark			Norway		
	0%	100%		44%	56%
Estonia			Poland		
	0%	100%		20%	80%
Finland			Portugal		
	37%	63%		0%	100%
France			Romania		
	82%	18%		21%	79%
Germany			Slovak Republic		
	60%	40%		36%	64%
Great Britain			Slovenia		
	61%	39%		59%	41%
Greece			Spain		
	0%	100%		52%	48%
Hungary			Sweden		

Remarks:

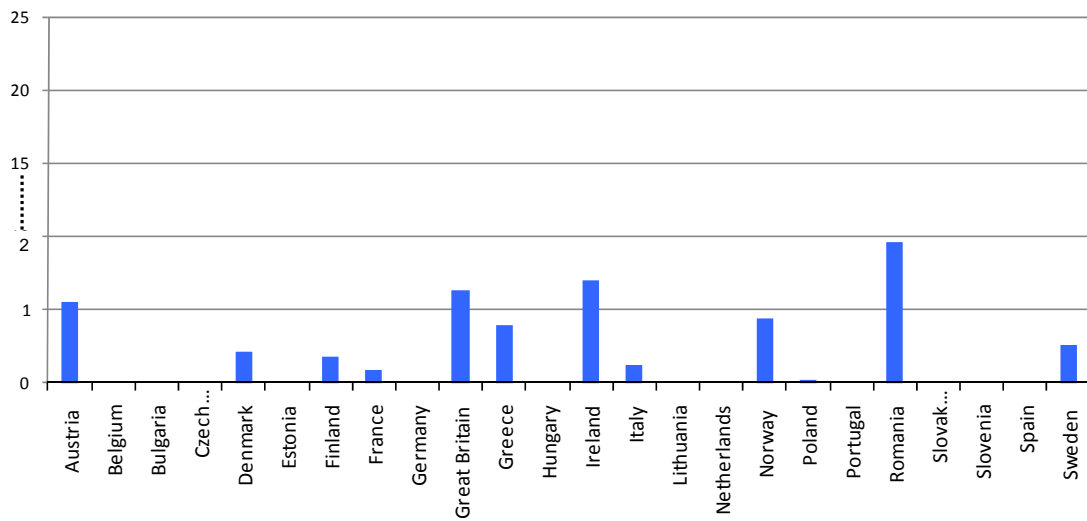
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.
- The values have been rounded.

Country remarks:

- Belgium: the cost of losses has been added, but is not included in the TSO-tariffs for users connected at EHV.
- Germany: weighted average, KWKG (combined cycle co-generation) not included.
- Poland: Values given including other burdens, not only TSO related costs. Figures without other burdens would be respectively 55 % and 45%.
- Spain: percentages corresponding only to access tariffs without losses and system services.

Range of G components paid in 2008 by producers across Europe

Euro per MWh



Remarks:

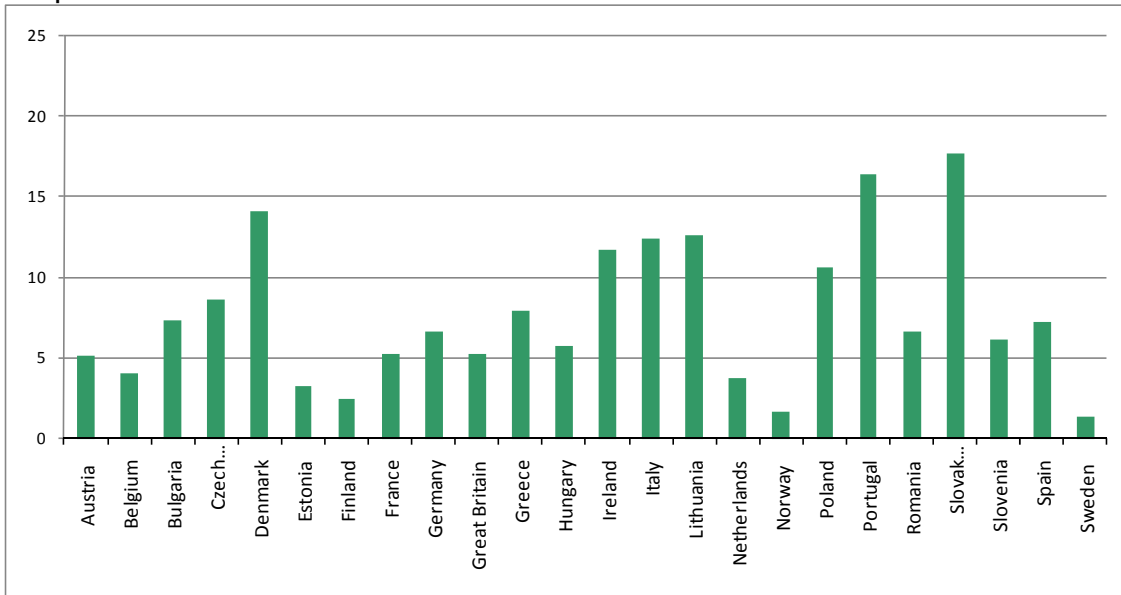
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.

Country remarks:

- Great Britain: Generation tariffs range from 30.16 €/kW in North Scotland to -13.44 €/kW in Peninsula. The mean TNUoS generation tariff is around 6.15 €/kW. The contribution from BSUoS charges has not been included.

Range of L components paid in 2008 by load across Europe

Euro per MWh



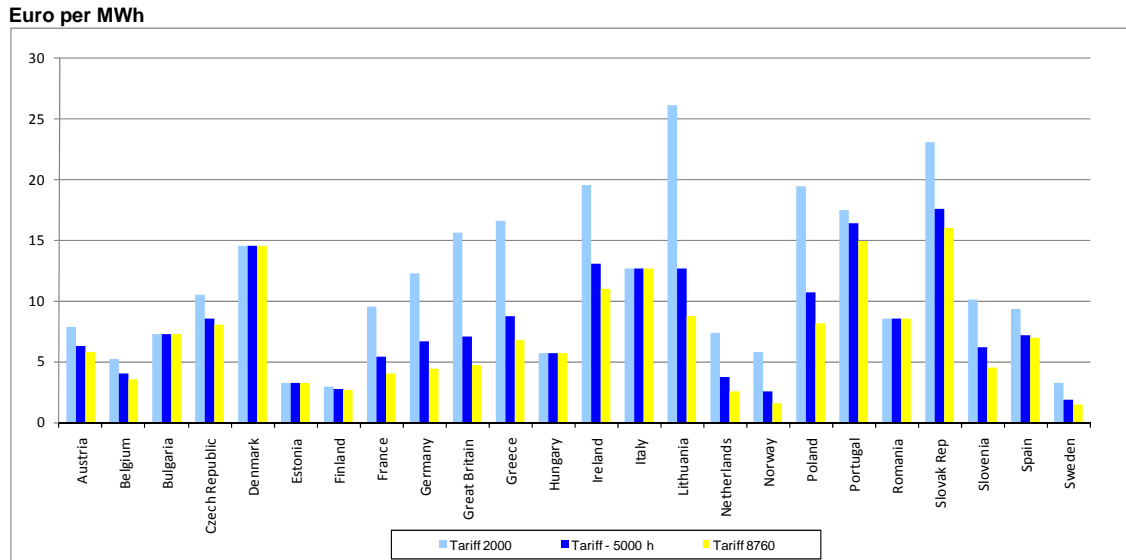
Remarks:

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

Country remarks:

- Great Britain: Demand tariffs range from 0.06 €/kW in the North Scotland to 30.13 €/kW in the South Western zone. The mean TNUoS demand tariff is around 19.58 €/kW. The contribution from BSUoS charges has not been included.

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



Remarks:

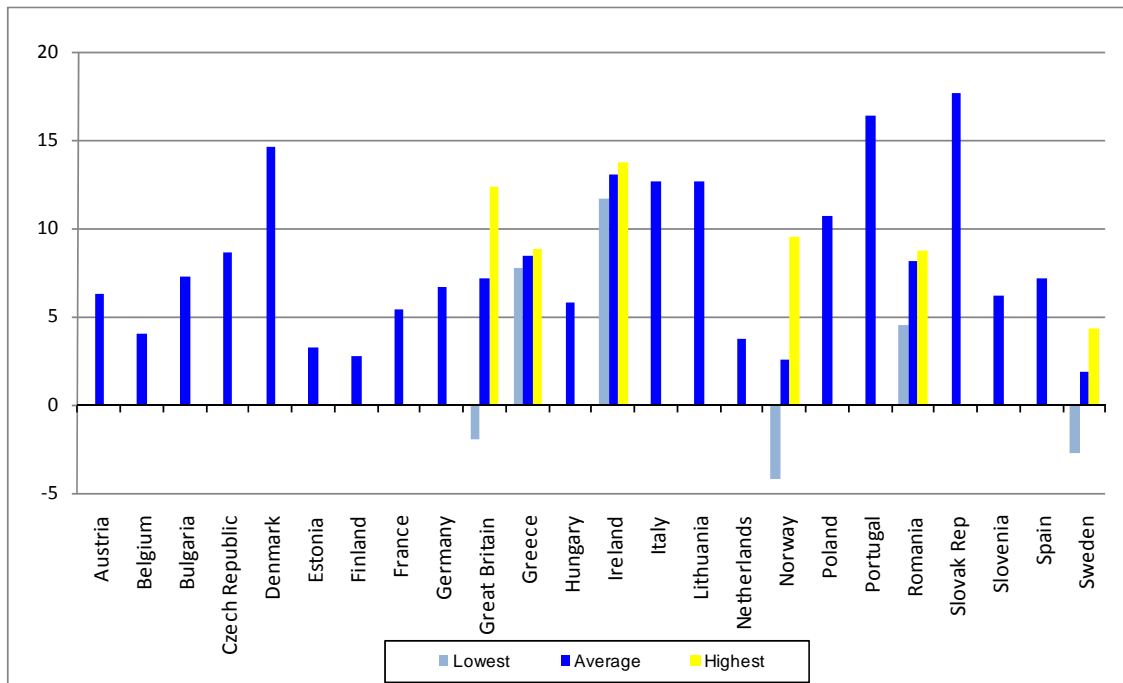
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5) but taking into account the effect of the utilization time.
- For any transmission system user connected to the highest voltage level in each country.
- Other regulatory charges are included.

Country Remarks:

- Estonia: Seasonal tariff only for 110 kV

Comparison of transmission tariffs G+ L: impact of location

Euro per MWh

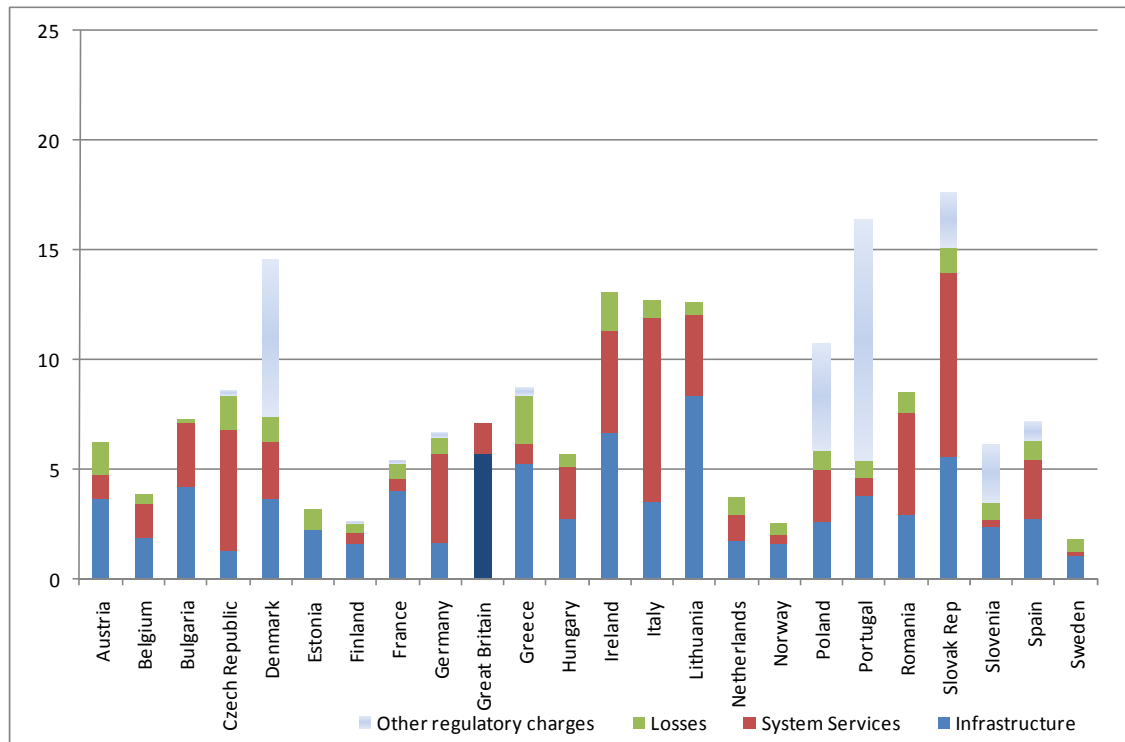


Remarks:

- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.
- Other regulatory charges are included
- See also Appendix 4. Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation.

Components of transmission tariffs

Euro per MWh



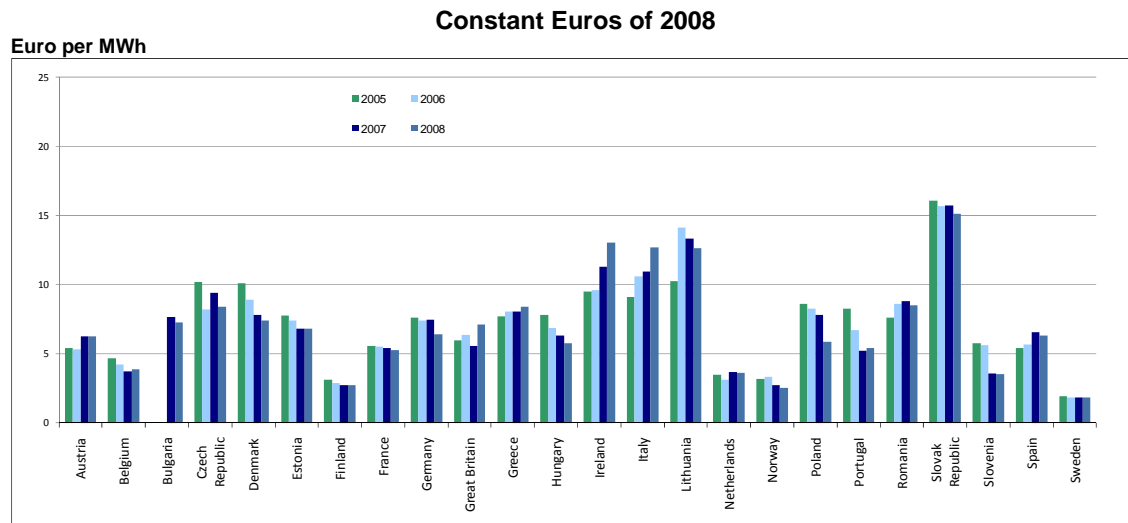
Remarks:

- The figures of the chart are estimations of the value of each final price component.
- The base case is taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- System services include balancing of the system where it applies.
- For any transmission system user connected to the highest voltage level in each country.

Country remarks:

- For Netherlands and Czech Rep., the price of losses is not public so the value taken is an average within the range in which it is included (see Appendix 2: Comparison of network losses)
- France: 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.
- Netherlands: the cost of losses is part of the transmission tariff so the value of the chart is only estimation.
- Portugal: system services include cross border tariff.
- Hungary: in the infrastructure component, the combined transmission and system operation tariff - including losses - is reduced due to surpluses of system operation OPEX of previous years given back to consumers through tariff decreases.
- Ireland: transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.
- Spain: System services and losses are not included in the transmission tariff because they are recovered in the energy price. Nevertheless they have been included in the comparison.

Transmission tariffs evolution only TSO costs



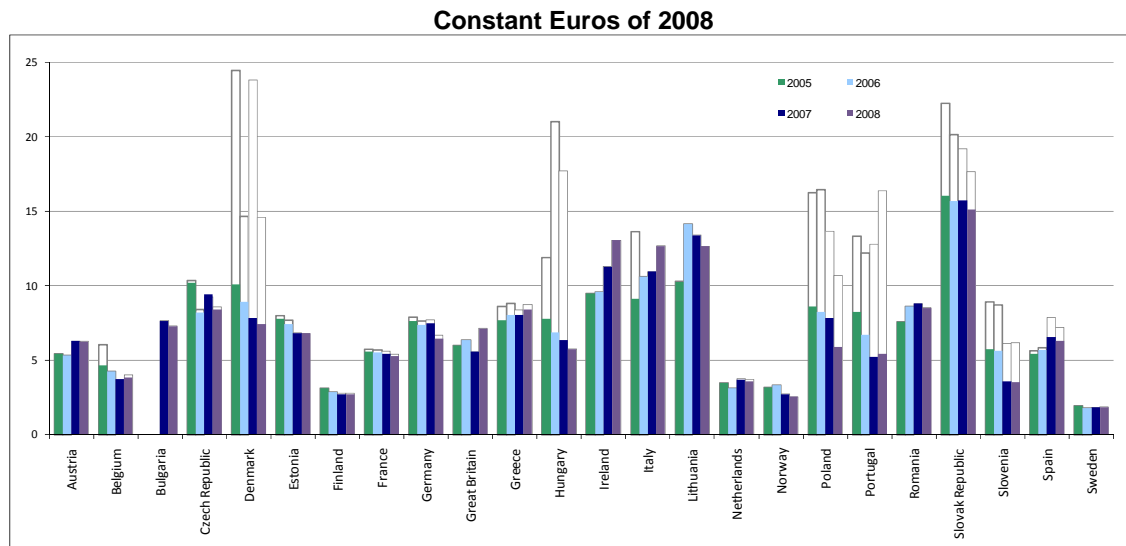
Remarks:

- The base case is taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- Prices updated to € 2008 (31st December).
- CPI used for each country is the published in Eurostat.
- For countries not being in the Euro zone the exchange rate to € in December 31st 2008 is used.
- For any transmission system user connected to the highest voltage level in each country.

Main changes compared to 2007:

- Estonia: Evolution for 110 kV level. There was a significant change in regard to 330kV tariff. Since 2008 a new tariff for 330kV was calculated that now includes both losses and infrastructure costs. Up to 2007 it only included the costs of losses
- Great Britain: changes due to exchange rate.
- Ireland: an estimated transmission losses charge is included in the 2008 figure while one was not included in the 2007 figure.
- Italy: The increase of tariff value consists of increasing value of :
 - o system services due to the raising prices of offers on the dispatching market mainly linked to the fuel price. System services are a pass through component for Terna;
 - o losses evaluated by applying standard regulatory coefficients related to the voltage level of the transmission grid. These conventional standard loss coefficients set by the Regulator are applied to the electricity injected by producers and withdrawn by final customers. Then the costs of losses on the Italian transmission network are recovered through the energy price on the basis of standard loss factor. The difference between the conventional standard losses and the real amount of losses, is regulated through the UPLIFT component of the transmission tariff. Taking into account that in 2008 the average electricity price on Italian market was equal to 86,99 €/MWh, the application of the 0,9% standard loss factor for energy withdrawn by the EHV level grid, the cost component for losses can be evaluated equal to 0,78 €/MWh whereas in 2007 was equal to 0,64 €/MWh.
- Poland: The decrease results mainly from change in access tariff structure and introduction since 2008 different rates for different kinds of points of delivery of electric energy from transmission grid (PoD). Points of delivery of final consumers connected to transmission grid were attributed to a group for which the access tariff rate decreased by 30% in comparison with a rate applied in year 2007

Transmission tariffs evolution including non TSO costs



- Costs connected 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 ETSO overview on page 5).
- Prices updated to € 2008 (31st December).
- CPI used for each country is the published in Eurostat.
- For countries not being in the Euro zone the exchange rate to € in December 31st 2008 is used.
- For any transmission system user connected to the highest voltage level in each country.

Main changes compared to 2007:

- Hungary:
 - o As of 1st January 2008 the Regulatory charges not directly related to TSO activities are not included in TSO tariffs.
 - o Instead of tariff for Renewable energy costs MAVIR purchases and wholesales the renewable energy. MAVIR purchases on a special feed in tariff determined by ministerial decree. Afterwards the company allocates the bought amount for Energy Traders in a way that it does not have profit or loss.
 - o Transition fee for stranded costs was terminated.
 - o Coal mine as a tariff component was also terminated. It is not paid by those who use the grid but Electricity Energy Traders pay for it to the TSO by Act on the Budget of the Republic of Hungary for 2008 and the TSO transfers it to the coal mine.
- Ireland: an estimated transmission losses charge is included in the 2008 figure while one was not included in the 2007 figure.
- Portugal: The increase of "total transmission tariff" 07/08 (3,92 €/MWh) is mainly due to an increase of "surplus costs arisen by renewables and cogenerators" and "islands' tariff convergence costs".

Appendices

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. Reactive Energy

Appendix 1: Voltage level operated by TSO

% km	400-380 kV	220 -150 kV	132-50 kV
Austria (Verbund)	31	50	19
Belgium (Elia)	14	43	43
Bulgaria (NEK)	16	19	65
Czech Republic (CEPS)	63	35	2
Denmark (Energinet.dk)	31	43	26
Estonia (OÜ Põhivõrk)	29	4	67
Finland (Fingrid)	30	16	54
France (RTE)	21	27	52
Germany	100		0
Great Britain (NGT)	75	23	2
Greece (HTSO)	27	73	0
Hungary (Mavir)	61 (6,1% 750 kV)	34	5
Ireland (ESBNG)	7	30	63
Italy (Terna)	24	76	
Lithuania (Lietuvos E.)	25	0	75
Netherlands (TenneT)	75	25	0
Norway (Statnett)	75	1	24
Poland (PSE Operator)	39 (1% 750 kV)	61	0
Portugal (REN)	21	79	0
Romania (Transelectrica)	27	73	0
Slovak Republic (SEPS)	64	35	2
Slovenia (Eles)	20	13	68
Spain (REE)	51	49	0
Sweden (SvK)	68	28	4

Remarks:

- Percentages 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.

Appendix 2: Comparison of network losses

Losses (€/MWh)	COUNTRY
0.7>=...	Hungary
	Bulgaria
	Finland
	Belgium
	Lithuania
	Norway
	Sweden
	Germany
	France
0.7<...	Slovak Republic
	Spain
	Slovenia
	Estonia
	Romania
	Portugal
	Poland
	Netherlands
	Denmark
	Czech Republic
	Italy
	Greece
	Austria
	Ireland

Remarks:

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

Country remarks:

- France: there is no specific allocation of system services or losses cost to any specific tariff, the values here are purely indicative.
- Great Britain: not available.
- Netherlands: Losses are part of transmission tariff, the value given is only estimation.
- Ireland: transmission losses are accounted for in the market however an estimated cost has been included here purely for comparison purposes.

Appendix 3: Comparison of system services

System Services (€/MWh)	COUNTRY
0.4>...	Estonia
	Sweden
	Norway
	Finland
	Slovenia
0,5<---<1	Portugal
	France
	Greece
1<---<3	Great Britain
	Belgium
	Denmark
	Austria
	Hungary
	Poland
	Bulgaria
	Spain
	Netherlands
3<...	Germany
	Ireland
	Italy
	Romania
	Lithuania
	Czech Republic
	Slovak Republic

Remarks:

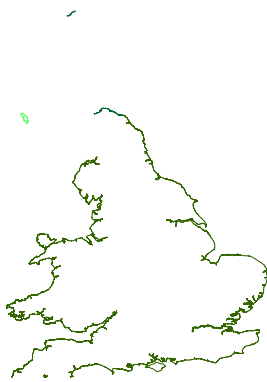
- The base case is taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- These figures cover the system services listed on the table Costs included in the comparison of transmission tariffs on page 9.

Country remarks:

- France: there is no specific allocation of system services or losses cost to any specific tariff, the values here are purely indicative.
- Ireland: Internal congestion management and system balancing are not included in the system services transmission tariff, they are recovered by the market operator; nevertheless they have been included in the comparison.

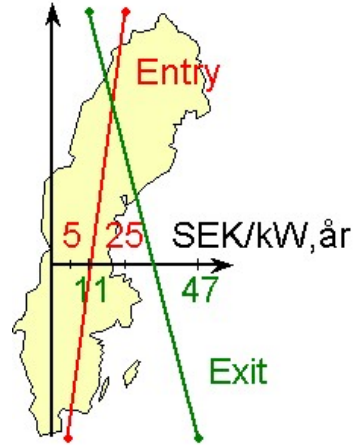
Appendix 4: Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation (i)

England and Wales



North area: Northern Scotland
South area: South of England

Sweden



Greece

Lowest: from G zone South
Highest: from G zone North
There are not L zones