

# CEER

**Council of European  
Energy Regulators**



## **CEER Workshop on Power Losses**

**Regulatory treatment of losses  
Procurement of Losses**

Fostering energy markets,  
empowering **consumers**.

**CEER Office, Cours Saint-Michel 30a  
Brussels, 06 October 2016**

# Procurement of network losses

- Procurement of network losses
- Procurement solutions in European countries
- Power losses procurement and compensation in Portugal

## Procurement of network losses

- Procurement of network losses
  - ▶ Directive 2009/72/EC, of the European Parliament and of the Council, oblige the network operators to procure the energy they use to cover network losses according to transparent, non-discriminatory and market based procedures, whenever they have this function.
  - ▶ In many Member States the network operators (TSOs and DSOs) are responsible for the procurement of losses, but it is also possible to oblige the suppliers to cover the losses. In these cases there is no need of a separate procurement system for network losses
  - ▶ Therefore there are two main possibilities for procuring the energy to cover network losses in place.



# Procurement solutions in European countries

- **I - Network operators is responsible for the procurement**
- ▶ **The network operators are responsible for network losses and purchase the expected losses in their grids. Energy is procured:**
  - on the power exchanges – PEX (day ahead or longer contracts),
  - bilaterally – OTC,
  - by auctions/tenders (generators or traders submit their price offers).
- ▶ **It is common to use more possibilities together, for instance a combination of PEX and bilateral (longer term hedged contracts). Average costs of losses are accepted by the regulator and used in the tariff calculation.**
- ▶ **Losses imbalances are usually handled in the balancing market as any other imbalance.**
- ▶ **This option is used in many Member States, namely in Austria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Iceland, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Romania, Slovenia and Sweden.**

## Procurement solutions in European countries

- **II - Supplier is responsible for the procurement**
  - ▶ Losses are physically injected by the suppliers.
  - ▶ Each supplier injects its own energy for a compensation of the losses related to the consumption of its clients in the same period. Estimated losses are priced at the same price as load.
  - ▶ Losses are treated as any other induced or occurred imbalance, the difference between effective losses and estimated losses on the network is priced at the cost of providing the extra energy on the balancing market.
  - ▶ This option is used in Ireland, Portugal and Spain.

# Procurement solutions in European countries

- Procurement solutions in European countries

	Who	How	Tariffs
<b>Croatia, Cyprus, Czech Republic</b>  <b>Denmark, Estonia, Finland</b>  <b>Germany, Greece, Malta</b>  <b>Netherlands, Slovenia, Sweden</b>	Network operators	PEX or bilaterally (by auctions or tenders)	Paid by network tariffs
<b>Austria, Hungary, Iceland</b>  <b>Latvia, Lithuania, Norway</b>  <b>Poland, Romania</b>			
<b>Ireland, Portugal, Spain</b>	Injected by suppliers		No tariffs for losses

## Power losses procurement and compensation in Portugal

- Power losses procurement and compensation in Portugal
  - ▶ In Europe, there are several possible solutions:
    - included in network tariffs
    - specific tariffs
    - physical injections
    - through power exchange pools.
  - ▶ In Portugal, power losses are physically injected by suppliers. Suppliers are supposed to buy their consumption needs in the most efficient way. If losses are included in these purchases, it is considered that the power losses procurement will be optimized.
  - ▶ Each supplier injects its own energy for compensation of the losses related to the consumption of its clients in the same period, based on hourly losses profiles approved by ERSE.
  - ▶ Regarding the global system energy balance, there is no specific treatment for power losses or dedicated generation groups. Power losses are treated as any other induced or occurred imbalance.

# Power losses procurement and compensation in Portugal

- **Energy procurement**

- ▶ Since power losses are physically injected, there is no specific tariff for losses.
- ▶ For each programming hour, each supplier must inject its own energy, including that one for power losses compensation related to its clients consumption in that period, i.e. injecting its clients' energy consumption quantities affected by hourly losses profiles.
- ▶ These hourly losses profiles are differentiated by network type and voltage level and are approved by ERSE, upon a proposal from the network operators.
- ▶ For a LV client with an  $E_C$  estimated energy consumption for an hour  $h$ , the supplier must provide the injection of the energy  $E_P$  as follows:

$$\text{Hour (h): } E_P = E_C \times (1 + \rho_{HV/RT}) \times (1 + \rho_{HV}) \times (1 + \rho_{MV}) \times (1 + \rho_{LV})$$

where:

$\rho_{HV/RT}$  – VHV transmission network losses profile, including VHV/HV transformers.

$\rho_{HV}$ ,  $\rho_{MV}$  e  $\rho_{LV}$  – HV, MV and LV distribution network losses profiles.

- ▶ For a VHV client with an  $E_C$  estimated energy consumption for an hour  $h$ :

$$\text{Hour (h): } E_P = E_C \times (1 + \rho_{VHV})$$



# Power losses procurement and compensation in Portugal

- Hourly losses profiles
- Hourly values differentiated by network type and voltage level, approved by ERSE, upon a proposal from the network operators.



**ERSE** ENTIDADE REGULADORA DOS SERVIÇOS ENERGÉTICOS

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### Perfis de perdas, perfis de consumo e de autoconsumo, e perfis de produção

A Diretiva n.º 1/2016, de 08 de janeiro, aprova os seguintes perfis a aplicar em 2016 :

- Perfis de perdas para as redes de Baixa Tensão (BT), Média Tensão (MT), Alta Tensão (AT), e rede de transporte a montante (AT/RT) e perfis de perdas aplicáveis a clientes ligados em Muito Alta Tensão (MAT).
- Perfis de consumo de instalações em MT, BTE e BTN, e o diagrama de carga de referência a que se refere o Guia de Medição, Leitura e Disponibilização de Dados de energia elétrica.
- Perfil de consumo aplicável a circuitos de iluminação pública.
- Perfil de produção para instalações de microprodução, miniprodução e Pequena Produção de tecnologia solar fotovoltaica.
- Perfis de autoconsumo aplicáveis às instalações de autoconsumo em BTN.

**Anexos:**

- Diretiva n.º1/2016, de 8 de janeiro
- Perfis de perdas em 2016 para clientes ligados em MAT, e para as redes de BT, MT, AT, e rede de transporte a montante (AT/RT)
- Perfis de consumo em 2016 para instalações em BT e o diagrama de carga de referência
- Perfis de consumo em 2016 para instalações em MT
- Perfis de consumo em 2016 para circuitos de IP
- Perfil em 2016 para instalações de microprodução, miniprodução e PP fotovoltaica
- Perfil de consumo em 2016 aplicável a instalações de Autoconsumo em BTN

**Perfis horários de perdas para as redes em baixa tensão (BT), média tensão (MT), alta tensão (AT), rede de transporte incluindo a transformação na fronteira com a rede de distribuição em AT (AT/RT) e redes em muito alta tensão (MAT), a aplicar entre 1 de janeiro e 31 de dezembro de 2016 ao abrigo da Diretiva ERSE n.º 1/2016, de 29 de dezembro.**

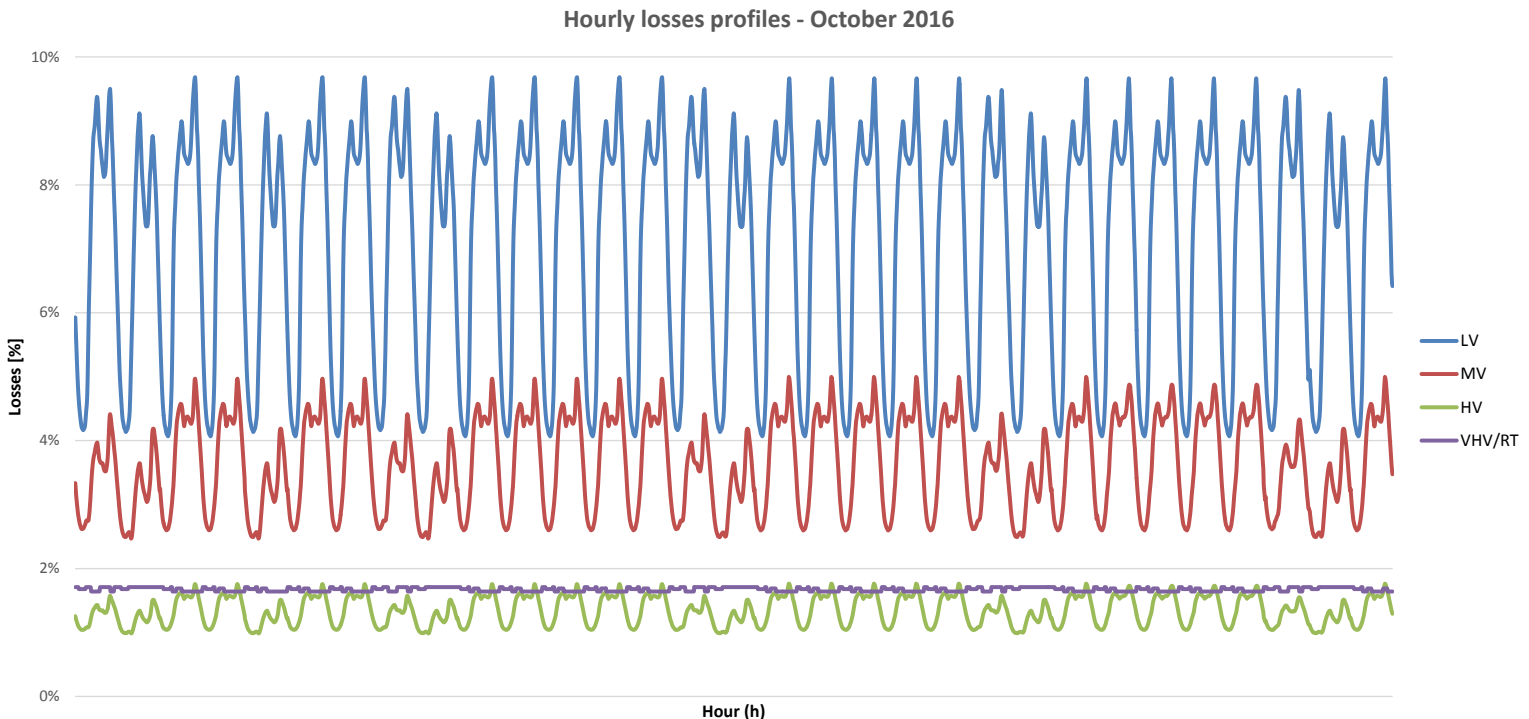
Para efeitos do ajustamento para perdas na rede de transporte, no caso dos clientes ligados em BT, MT e AT deverão ser utilizados os perfis de perdas da coluna AT/RT em vez dos da coluna MAT. Para os clientes ligados diretamente em MAT deverão ser utilizados apenas os perfis de perdas da coluna MAT.

Data	Dia	Hora	Perfis de perdas				
			BT	MT	AT	AT/RT	MAT
1-jan-2016	sex	00:15	0,090719	0,042274	0,014852	0,017100	0,012800
1-jan-2016	sex	00:30	0,087982	0,041045	0,014480	0,017100	0,012800
1-jan-2016	sex	00:45	0,084948	0,039765	0,014091	0,017100	0,012800
1-jan-2016	sex	01:00	0,081988	0,038708	0,013771	0,017100	0,012800
1-jan-2016	sex	01:15	0,078764	0,037610	0,013435	0,017100	0,012800
1-jan-2016	sex	01:30	0,075983	0,036599	0,013122	0,017100	0,012800
1-jan-2016	sex	01:45	0,073197	0,035582	0,012808	0,017100	0,012800
1-jan-2016	sex	02:00	0,070707	0,034829	0,012580	0,017100	0,012800
1-jan-2016	sex	02:15	0,068249	0,034090	0,012360	0,016800	0,012600
1-jan-2016	sex	02:30	0,066024	0,033407	0,012153	0,016800	0,012600
1-jan-2016	sex	02:45	0,064235	0,032823	0,011973	0,016800	0,012600
1-jan-2016	sex	03:00	0,062572	0,032286	0,011806	0,016800	0,012600
1-jan-2016	sex	03:15	0,060933	0,031761	0,011642	0,016800	0,012600
1-jan-2016	sex	03:30	0,059304	0,031243	0,011479	0,016800	0,012600
1-jan-2016	sex	03:45	0,058056	0,030808	0,011345	0,016800	0,012600
1-jan-2016	sex	04:00	0,057153	0,030554	0,011266	0,016800	0,012600
1-jan-2016	sex	04:15	0,056565	0,030380	0,011212	0,016800	0,012600
1-jan-2016	sex	04:30	0,055941	0,030196	0,011157	0,016800	0,012600
1-jan-2016	sex	04:45	0,055336	0,030001	0,011101	0,016800	0,012600
1-jan-2016	sex	05:00	0,054652	0,029810	0,011040	0,016800	0,012600
1-jan-2016	sex	05:15	0,054126	0,029665	0,010987	0,016800	0,012600
1-jan-2016	sex	05:30	0,053704	0,029545	0,010938	0,016800	0,012600
1-jan-2016	sex	05:45	0,053336	0,029438	0,010901	0,016800	0,012600
1-jan-2016	sex	06:00	0,052969	0,029391	0,010894	0,016800	0,012600

Perfis Perdas 2016

# Power losses procurement and compensation in Portugal

- Hourly losses profiles
- ▶ Hourly values differentiated by network type and voltage level, approved by ERSE, upon a proposal from the network operators.



# Power losses procurement and compensation in Portugal

- Concerning tariffs

- ▶ Regarding tariffs, the prices of the components of each related tariff (Networks and Global Use of the System) are affected by losses adjustment factors.
- ▶ These factors convert the consumption quantities measured at the client referential (metering point for tariff application) to the energy injection referential (assumed to be VHV plant bus bars).

- Losses adjustment factors

- ▶ These losses adjustment factors, differentiated by network type, by voltage level and by day time period (peak, partial peak, valley, and super valley) are approved and published by ERSE every year, upon a proposal from network operators.
- ▶ Losses adjustment factors for the current year (2016), in percentage:

		Hourly period			
		Peak	Partial peak	Valley	Super valley
Transm.	$\gamma_{VHV}$	1,25	1,21	1,26	1,25
	$\gamma_{HV/RT}$	1,67	1,61	1,69	1,66
Distrib.	$\gamma_{HV}$	1,62	1,46	1,21	1,01
	$\gamma_{MV}$	4,72	4,15	3,36	2,68
	$\gamma_{LV}$	9,68	8,69	7,46	4,56

## Comparison with 2008

(From the)

► **Treatment of Losses by Network Operators**

**ERGEG Position paper for public consultation**

Ref: E08-ENM-04-03 (15 July 2008)

### 6.5 Tariffs and regulation

In many countries like France, Sweden, Norway, Finland and the Czech Republic, where the network operators are responsible for the coverage of the network losses, there are no special tariffs for losses. Therefore the costs for the procurement of the losses have to be considered and included in the network tariffs.

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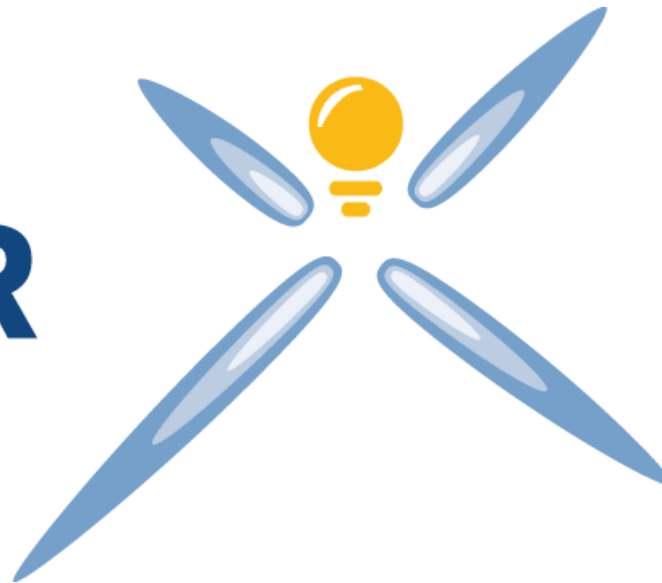
In Austria, the network operator is also responsible for the procurement of losses but there is a special network tariff for losses which has to be paid by the customers in addition to the tariffs for the use of the network. The tariff for losses is calculated by the regulatory authority according to a formula which considers peak and base components in the procurement of the losses. There are different tariffs for losses in different voltage levels and network areas.

Portugal has a model for the covering losses which is very different to the models of the other analyzed Member States. In Portugal, the supplier has to inject the energy for the compensation of losses physically and therefore there is no special tariff for losses. The suppliers are obliged to inject the energy for the compensation of the losses related to the consumption of their customers according to special losses profiles which are suggested by the network operators and approved by the regulatory authority.

# Thank you for your attention!

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