ETSO Overview of transmission tariffs in Europe: Synthesis 2006

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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 2006 transmission tariffs for 23 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 invoice 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 on page 18)
  - to deal with this circumstance, two main situations are taken:
    - the producer and consumer are both connected to the EHV network (400 kV or 220 kV)
    - because in some countries transmission tariffs are applied to the HV 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	16.5 %	83.5 %	-	-	Yes	Through a specific component to generators
Belgium	0%	100%	xxx	-	Not included for grid >=150 kV	Tariff for ancillary services
Czech Republic	0%	100%	-	-	Yes	Through a specific fee
Denmark	2-5%	95-98%	-	-	Yes	Yes
Estonia	0%	100%	x	-	Yes	Yes
Finland	12%	88%	x	-	Yes	Yes
France	2%	98%	-	-	Yes	Yes
Germany	0%	100%	-	-	Yes	Yes
Great Britain	27% TNUoS Tariff (2) 50% BSUoS Tariff	73% TNUoS Tariff 50% BSUoS Tariff	xx	TNUoS - locational; BSUoS - non-locational	No, recovered in the energy market	Included in BSUoS Tariff
Greece	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
Lithuania	0%	100%	-	-	Yes	Yes
Ireland	20%	80%	-	Generation only	No	Tariff for ancillary services
Italy	8%	92%	x	-	No	Yes
Netherlands	0%	100%	-	-	Yes	Tariff for ancillary services
Norway	35%	65%	xxx (via losses)	Location	Yes	Yes
Poland	0.4%	99.6%	-	-	Yes	Yes
Portugal	0%	100%	xx	-	No, recovered in the energy market	Included in the GUoS tariff
Romania	26%	74%	-	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	No, included in energy price
Sweden	25%	75%	xx (via losses)	Location	Yes	Yes

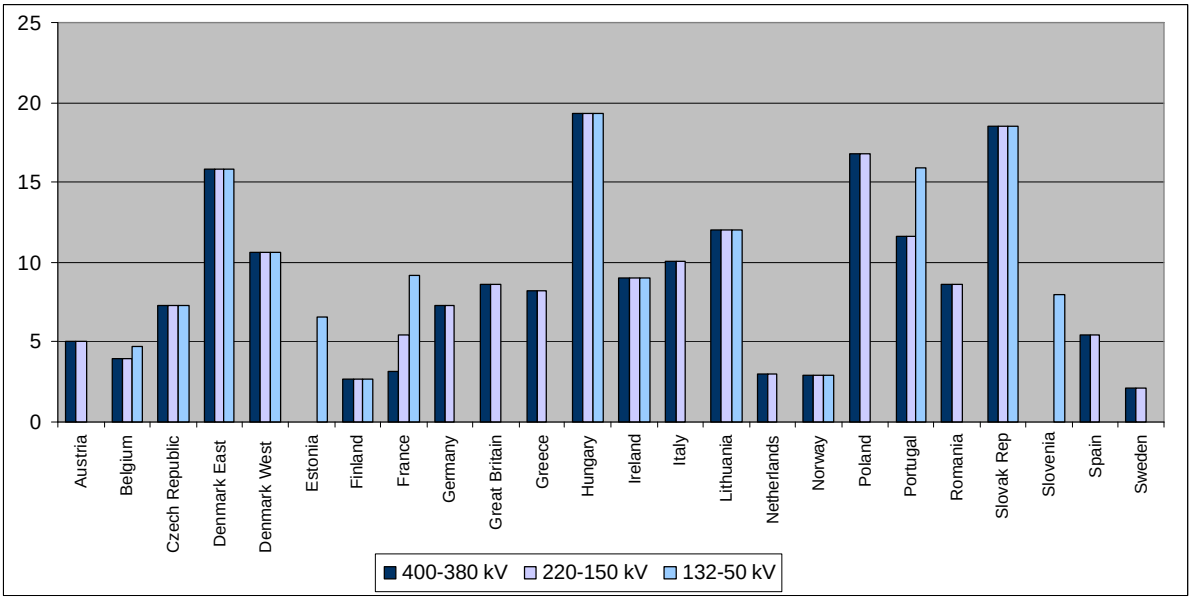
Remarks:

(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.

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.
- Germany: weighted average, KWKG (combined cycle co-generation) not included.
- Spain: Although system services and losses are not included in the transmission tariff as they are recovered in the energy market, they have been included in the comparison.
- Slovak Rep: Structure and amount of fees is determined by the Regulator. Share of TSO on total transmission fees for the case base amounts to 4.42 €/MWh.

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	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	N
Belgium	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N
Czech Rep.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Denmark E.	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y
Denmark W.	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y
Estonia	Y	Y	N	N	N	Y	N	N	N	Y	N	Y	Y	N
Finland	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	N	Y	Y	N
France	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y
Germany	Y	Y	Y	Y	Partly	Partly	Y	Y	Y	Y	Y	Y	Y	Y
Great Britain	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N
Greece	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
Hungary	Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
Ireland	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N
Italy	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Lithuania	Y	Y	Y	N	Y	Y	N	N	Y	Y	N	Y	Y	N
Netherlands	Y	Y	Y	N	Partly	Partly	Y	N	Y	Y	Partly	Y	Y	N
Norway	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	N	Y	Y	N
Poland	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Portugal	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
Romania	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
Slovak Rep	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
Slovenia	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y	Y	Y
Spain	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sweden	Y	Y	Y	N	Y (1/3)	N/A	Y	Y	Y	Y	N	Y	Y	N

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:
  - Primary Reserve: According to the Austrian legal framework every generator with a max. capacity > 5 MW has to provide primary reserve.
  - 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.
- Germany: Secondary reserve and Tertiary reserve, covering only costs for capacity.
- Nordic countries: "Tertiary reserve" does not exist in the Nordic countries.
- Spain: Although system services and losses are not included in the transmission tariff as they are recovered in the energy market, they have been included in the comparison.

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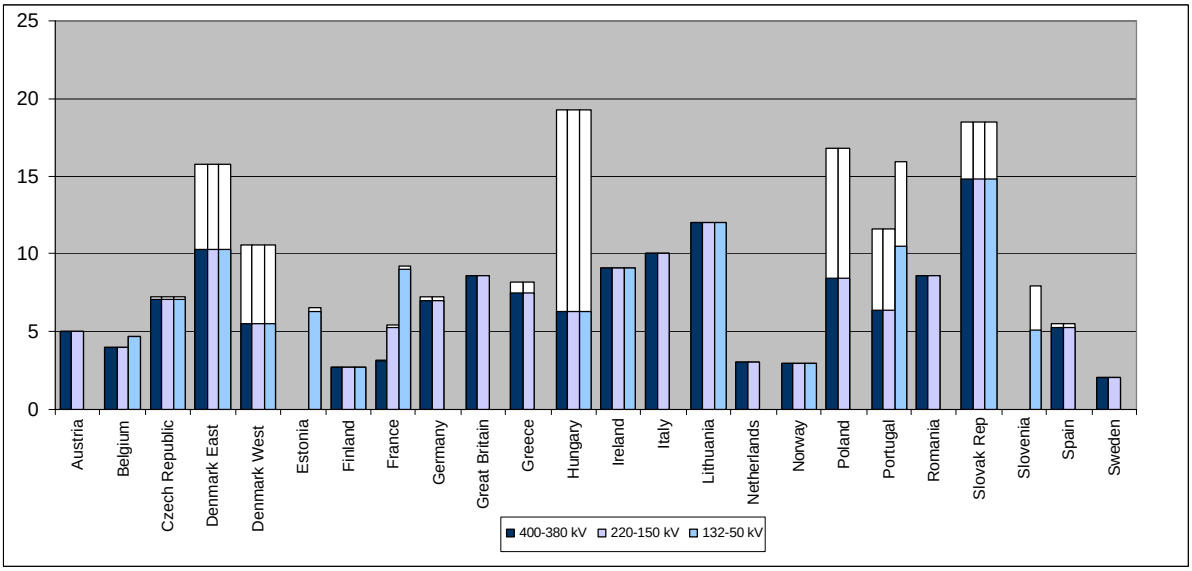
Comparison of transmission tariffs: split between components related to TSO activities and other regulatory charges

Euro per MWh



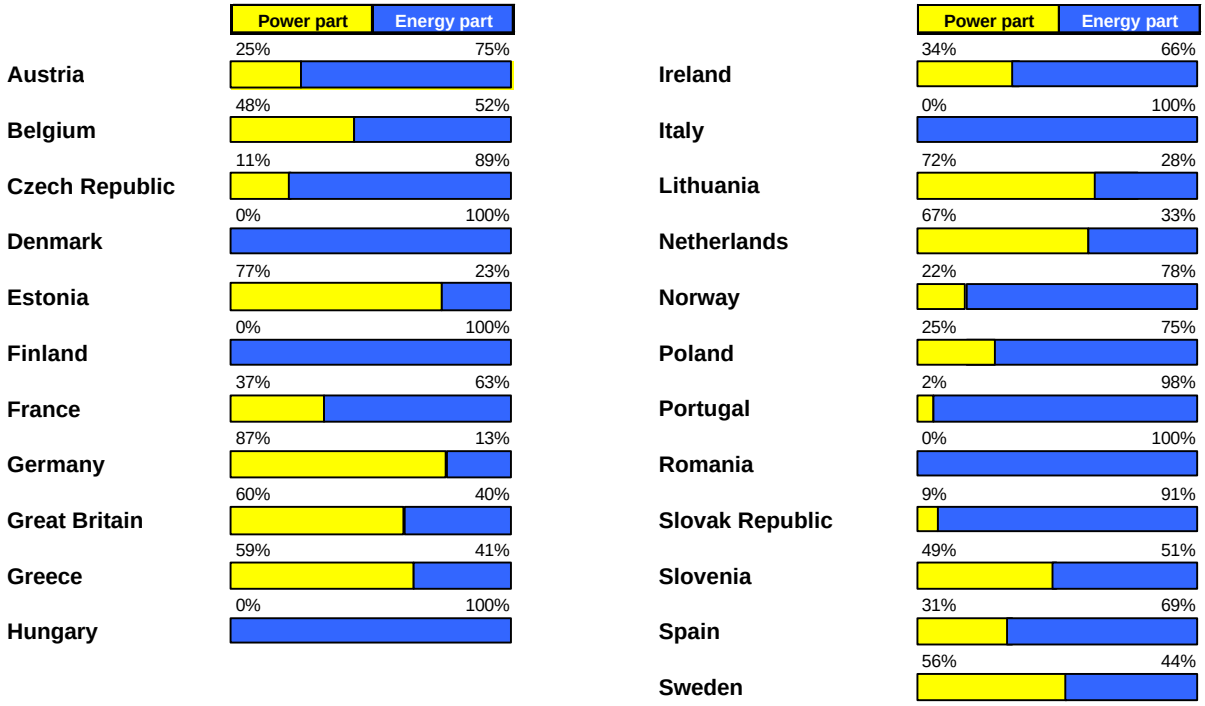
Costs connected to TSO activities: infrastructure (capital and all operation charges), losses, system services, congestion.

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



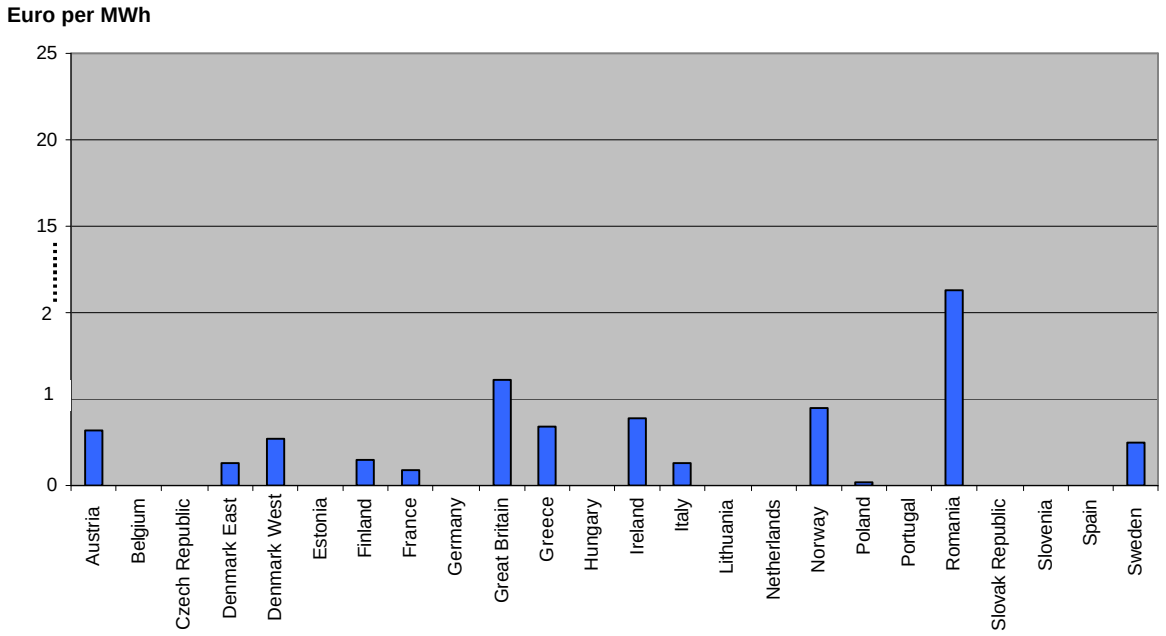
Remarks:

- 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
- Spain: percentages corresponding only to access tariffs without losses and system services.

Range of G components paid in 2006 by producers across Europe



Remarks:

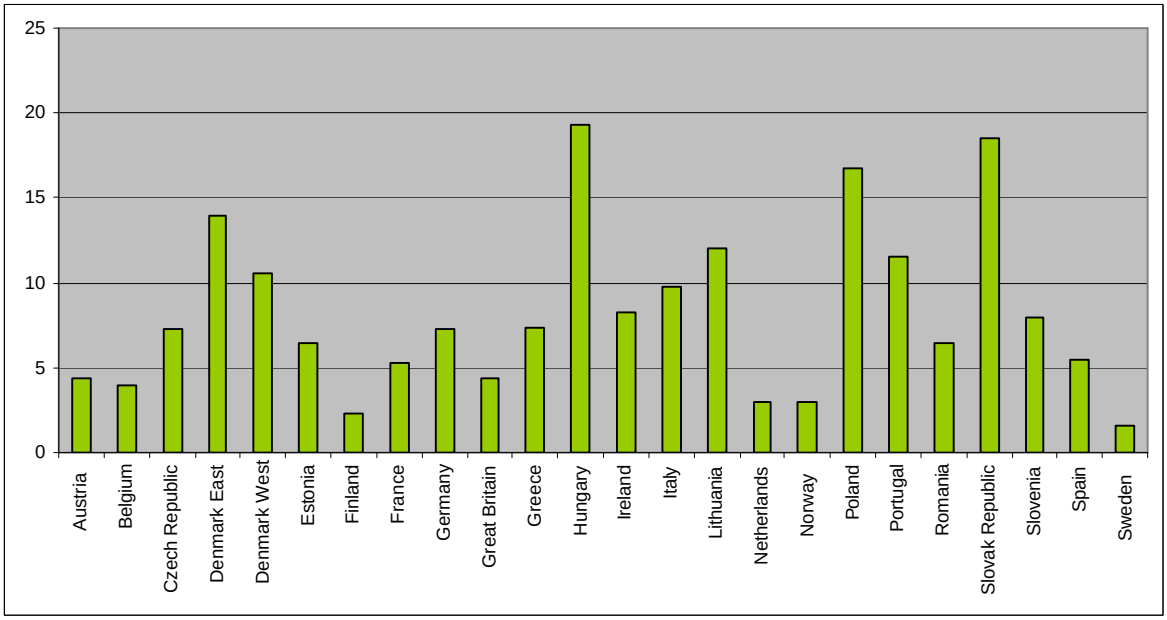
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.

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 2006 by load across Europe

Euro per MWh



Remarks:

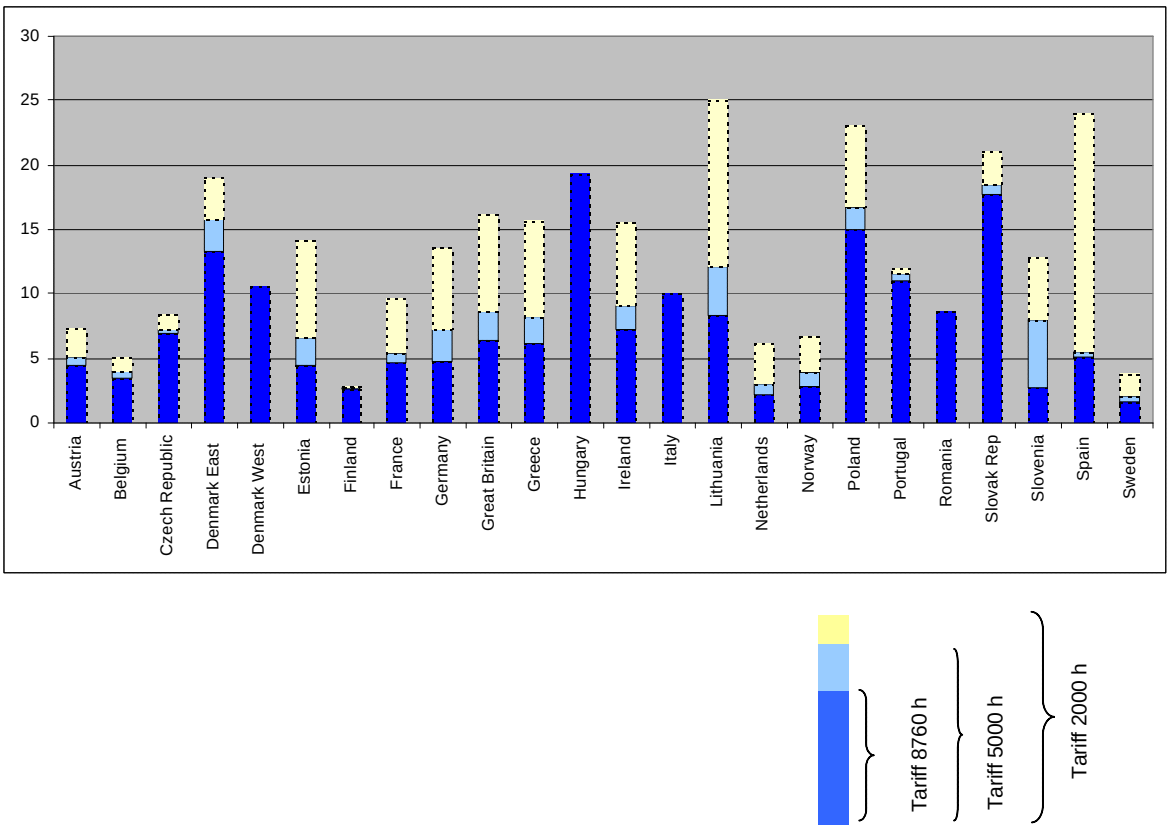
- The example taken for this comparison is the base case (see Methods and hypotheses chosen for ETSO overview on page 5).
- For any transmission system user connected to the highest voltage level in each country.

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

Euro per MWh

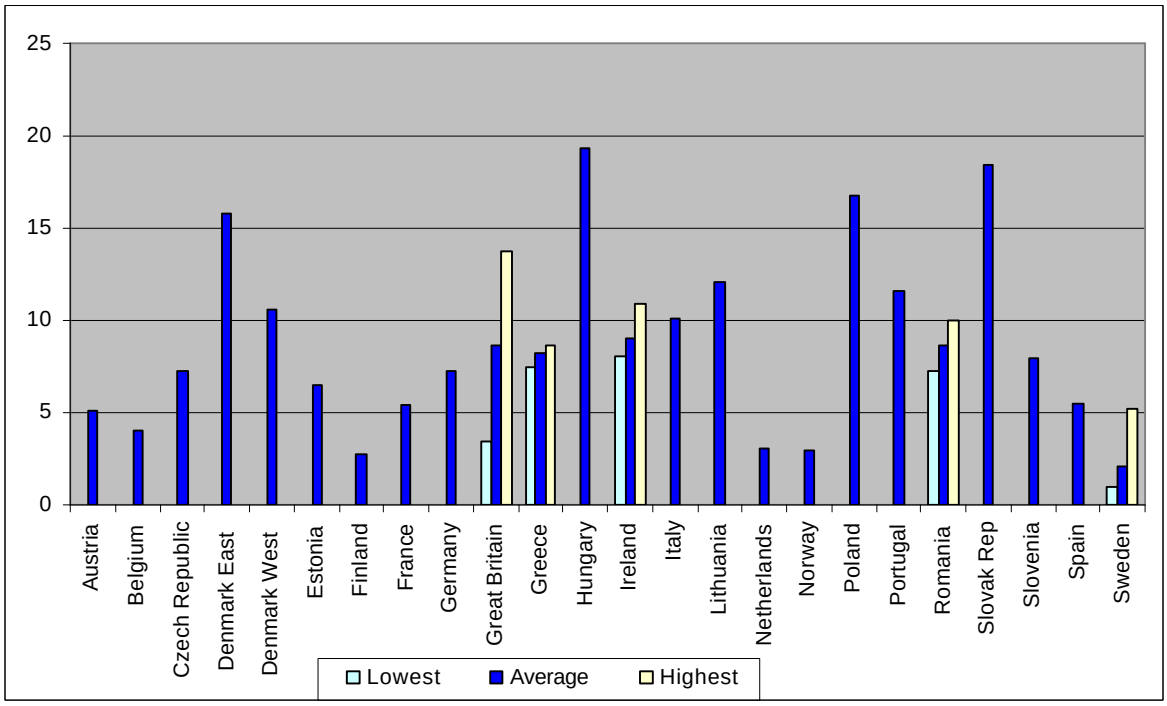


Remarks:

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

Comparison of transmission tariffs G+ L: impact of location

Euro per MWh

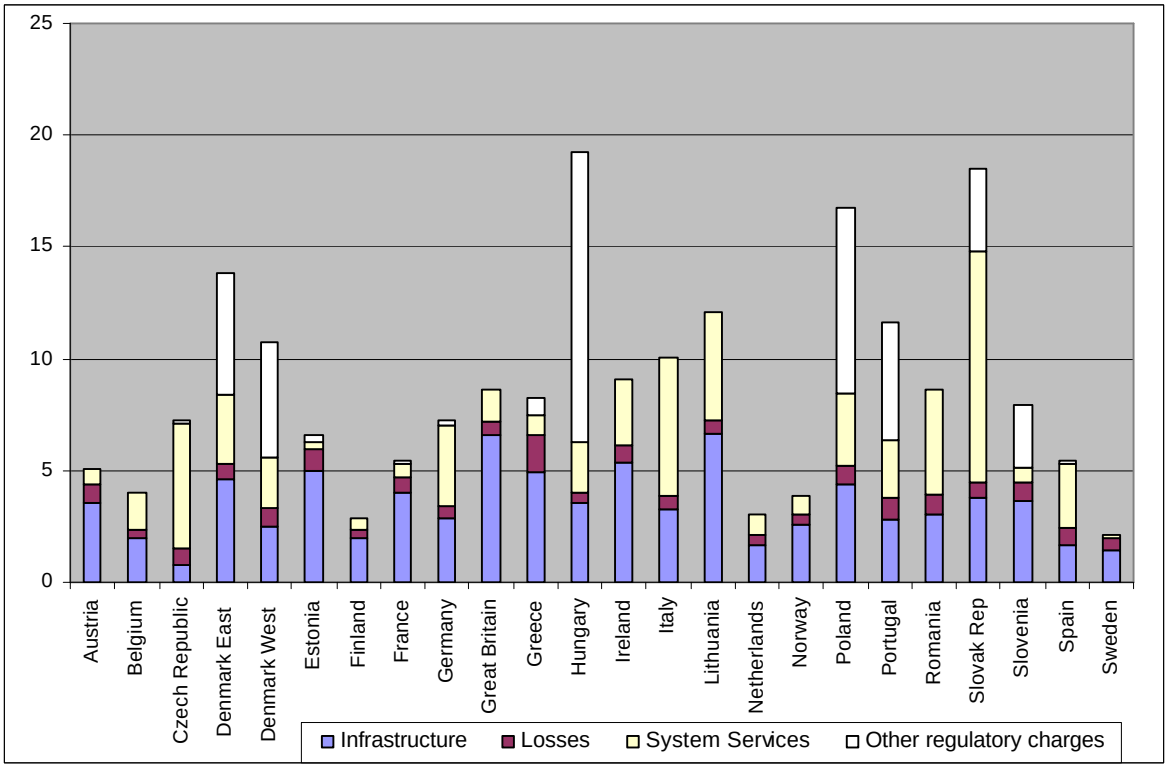


Remarks:

- 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.
- 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.

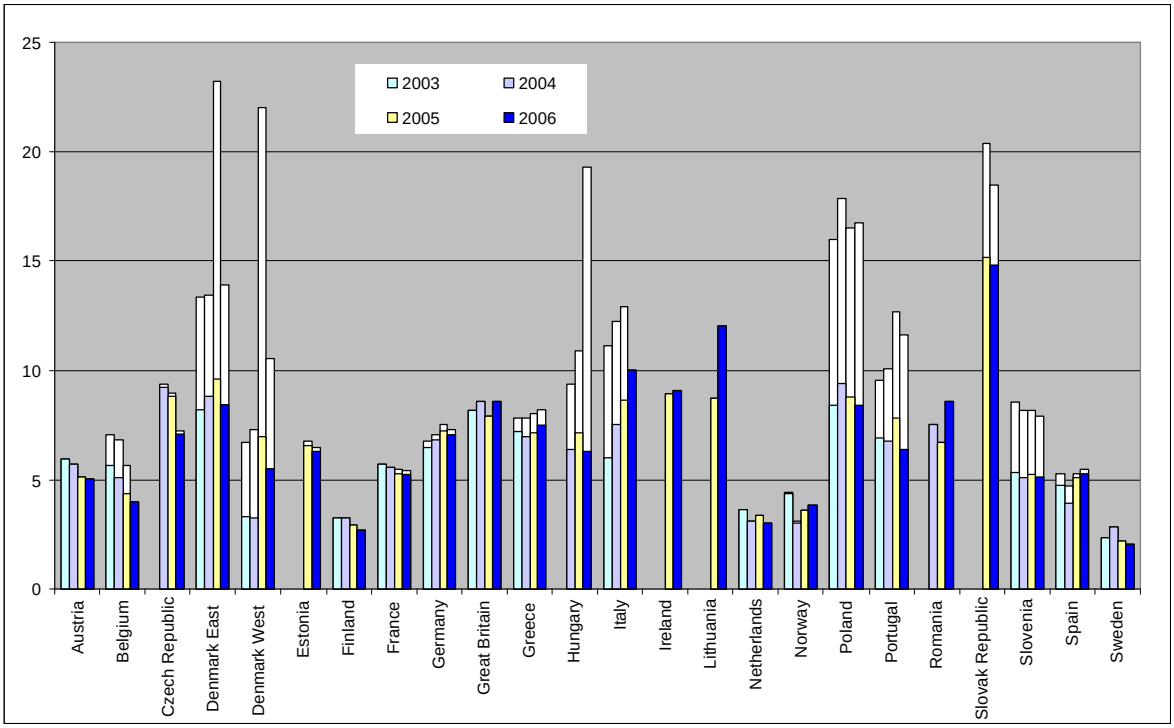
Country remarks:

- For Ireland, Netherlands and Czech Rep., the price of losses is confidential 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.

Transmission tariffs evolution

Split between components connected to TSO activities and other regulatory charges
Constant Euros of 2006

Euro per MWh



Remarks:

- The base case is taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- Prices updated to € 2006 (31st December).
- CPI used for each country is the published in Eurostat.
- For countries not yet in the Euro zone the exchange rate to € in December 31st 2006 is used.
- For any transmission system user connected to the highest voltage level in each country.

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

Appendix 1: Voltage level operated by TSO

% km	400-380 kV	220 -150 kV	132-50 kV
Austria (Verbund)	30	51	19
Belgium (Elia)	14	43	43
Czech Republic (CEPS)	62	36	2
Denmark (Energinet.dk)	25	44	31
Estonia (OÜ Põhivõrk)	29 (330 kV)	4	64
Finland (Fingrid)	29	17	54
France (RTE)	21	27	52
Germany	100		0
Great Britain (NGT)	75	23	2
Greece (HTSO)	25	75	0
Hungary (Mavir)	61,2 (6,1% 750 kV)	34	5
Ireland (ESBNG)	7	28	65
Italy (Terna)	27	73	0
Lithuania (Lietuvos E.)	25	0	75
Netherlands (TenneT)	75	25	0
Norway (Statnett)	73	0	27
Poland (PSE Operator)	37 (1% 750 kV)	63	0
Portugal (REN)	21	79	0
Romania (Transelectrica)	54	46	1
Slovak Republic (SEPS)	64	35	2
Slovenia (Eles)	20	13	68
Spain (REE)	51	49	0
Sweden (Svenska K.)	72	28	0

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>=	Belgium
	Czech Republic
	Denmark East
	Finland
	France
	Germany
	Great Britain
	Hungary
	Italy
	Lithuania
	Netherlands
	Slovak Republic
	Sweden
0.7<…	Austria
	Denmark West
	Greece
	Estonia
	Ireland
	Norway
	Poland
	Portugal
	Romania
	Slovenia
	Spain

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.

Appendix 3: Comparison of system services

System Services (€/MWh)	COUNTRY
0.4>	Estonia Finland Sweden
0,6<---<1	Norway France Slovenia Austria Netherlands Greece
1<---<3	Great Britain Belgium Hungary Denmark West Portugal Spain Ireland
3<…	Denmark East Poland Germany Romania Lithuania Czech Republic Italy Slovak Republic

Remarks:

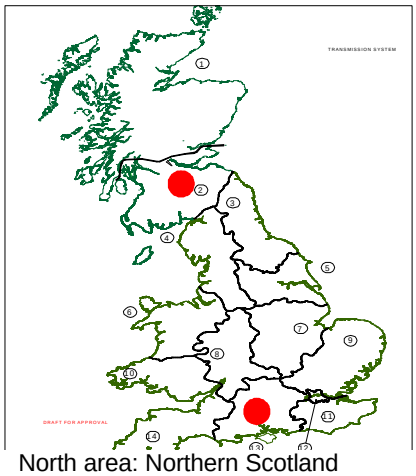
- The base case is taken (see Methods and hypotheses chosen for ETSO overview on page 5).
- These figures cover the system services listed on the table Costs included in the comparison of transmission tariffs on page 8.

Country remarks:

- France: there is no specific allocation of system services or losses cost to any specific tariff, the values here are purely indicative.

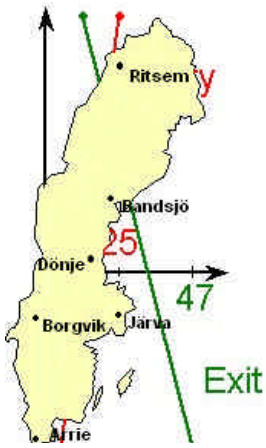
Appendix 4: Definition of the tariff areas in countries with generation/consumption geographic zonal differentiation

England and Wales



North area: Northern Scotland
South area: South of England

Sweden



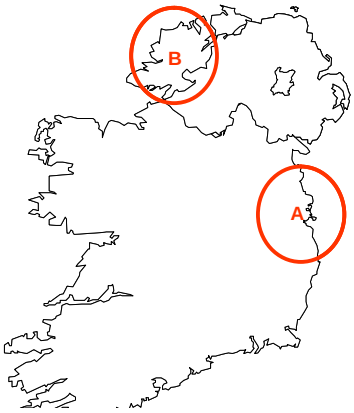
Near transmission example: Järva- Järva
Far transmission example: Ritsem-Arrie

Greece

Zone 1: North System
Zone 2: South System

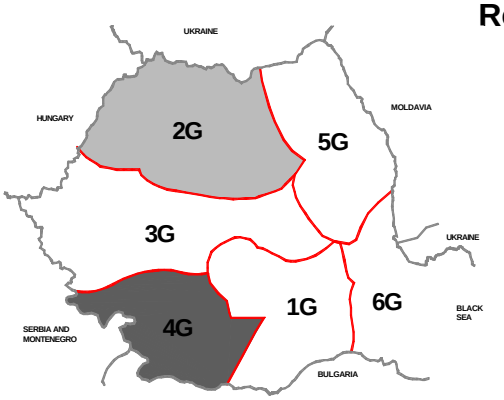
Lowest: from G zone South
Highest: from G zone North
There are not L zones

Ireland

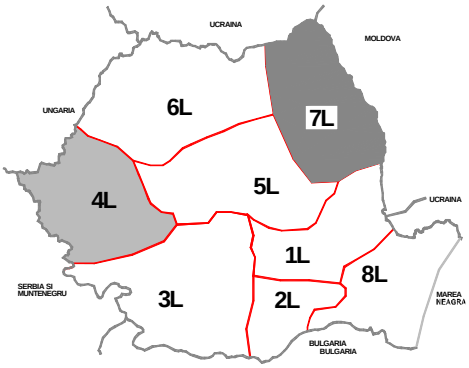


Highest case (A): G located in Dublin (surplus area)
Lowest case (B): G located in Donegal (shortage area)

Romania



6 Generation zones highlighting the generation surplus area (4G) and generation deficit area (2G)
4G – highest G value
2G – lowest G value



8 Load zones highlighting the load deficit area (4L) and load surplus area (7L)
4L – lowest L value
7L – highest L value

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

Czech Republic: 0.165 €/MWh related to market operator.

Denmark: The PSO tariff was 0.5 eurocent/kWh on average in 2006 in Denmark.

- The cost of the guarantee of generation reserves required to secure the supply in the area (13% for west and 19% for east).
- Special subsidies to producers of environmentally friendly energy (74% for west and 64% for east).
- Research & development into environmentally friendly energy (5% for west and 6% for east).
- Different public charges and other expenses (7% for west and 11% for east).

France: For the case base this is 0.18€/MWh. 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). The rate for 2006 is 8.2%. All the customers pay the "CTA" which does not cover any RTE cost.

Germany: The level of this charge here is at least 0.25 Euro /MWh applied to all utilisation times and voltage levels. Extra charge for extra costs according to the German law "Gesetz für die Erhaltung, die Modernisierung und den Ausbau der Kraft-Wärme-Kopplung" (KWKG), Modified Law for Combined Heat and Power Production Promotion.

Greece: Costs related to the compensation of RES Units and the cost for the coverage of the Use of System charge for RES units. For the year 2006 the total cost for other burdens was 0.7295 €/MWh which includes 0.7147€/MWh for the compensation of RES Units and 0,0148€/MWh for the compensation of the cost for the coverage of the Use of System charge for RES units..

Hungary: 12.98 €/MWh regarding:

- 4.46 €/MWh related to stranded costs,
- 7.47 €/MWh related to renewable energy costs.
- 1.05 €/MWh coal mine

Poland: 8.34 €/MWh regarding:

- Costs of the long term contracts concluded in the past between TSO and power plants that modernized their production units, adjusting them to environmental standards.

Portugal: 5.29 €/MWh related to:

- Hydropower station land,
- Surplus costs arisen by renewables and cogenerators,
- Islands' tariff convergence costs,
- Regulator costs.

Romania: The Energy Regulatory Authority is financed by all the electricity market participants and Transelectrica's contribution is set at 0.06% out of turnover from regulated activities. This cost is also included in the transmission tariff and it is 0.04 €/MWh.

Slovenia*:* 2.82 €/MWh regarding*:*

- Power Market Operator's activities (0.12 €/MWh),
- Regulator's activities (0.16 €/MWh)
- Preferential dispatching (2,54 €/MWh)

Spain: They are included as a percentage of the access tariffs. For the case base it is 0.17 €/MWh. For the year 2006, these % are the following:

- Permanent costs = 6.988%,
- Diversification and security of supply cost = 2.548%.

Appendix 6: First connection charges

First connection charges can be:

- Shallow: only for the connection line and other equipments belonging to the connection
- Deep: connection line and other equipments belonging to the connection plus the investment costs in the grid due to the connection that has to be borne by the TSO

First connection charges have an impact on the tariff for use of the system since in case of a "deep" approach the concerned costs in the grid are not to be socialized in the tariff.

Country	First connection charges are "Shallow" or "Deep"?
Austria	**Deep**. Grid user builds own connection line. If grid reinforcements are necessary the user has to pay for this.
Belgium	**Shallow**
Czech Republic	**Deep.** Grid user builds own connection line. Customers pay a lump sum connection fee of +/- 6.900€/installed MW for reinforcement of the grid, generators pay +/-17.250€/installed MW. Not covered costs are actually not borne by tariff.
Denmark E & W	**Shallow** to partially **Shallow** (in some cases charges are calculated to a fictitious point that can be closer than the physical connection point)
Estonia	**Deep.** All the equipment, belonging to the connection + all reinforcements, needed prior to the connection are included in the connection fee.
Finland	**Shallow** in most cases, but a possibility to **Deep** in exceptional cases.
France	**Shallow**. The first connection is made to the nearest substation where the adapted voltage level is available and where this connection is technically possible.
Germany	**Deep**
Great Britain	**Shallow**
Greece	**Shallow**
Hungary	**Partially Deep** (maximum of 70% of investment costs for customers and 100% for generators).
Ireland	**Partially Deep**. Charges include station common costs or common extension costs (if higher). Customers pay only 50% of the charge, generators 100%.
Italy	**Shallow**. Grid user builds own connection line. Enhancements of the grid are socialized in tariff.
Netherlands	**Shallow**
Norway	**Deep**
Poland	**Partially Deep**. Customers pay only 25% of investment costs for typical connection, generators and DSOs the charge is 100%. The typical connection contains extension or rebuilding costs for the substation (if such costs are necessary).
Portugal	**Deep** (if the investment in the grid was done up to 5 years ago). Made also on a negotiated basis.
Romania	**Deep**
Slovak Republic	**Partially Deep**. Distributions companies pay 40% charge, TSO pay 60 % charge. Direct customers connected on the TSO pay 100% charge.
Slovenia	**Deep**
Spain	**Shallow**. The generator builds own connection line.
Sweden	**Deep**, but only one connection since 1996