



## Regional seminar: INOGATE PC convergence with EU Electricity and Gas Tariffs



## European Tariff Methodologies: Common themes and practices

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Budapest, October 31, 2013

# Agenda



- Liberalisation of electricity and gas markets
- Pricing principles
- Revenue requirement
- Valuation of the regulatory asset base (RAB)
- Rate of return
- Tariff structures

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# Liberalisation of the energy market in the EU



# Towards competitive market

Competitive pan-European market?

2015

Implementation of the 3<sup>rd</sup> package

2011

3<sup>rd</sup> package: Electricity and Gas directives, Regulations

2009

2003

2nd Electricity and Gas directives

1998

1<sup>st</sup> Gas directive

1996

1<sup>st</sup> Electricity directive



# Pricing in a competitive market



**Wholesale:**  
Bilateral,  
PX

+

**System use charges:**  
Network use  
System operation  
Cross-border capacity use

+

**Retail margin:**  
Risk management services

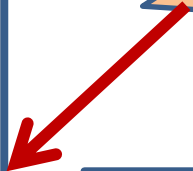
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**Final purchase price**

+

taxes

regulated



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# ERGEG advised the EU regulators already in 2007



- End-user price **regulation** should be abolished as it distorts the functioning of the market
- It asked all regulators to provide plans to remove any price regulation
- in some countries, although in theory the market is open, in practice there may still be only one supplier and a consequent lack of choice for consumers

# Price regulation fails to activate consumers and suppliers



*REGULATED PRICES FOR  
HOUSEHOLD CONSUMERS AND  
INDUSTRIAL CONSUMERS, IN GAS  
AND/OR OF ELECTRICITY*



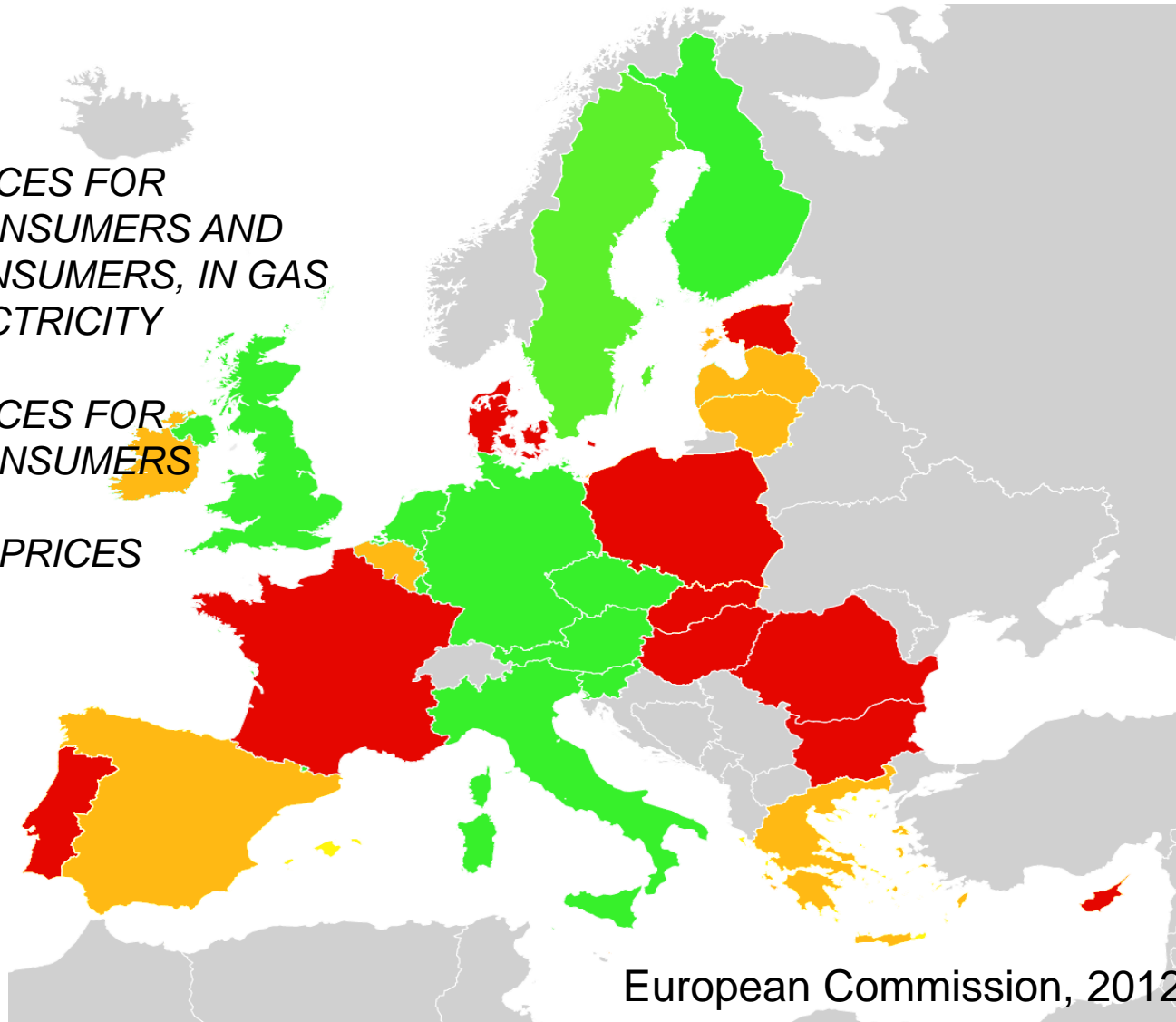
*REGULATED PRICES FOR  
HOUSEHOLD CONSUMERS*



*NO REGULATED PRICES*

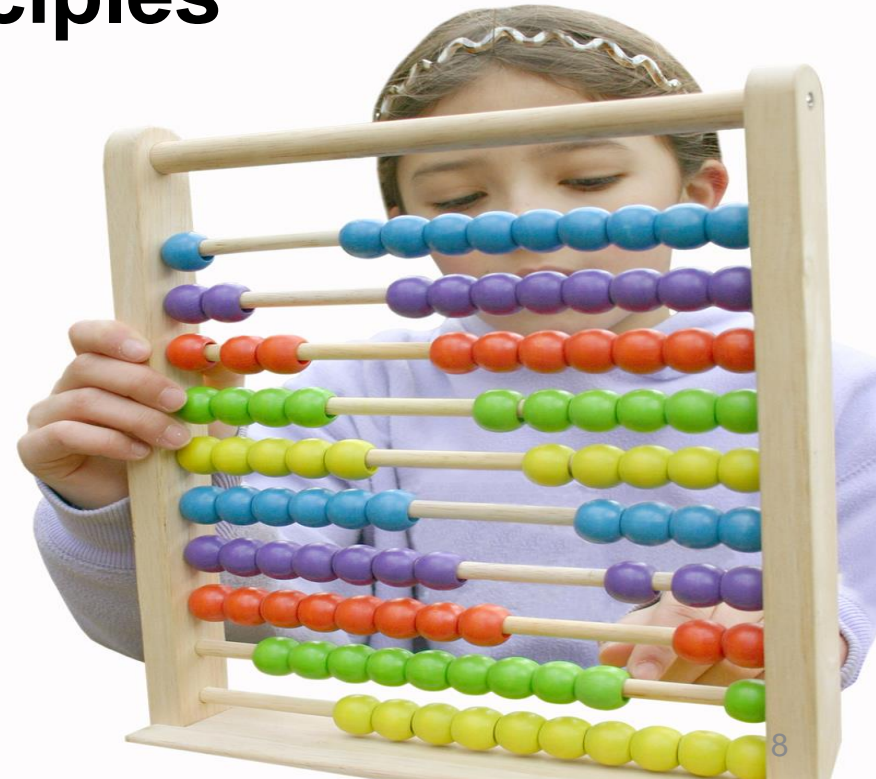


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European Commission, 2012

# Pricing principles





# The main principle of the price regulation



The regulator should set *regulated tariffs* for the regulated companies so that the regulated tariffs allow the companies to earn a revenue that covers the “*justified costs*” of their operation, that is the costs that are *necessary* and *unavoidable* to provide the regulated service at a *predefined level of quality*

# The main approaches to pricing



- Traditional cost plus
- Incentive pricing
  - price cap
  - revenue cap
  - hybrid cap
  - yardstick competition
  - benchmarking
  - etc.

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# Approaches in some EU MS



Country	Electricity		Gas	
	TSO	DSO	TSO	DSO
AT	RR	PC	RR	PC
CZ	RC	RC	RC	RC
EE	RC	RC	RC	RC
GB	RC	HC	RC	RC
IT	RC	RC	RC	RC
PL	RC	RC	RC	RC
SI	HC	HC	HC	HC
ES	RC	RC	CP	...

RR – rate of return, PC – price cap, RC – revenue cap,  
 HC – hybrid cap, CP – cost plus

# Different length of the regulatory period



Length	Electricity TSO	Electricity DSO
1 year	AT, ES	DK, SE
3 years	LT, NL, PT, SI	LT, NL, PT, SI
4 years	BE, FI, HU, IT	BE, FI, HU, IT
5 years	majority	majority

Majority of the regulators are applying 5 years regulatory period but there are some exceptions

# Pricing is a two step procedure



1. Regulator determines the revenue requirements for the regulated company
2. Regulator chooses a tariff structure which allows the company to obtain enough revenues to cover its cost and earn a reasonable return

*alternatively*

Regulator revises a tariff structure proposed by the company

# Calculation of the revenue requirement



# Calculating the revenue requirement



- Revenue Requirement - total (annual) revenue which covers the operating expenses (including depreciation and taxes) of supplier(s) of a given service or product and ensures (them) a fair rate of return on assets utilized.
- Setting revenue requirement (RR) can substantially affect the profitability of the firm as well as the costs of ratepayers.
- Calculating RR is usually the first step of each well-known price regulation methodology (cost-plus regulation, incentive price regulation methods etc).

# The main formula

Typical formula of revenue requirement (RR) is the following:

$$RR = O + D + T + r * B$$

*where*

RR = Revenue Requirement

O = Operating Expenses

D = Depreciation

T = Taxes

r = allowed rate of return

B = rate base (or regulatory asset base – RAB)





# Necessary costs



- Regulator will accept only reasonable and necessary costs in calculation of the Revenue Requirement
- How to know if certain costs are reasonable and necessary?
- Benchmarking if there are several similar companies (e.g. electricity distribution)
- International benchmarking may give some comparison, but due to different legal background it could also mislead

# Historic data



- Historic data is very useful for understanding the costs' levels as also their development
- But one should ask if company was managed and operated efficiently
- When setting tariffs regulator needs to evaluate the future costs, therefore some forecasts should be calculated
- The forecasts should evaluate the historic trends, current developments and make comparisons with such costs elements of similar companies

# Asymmetry of information



**Regulator**

Decisions to be made on the basis of best available information

**Regulated company**

Distort information in order to serve the profitability objective (shareholders interest)

# Normative values



- Some regulators are trying to give a scientific justification to almost all cost elements – theoretical values are calculated based on complicated formulas and assumptions
- Though it is rather popular, especially in the CIS countries, one should understand that theory may significantly differ from reality
- Therefore, theoretical normative values may be used as benchmarks only
- Price regulation is more art than science 😊

# Regulatory asset base (RAB)

- RAB usually refers to the measure of the net value of a company's regulated assets used in price regulation
- RAB drives two of the fundamental building blocks that make up the company's revenue requirements:
  - the return on capital (i.e. the return on the RAB) and
  - the depreciation allowance
- RAB is a key determinant of prices that may be charged for regulated services in the future



# RAB initial value



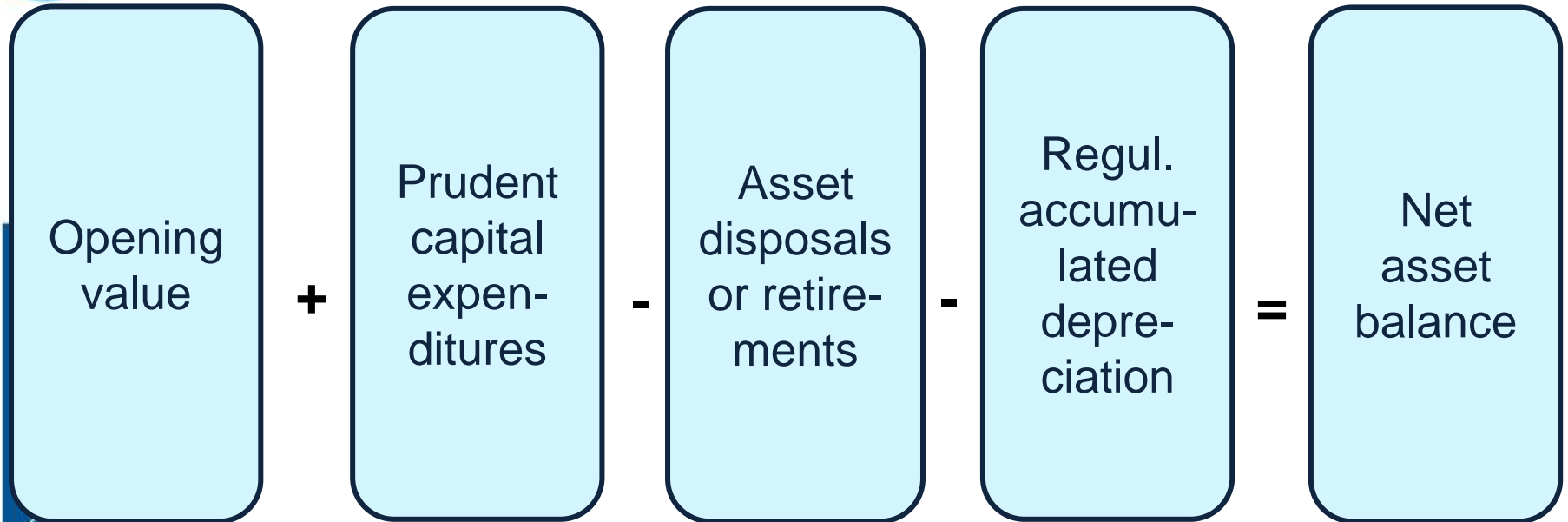
- RAB is compilation and summation of the assets used in providing the regulated service
  - generally only includes those assets funded with investor money
  - regulators do not generally recognise intangible assets such as goodwill
  - RAB should include the assets used for the provision of the regulated services only
  - excludes customer contributed assets
- RAB is the investment base upon which the provider is permitted to earn a reasonable return

# Fair value of RAB

- provision of certainty for investors
- provision of incentives for investors
- fairness - including:
  - sharing benefits between investors and customers
  - continuity of initial price level for social reasons
- provision of correct price signals for consumption, investment etc.
- interpretation of the regulatory 'contract' - in what state are assets expected to be kept?



# RAB calculation



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# Capital contributions



- Capital contributions comprise of:
  - grants obtained from international institutions and/or the government and
  - direct payments by the user of a specific service for an asset, e.g. connection payments
- The assets financed by the capital contributions should be excluded from the RAB
- Therefore, it is necessary to disclose the values of capital contributions (for existing assets and for new investments) in order to ensure transparency of the process

# Working capital



- To the extent that the time at which a particular cost is incurred is not matched with its recovery (via tariff revenues), then capital is required to cover the time lag – working capital
- An investment in working capital is a necessary part of conducting a regulated business
- In addition, there is also place for a return on the working capital similar to the requirement for a return on capital assets

# Construction work in progress (CWIP)



- Most of the regulators think that new capital expenditure should be introduced in the RAB on the basis of actual costs incurred up to the point at which the assets become operational
- Some regulators include construction work in progress in the RAB when construction is to be completed within a relatively short period of time, e.g. in one year
- There is also the question of prudent investment when considering whether the full cost of new investment should be added to the RAB

# New investments



- Different type of investments
  - extension investments: all investments needed for meeting the change of load and generation patterns in the future
  - replacement investments: all investments related to replacement of aged (technically or economically) equipment
  - exceptional investments: investment resulting from e.g. new legal obligations.
- Some investments could be both for network extension and for replacement reasons (e.g. replacement of an old transformer with a new one but more powerful)

# Used and useful concept

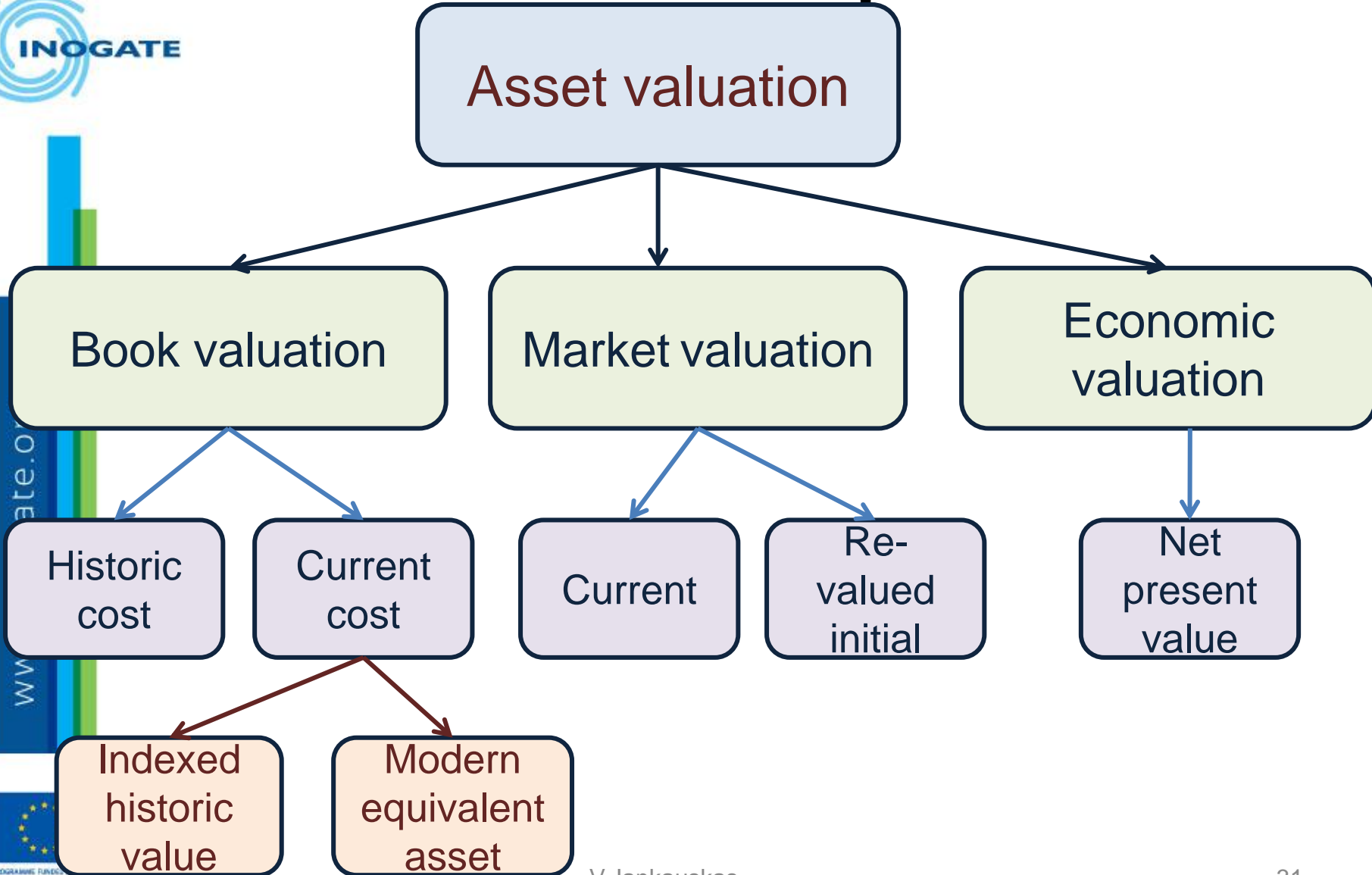


- Regulator needs to consider whether the company's assets are sufficient to carry the regulated activity
- On the other hand, if a regulated company has excessive number of assets the regulator may decide not to include these assets into the RAB
- Although the assets are being “used” the question is whether they are actually “useful”

# Asset valuation



# Asset valuation options



# Historic cost

- The historic cost methodology values assets at their original purchase price
- It has several advantages:
  - it is administratively efficient and can be easily audited because the data should be available from financial statements;
  - it is relatively inexpensive since it does not require experts to determine costs;
  - and it is objective because it relies on actual data rather than judgements





# Indexation



- This is the procedure for adjusting the value of the asset base for the effect of inflation
- Indexation should measure movements in the current replacement cost of the assets
- Consumer price index or industrial price index?

# Replacement cost

- Calculates the cost of replacing an asset with another asset (not necessarily the same) that will provide the same services and capacity as the existing asset
- The assets are valued based on what it would cost to replace them today
- Replacement costs reflect the price that a firm with a certain service requirement would pay for existing assets in preference to replicating the assets



# Fair market value



- Sum of the prices that would be obtained from selling each of the assets in a competitive market
- What a third party would pay in an arm's length transaction
- Difficult if no active market, especially for large, specialised items
- Romanian example

# Valuation of assets in the CEE countries



- In many CEE countries assets of the energy companies were not properly valued, historic cost was very low
- Indexations were not sufficient and many countries introduced the replacement cost principle for re-evaluation
- E.g. in Romania asset value of the distribution companies after the re-evaluation increased from 3 to 7 times
- But it was impossible to put it into the revenue requirement

# Bad example: Lithuania



- One of the two distribution companies (0.7 million customers) was privatised in 2003 by the local biggest retailer
- Competitive process, good price, but...
- Law on Electricity was amended after the privatisation, in 2004
- Assets were re-valued in 2004, increasing their value by factor 3
- Consequently tariffs were raised
- Result: consumers complaining that the private investor caused such an increase of tariffs

# Lessons from the CEE countries



Privatisation of the distribution utilities in Bulgaria, Romania and Macedonia has shown that

- necessary to increase the asset value before the privatisation as it was usually kept too low
- could be too painful to switch to the replacement value of assets
- therefore it is important to agree on the re-valuation of assets before the privatisation and on their further regulatory treatment
- Romania agreed on the market value

# Example: RAB calculation in some CEE countries

Country	CWIP included	CC included	Assets value	Revaluation
Bulgaria	no	yes	historic	yes
Croatia	yes	no	historic	no
Estonia	no	no	historic	yes
Hungary	no	no	replacement	yes
Lithuania	no	no	replacement	yes
Serbia	yes	no	historic	yes
Slovakia	yes	no	replacement	yes

# Rate of return





# Rate of return



- Rate of return ( $r$ ) is the expected yield from the company (industry), taking into account the costs of financing the business (cost of capital)
- The cost of capital is usually measured as the Weighted Average Cost of Capital (WACC)
- The  $r$  sets the return that can be earned on:
  - existing assets and
  - net investment
- This is a mixture of debt and equity

# Rate of return

**Equity**

Equity holders are „residual claimants” on the revenues – the rest after all payment obligations are allocated to them

Returns of other possible investments with similar risks (opportunity cost)

**Debt**

Debt providers require a fixed interest rate on their investments

Interest expenses



# Capital gearing ratio

It is a financial ratio that compares some form of owner's equity (or capital) to borrowed funds

- Gearing is a measure of financial leverage, demonstrating the degree to which a firm's activities are funded by owner's funds versus creditor's fund
- The share of borrowed funds may differ from 30% in the Czech Republic to 70% in Austria (by assumptions of national regulators)



# Weighted average cost of capital



$$WACC = r_e \frac{E}{E + D} + r_d(1 + t) \frac{D}{E + D}$$

where

$r_e$  = required rate of return on equity

$r_d$  = rate of return on debt

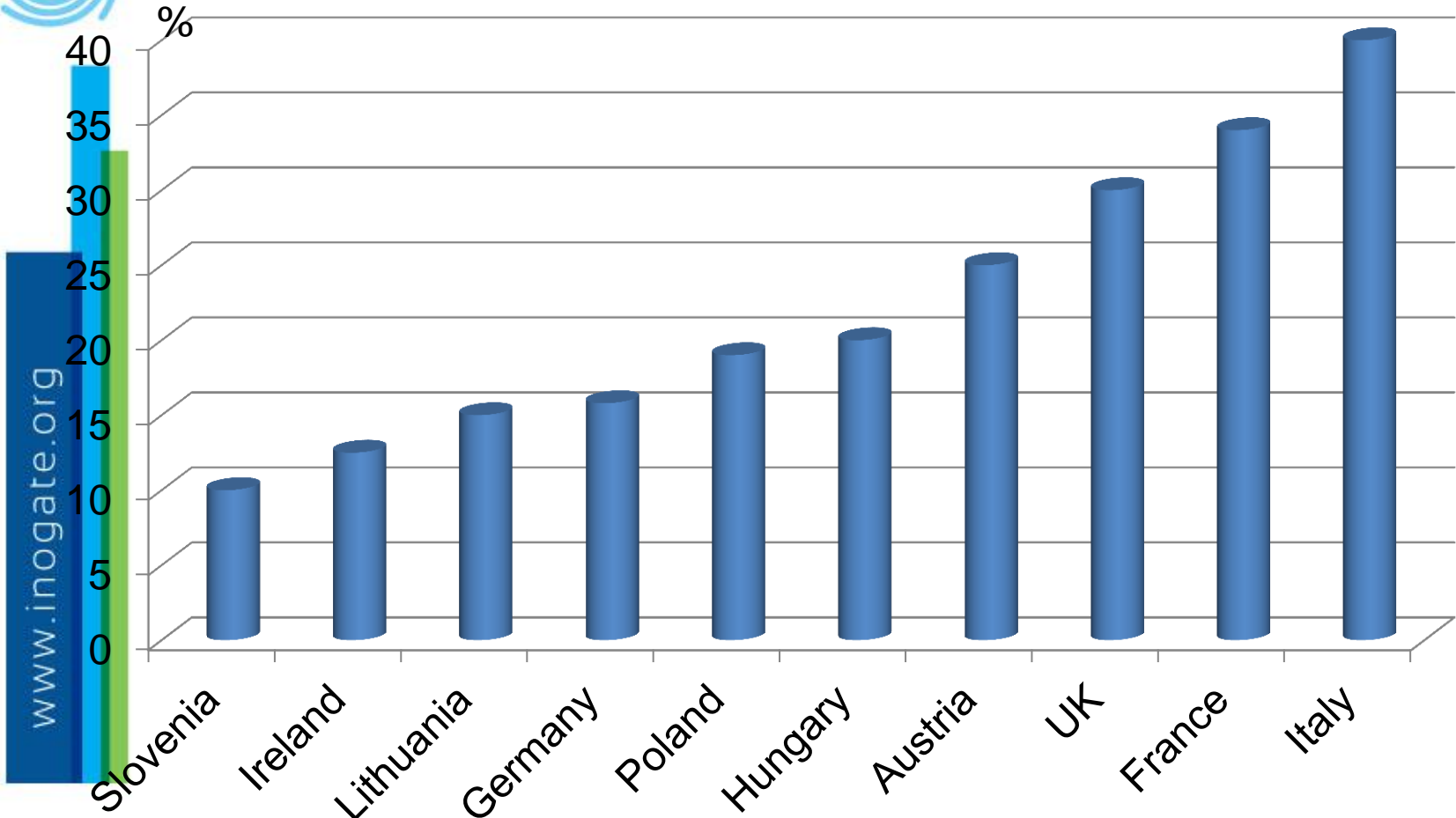
E = equity

D = debt

t = corporate tax rate

# Different tax rates in the EU countries

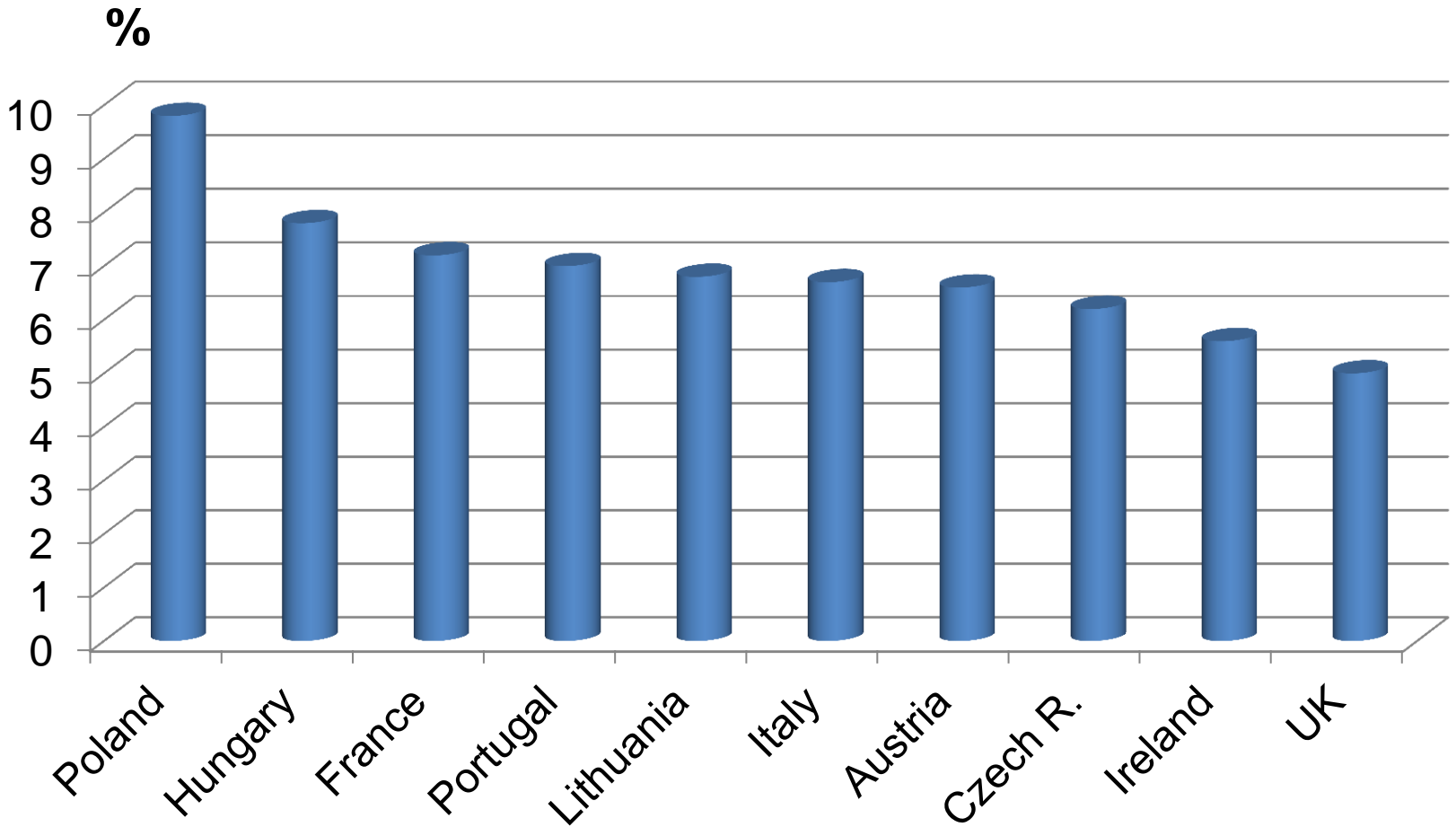
2009



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# WACC of some European TSOs





# Tariff structures

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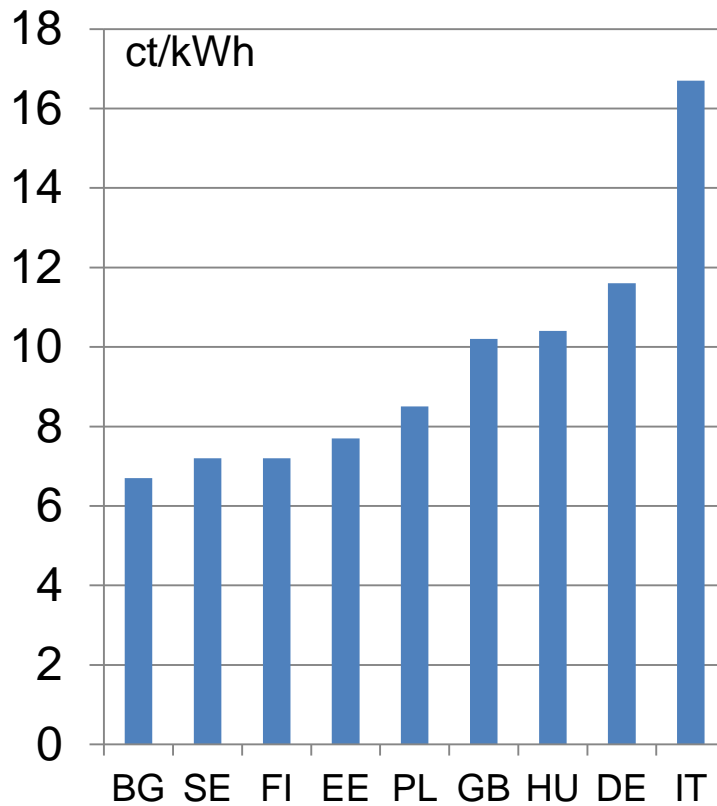


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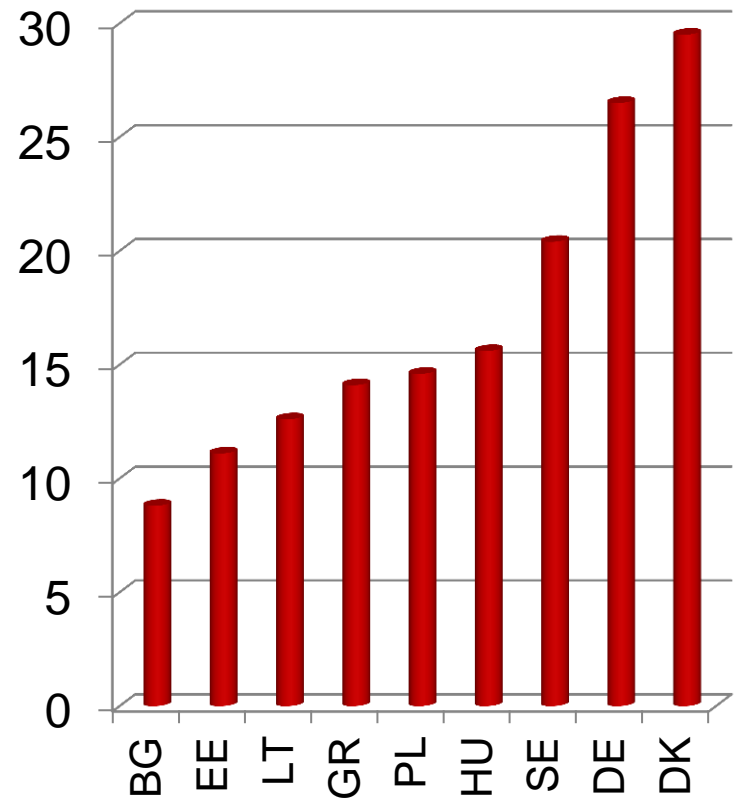
# Average electricity prices, May 2013



## industrial



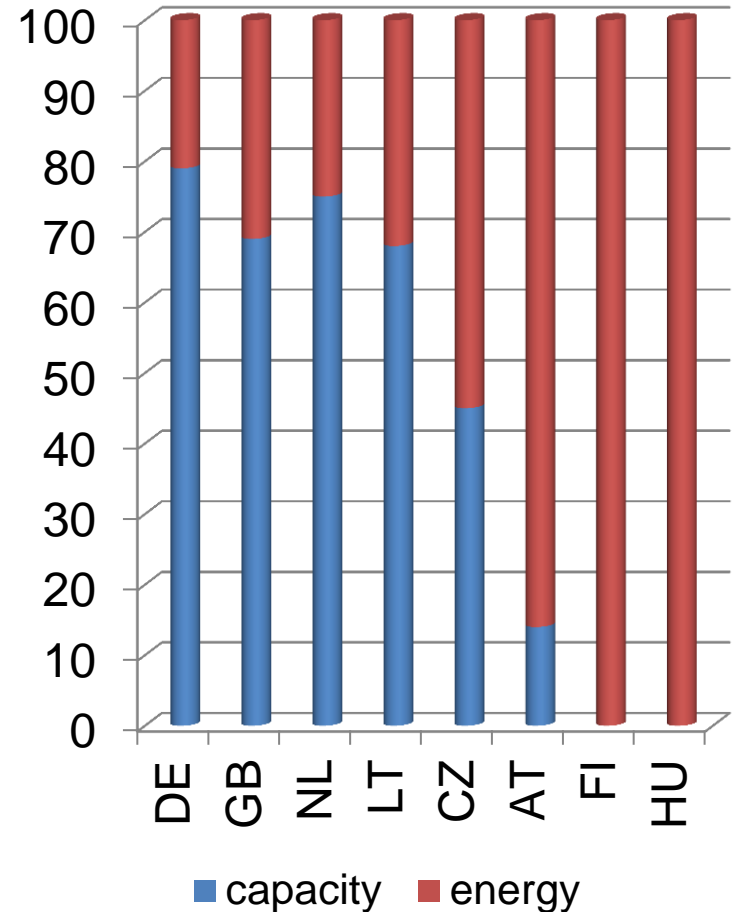
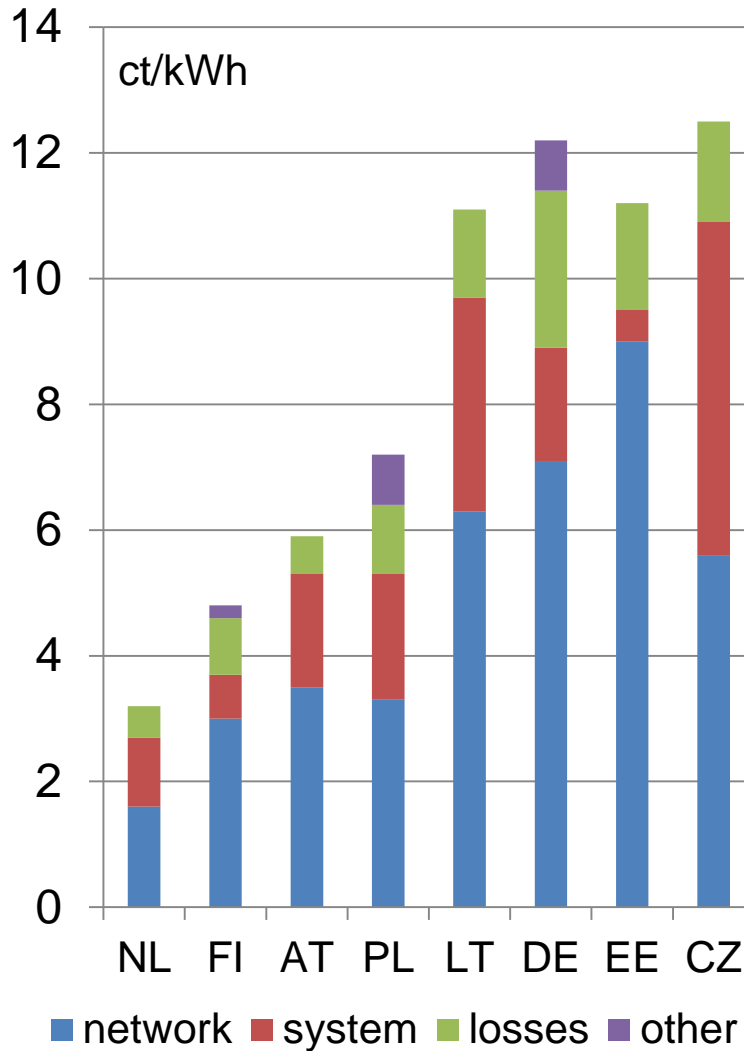
## residential



Source: [www.energy.eu](http://www.energy.eu)



# Structure of electricity transmission tariffs



# The tariff structure



The optimal degree of complexity of the tariff depends on:

- response possibility of customers concerned - e.g. major industrial customers could respond much more than residential ones
- metering and implementation costs associated with the tariff structure envisioned

=> large industrial consumers require complex tariff structure, residential consumers - simple

# Possible gas tariffs

	Tariff type	Energy component	Capacity component
Transportation	Two component	€/m <sup>3</sup>	€/m <sup>3</sup> /hour/year differentiated by entry and exit points
Distribution	Two component	€/m <sup>3</sup>	€/m <sup>3</sup> /hour/year
Storage	Four component	Injection fee €/m <sup>3</sup> Withdrawal fee €/m <sup>3</sup>	Mobile fee (annual): after maximum booked storage capacity (€/m <sup>3</sup> ) Peak fee (annual): after maximum booked withdrawal capacity (€/m <sup>3</sup> /day/year)
Retail	Two component	€/MJ or €/kWh	€ or €/kWh/day

# Tariffs for residential consumers in Warsaw, 2009



Charge	G11	G12
Quality charge, zł/MWh	9.8	
Transition fee, zł/month for consumption		
< 500 kWh/year	0.36	
501-1200 kWh/year	1.54	
>1200 kWh/year	4.86	
Day and night tariff, zł/kWh	0.1661	
Day tariff, zł/kWh		0.1778
Night tariff, zł/kWh		0.0789
Network fee, zł/month, 1 phase	1.22	4.2
Network fee, zł/month, 3 phase	2.68	6.15
Customer charge, semi-annual settlement, zł/month	0.96	
Customer charge, monthly settlement, zł/month	4.99	



# Thank you

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