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McKinsey & Company


Distribution Regulation in Europe: Time for Change

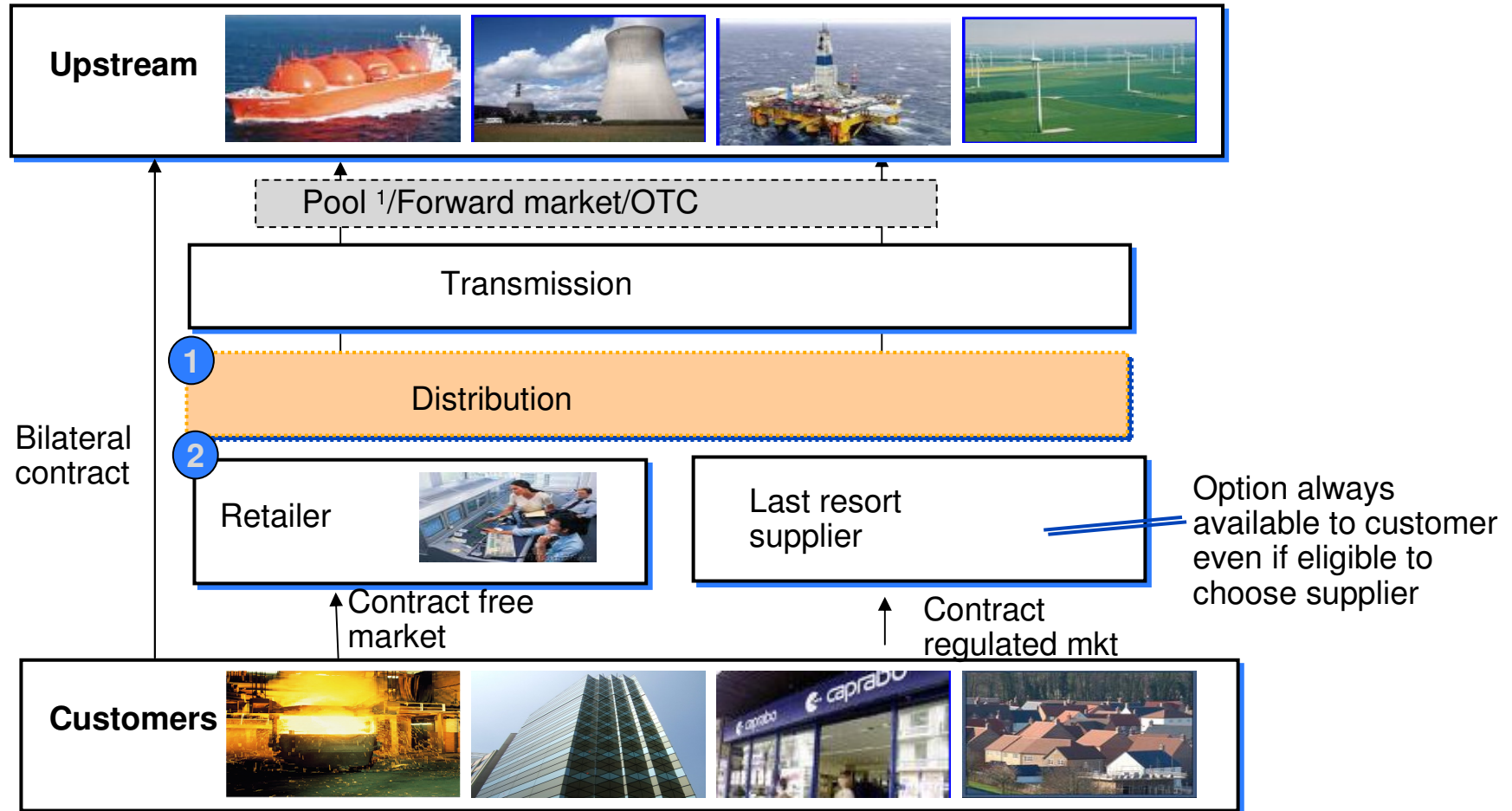
ANEEL Tariff Structure Seminar

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Overall value chain in the European market

SIMPLIFIED

 Focus of this section

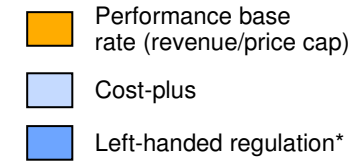


1 Only for electricity

Power distribution regulation in Europe: Time for Change

- **The success of performance base rate (PBR) model in the last decade**
- Why PBR model doesn't work anymore in the new context of distribution industry
- What's next? How to rethink distribution regulation

Most EU countries have evolved toward PBR regulation



1995 – northern pioneers

2000 – north and south

2009 – Germany



* Distribution tariff negotiated between grid companies and retail players

** Rate of return for transmission (Portugal)

Source: Regulators; European Commission; www.iern.net



PBR motivates efficiency, allowing top performers to gain extra profits

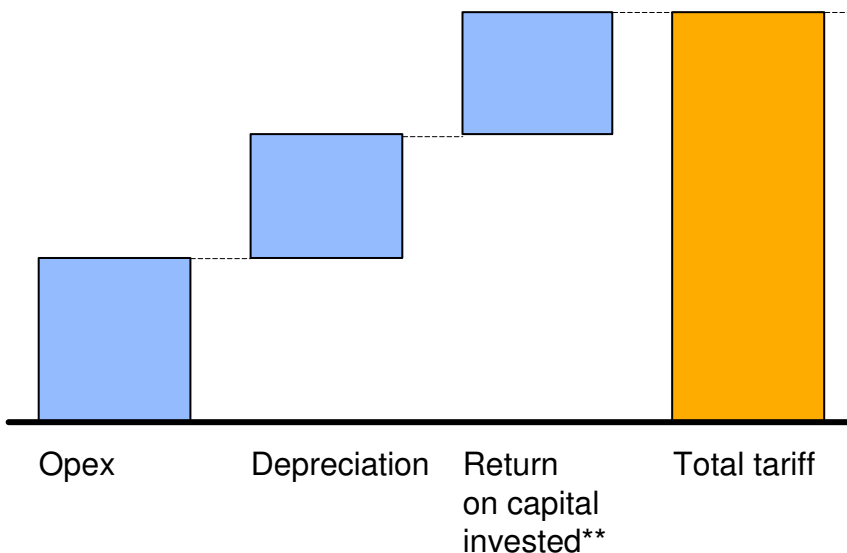
ILLUSTRATIVE

■ Extra profit for utility

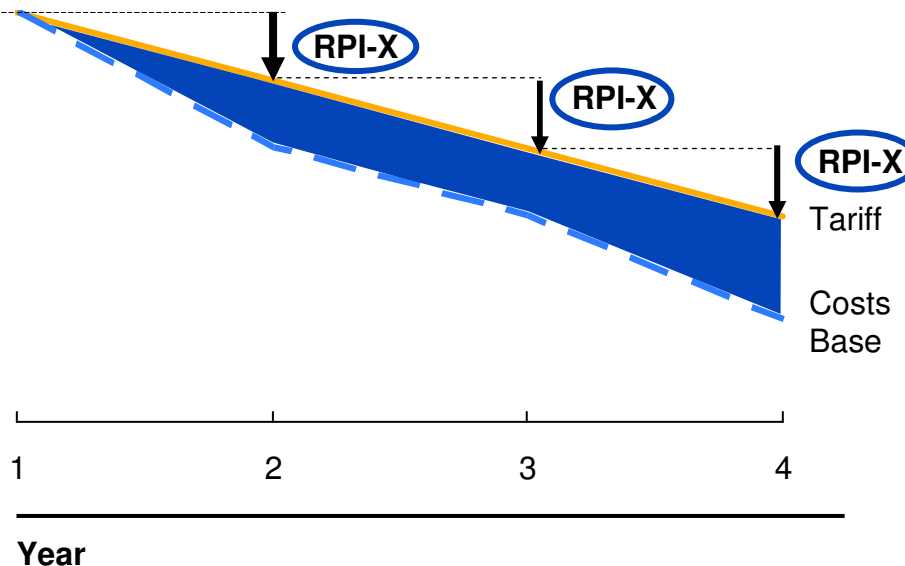
- Initial tariff set to cover the costs of the business
- Various methods to calculate them
 - **Historical:** Costs at year N-1
 - **Parametric/benchmarking:** Costs defined through a benchmarking and /or a statistical model correlating various operators' cost data
 - **Standard costs:** Cost of an ideal player

- Tariff evolve with RPI-X
- X is the “cap” imposed by regulator and can be set on total revenues or unit tariff. It can be applied on opex tariff component, on opex and depreciation, or on all the tariff baseline
- Utility makes extra profit if it is able to reduce the cost more than RPI-X target

Set up initial tariff for year one



Tariff evolution: RPI*-X

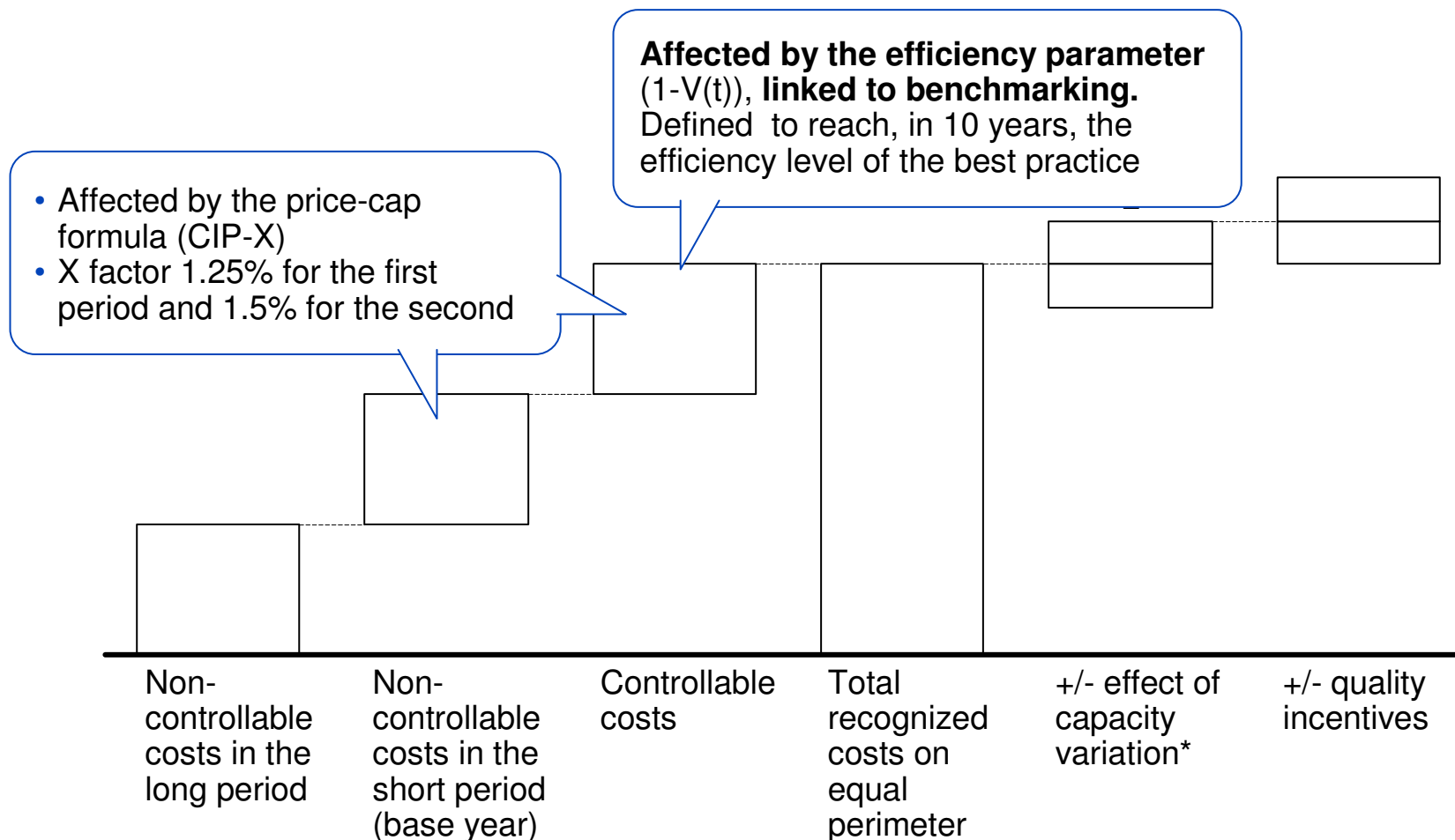


* Retail Price Index

** Usually defined as WACC (real –pretax) x RAB (Regulated Asset Based)

Set up of initial tariff and efficiency parameters in PBR systems – example of use of benchmarking

GERMANY PBR EXAMPLE

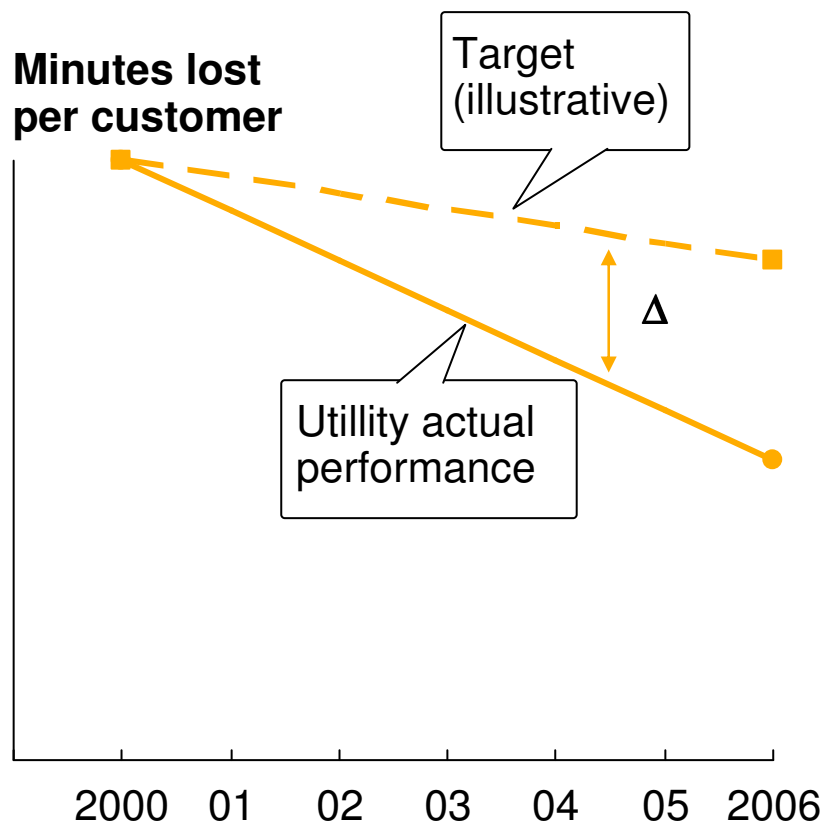


* Specific formula linked to factors influenced by capacity (peak demand, number of connections,..)
Source: EnWG, Bundesnetzagentur



Quality incentives under PBR regime – example interruption time

Italy quality incentives scheme
2000-03 regulation



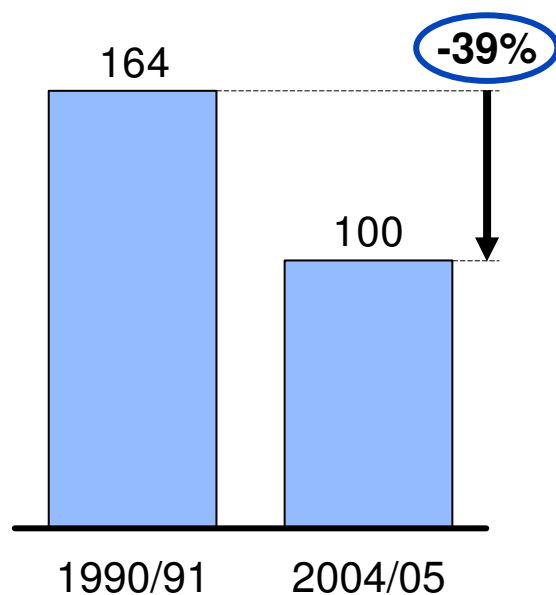
- Drastic target required - X0% within 2006
- Strong penalty/incentive to achieve target
 - ~EUR 0.3/yr per min per customer
 - ~EUR 10 million/yr for a Δ of 1 minute

PBR model at work: benefits for the customers and for utilities

GB EXAMPLE

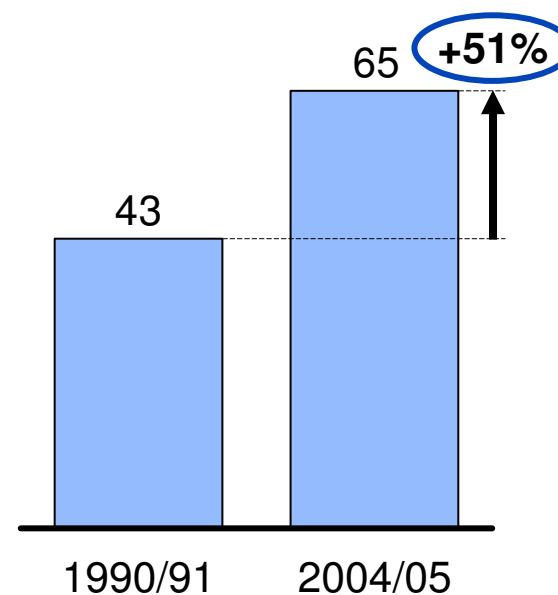
Better quality for the customer

Minutes lost per customer



Better margins for utilities

EBITDA margin, % on revenues



**Improvements obtained while
distribution tariff reduced in real terms**

Power distribution regulation in Europe: Time for change!

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- What's next? How to rethink distribution regulation

Uncertain future for current PBR model

Current PBR model

- Strong push for efficiency... ... **but** ...

Current distribution context

- ... in many countries, best practice levels already achieved

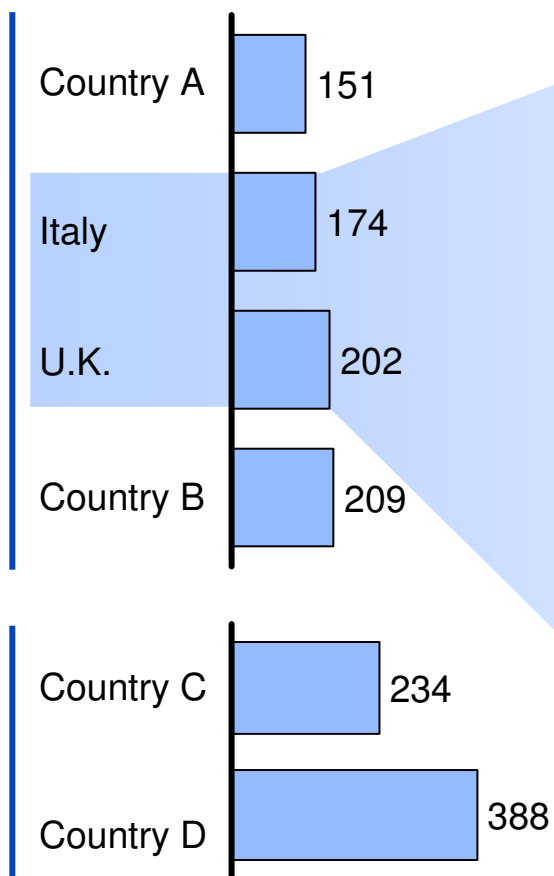


PBR, where adopted, has already forced significant cost reduction up to known best practices level

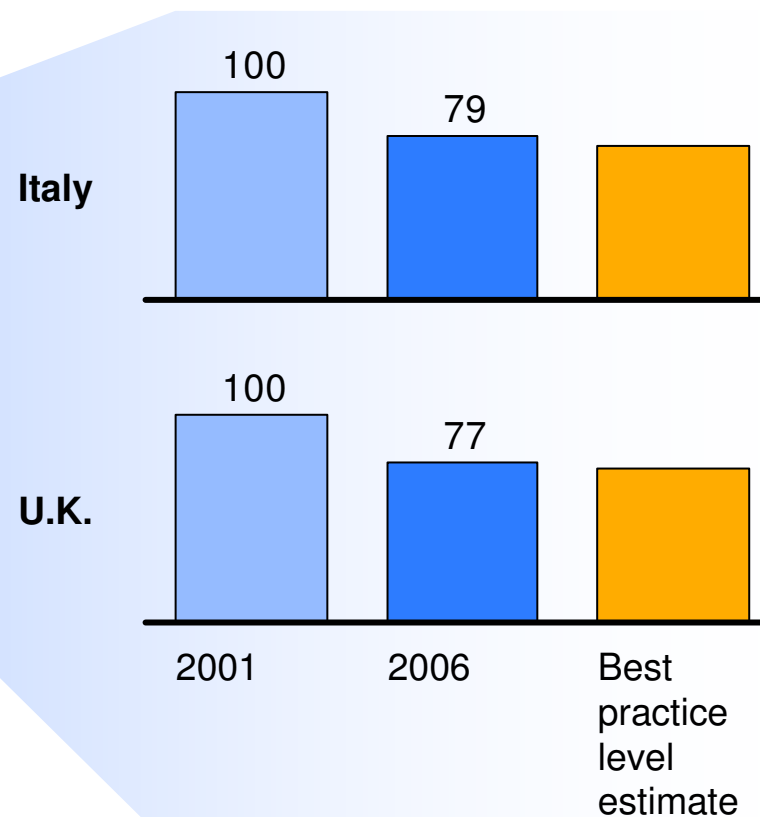
Average power distribution tariff
€/customer, 2007

Performance base rate (PBR) regulation

"Cost-plus" regulation



Cost levels close to best practice limits in PBR countries – examples
€/customer, opex nominal index



Sources: U.K. regulatory accounts; annual reports; team analysis



Uncertain future for current PBR model

Current PBR model

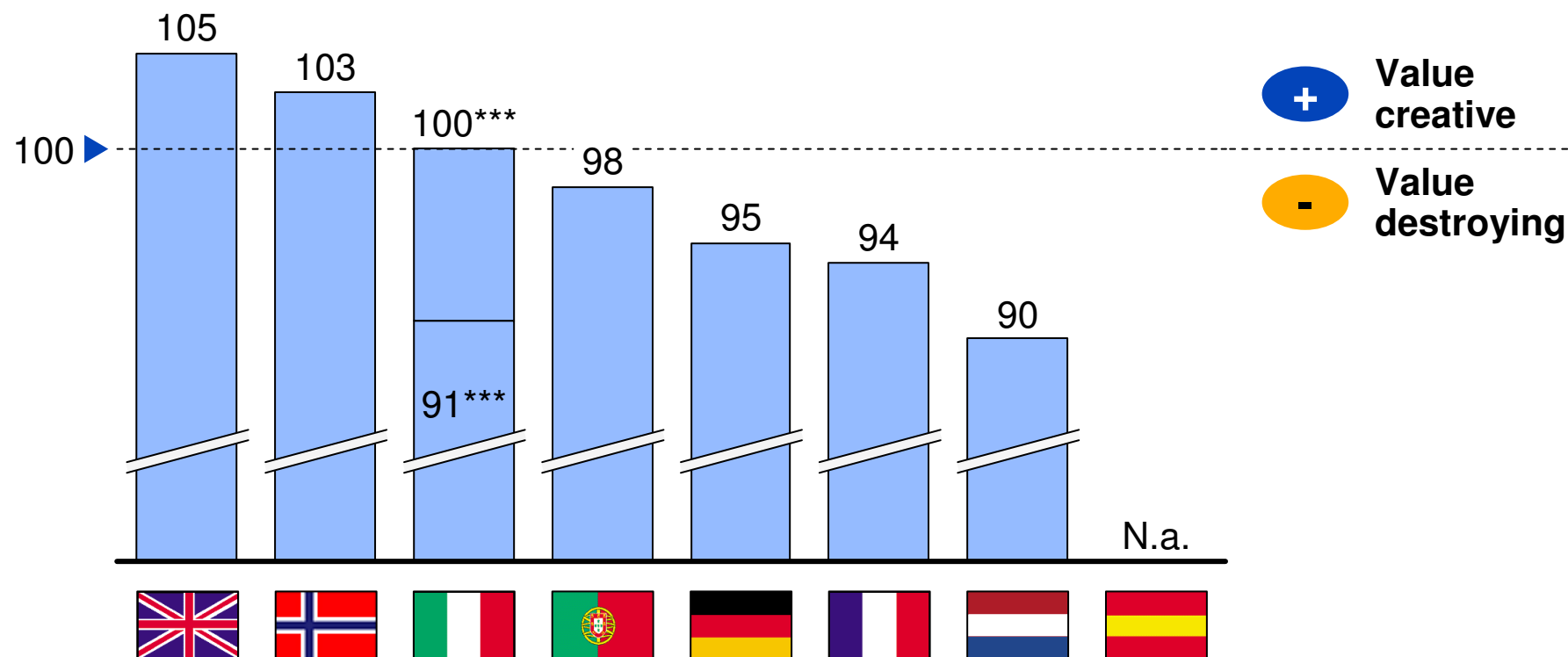
- Strong push for efficiency... ... **but** ...
- In many regions, no value creation for new investments (especially on power distribution) ... **but** ...

Current distribution context

- ... in many countries, best practice levels already achieved
- ... huge need for new investments in the coming years

Insufficient return often allowed on new investments

PV* of tariff corresponded for a EUR 100 new investment**
Power distribution, 2007



* Discount rate equal to Market WACC, estimated considering the EU average of business specific parameters set by regulator (Beta unlevered, spread on debt, MRP, D/E) and separately for each country the country specific parameters (tax rate, tax shield, inflation, risk free rate)

** PV of incremental investments reflected in tariff may slightly differ from PV of existing assets or systems with Regulatory periods longer than 1 year

*** 91 without incentives (base remuneration); 100 with maximum incentives (+2% on base WACC for 12 years)

Source: Regulators EU countries

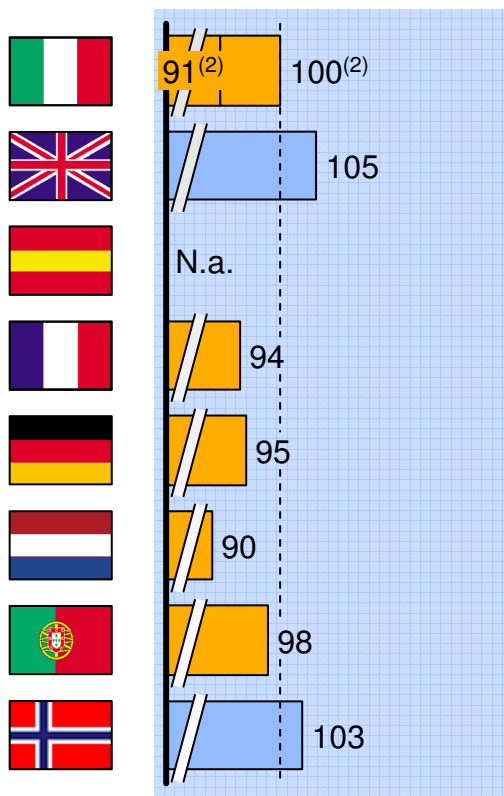


Returns in power distribution generally lower than in transmission and in gas T&D

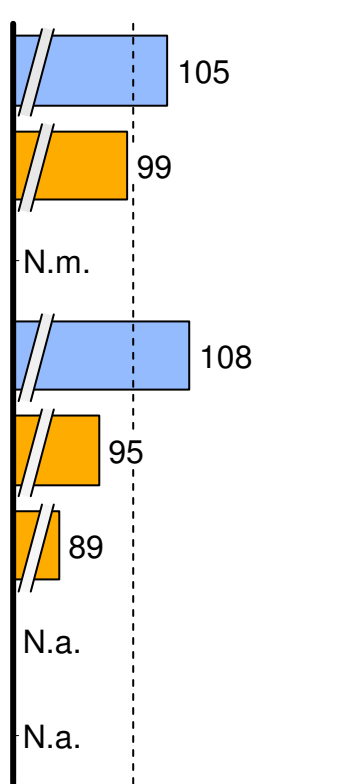
Present Value⁽¹⁾ of the EUR 100 incremental investment, 2007

Distribution

Power

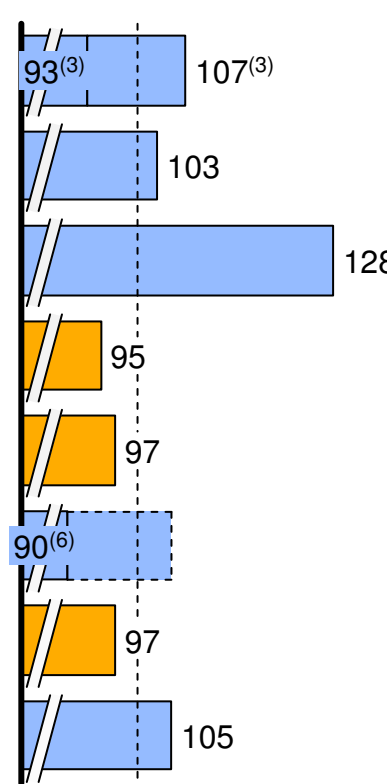


Gas

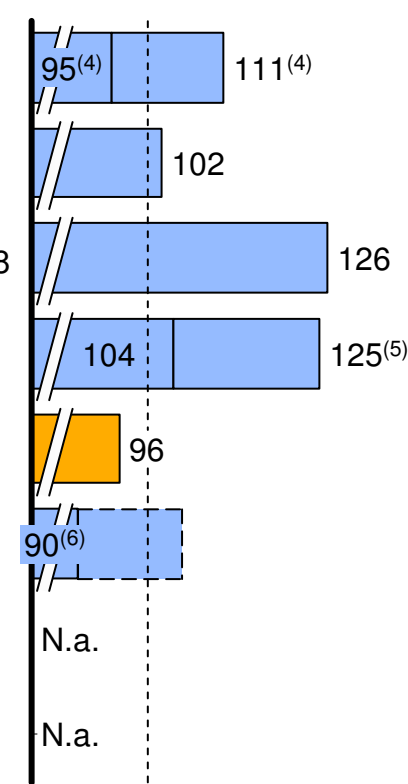


Transmission

Power



Gas



(1) Discount rate equal to Market WACC, estimated considering the EU average of business specific parameters set by regulator (Beta unlevered, spread on debt, MRP, D/E) and separately for each country the country specific parameters (tax rate, tax shield, inflation, risk free rate)

(2) 91 without incentives (base remuneration); 100 with maximum incentives (+2% on base WACC for 12 years)

(3) 93 without incentives (base remuneration); 107 with maximum incentives (+3% on base WACC for 12 years)

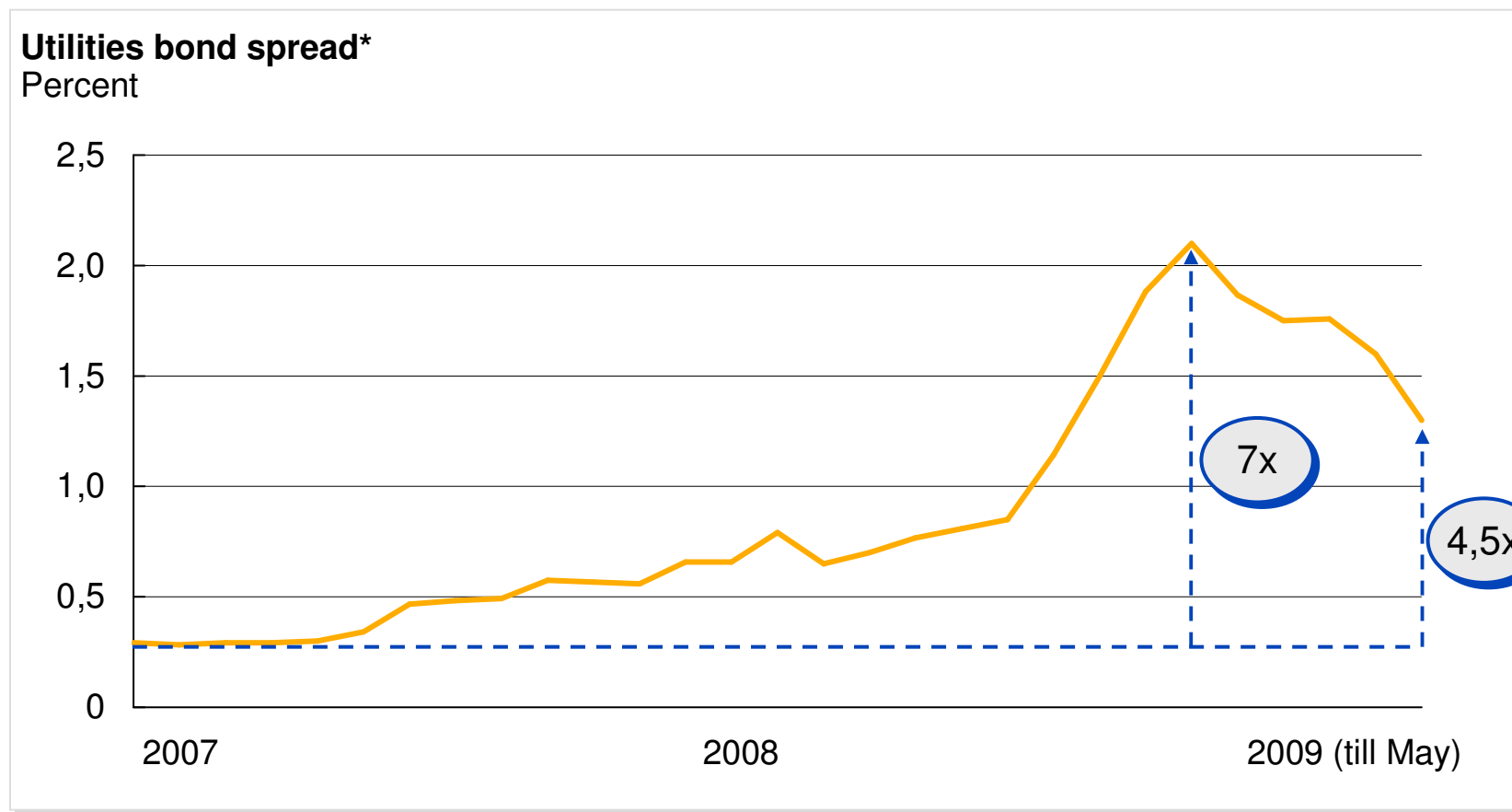
(4) Different categories of investments identified with different level of incentives in the form of extra WACC for different number of years

(5) Old assets in RAB before 1.1.04 at 7.25% (PV=100); New capex since 1.1.2004 at 8.5% (PV=108). Incentives on top of 8.5% for specific investments: 3% extra WACC for 5-10 yrs (determined by regulator)

(6) Significant, exceptional, developmental investments get higher remuneration on a case by case basis. Revenue cap is not sufficient to recover capex costs that exceeds normal investment levels

Source: Regulators EU countries

Recent increase of debt spreads creating additional pressure on financing costs of new investments



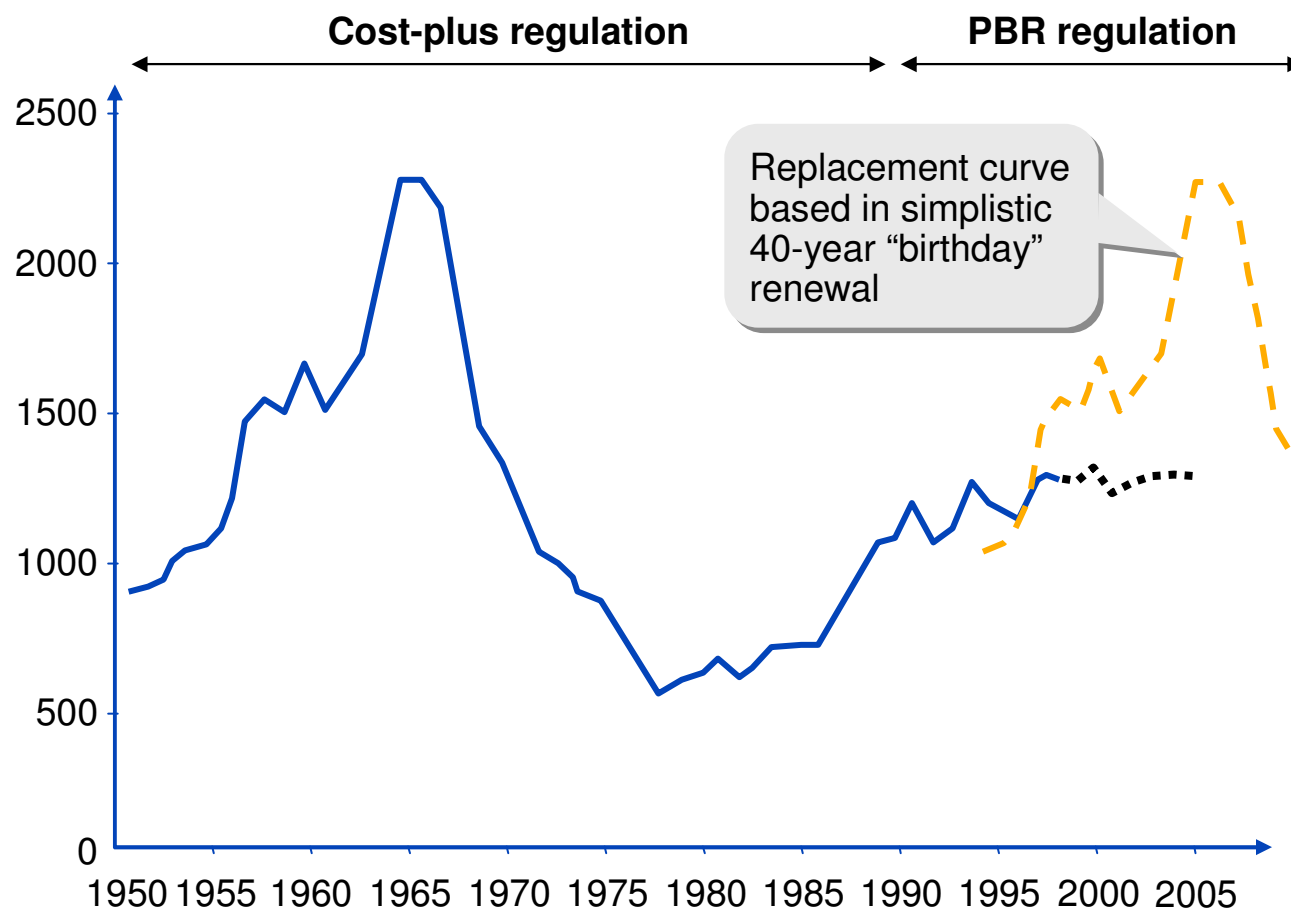
* Spreads between the Bloomberg Eurozone Utility (AA rated) Bond Index vs. 10 year German Government Bond

Source: Bloomberg

Distribution networks approaching end of plate lifetime

U.K. investment in electricity distribution networks since 1950

Mil. £



- Major investment done under a cost-plus regulation
- Is it performance base rate regulation (price cap + RAB) ensuring adequate network renewal

Source: Distribution Price Control Final Proposals, Ofgem, December 1999

Uncertain future for current PBR model

Current PBR model

- Strong push for efficiency...
- In many regions, no value creation for new investments (especially on power distribution)
- Rates based on volume increase assumptions

... **but** ...

... **but** ...

... **but** ...

Current distribution context

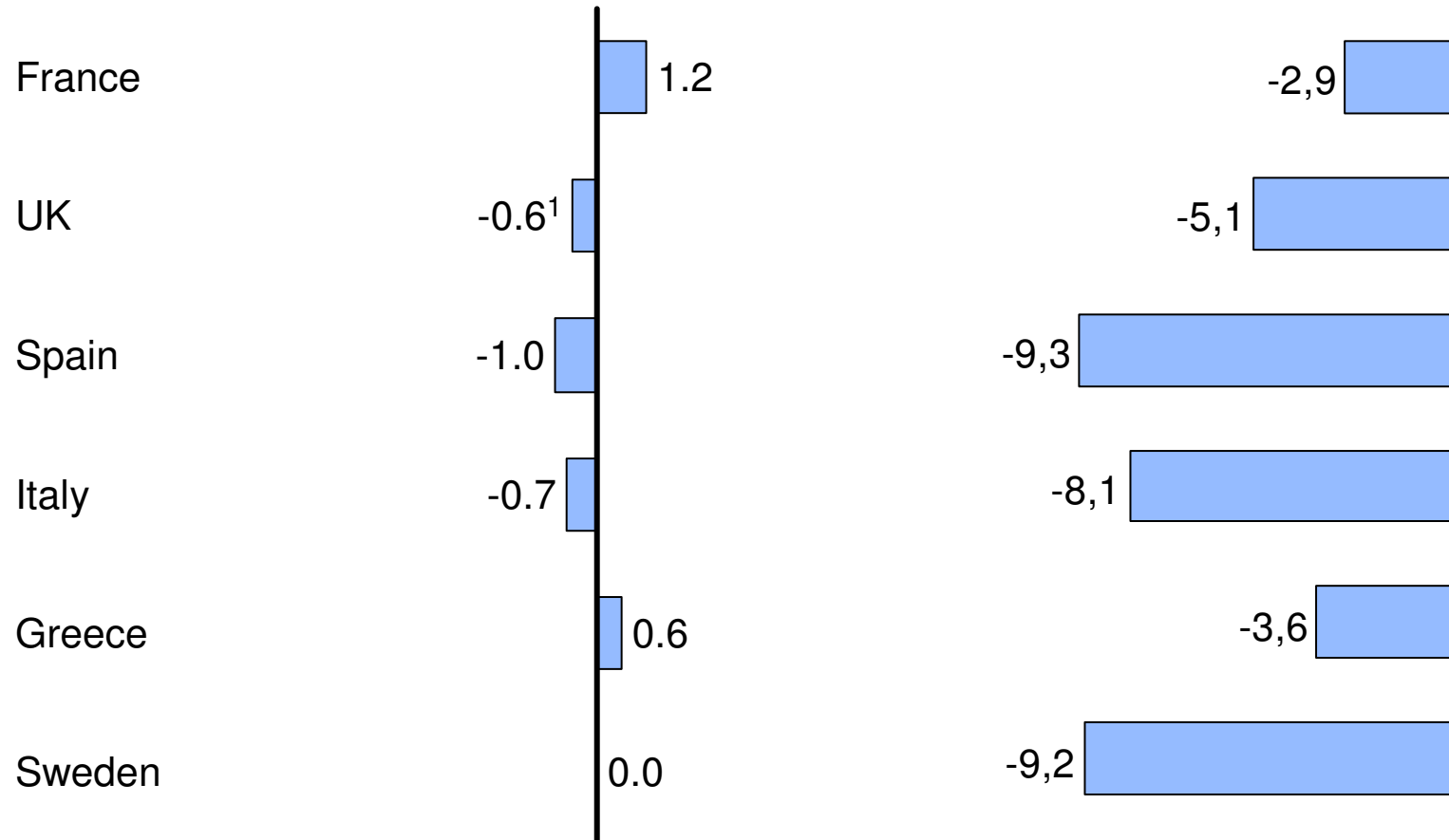
- ... in many countries, best practice levels already achieved
- ... huge need for new investments in the coming years
- ... crisis and energy efficiency can lead to lower growth in volumes

Electricity demand in key selected European countries is falling down significantly due to the crisis...

Percent

2008 vs. 2007

Jan. - Apr. 2009 vs. Jan. - Apr. 2008



¹ Data refers to 3rd quarter 2008

Source: TSOs



... with negative impact on distribution depending on the specific characteristics of each regulatory framework

Issues	Models	Options	Examples	Demand deviation vs. forecast	Impact on EBITDA 2009	
					Million €	Percent
<p>Volume risk in some countries mostly held by T&D companies</p> <p>No adjustment by regulator for demand deviations</p>	Price cap	<ul style="list-style-type: none"> Distributors hold part of the volume risk Large deviations are corrected ex post Deviations are corrected each year Deviations are corrected each year 	Italy	-4.2%	-37	-1
			Netherlands	-4.5%	-10	-1
			UK	-5.6%	0	0
			Ireland	-2.6%	0	0
	Revenue cap	<ul style="list-style-type: none"> No adjustments Deviations settled yearly, when significant Deviations settled at the end of regulatory period (interest rates included) 	Norway	-3.3%	-9	-3
			Spain	-4.6%	-23	-1
			Germany	-4.2%	0	0
	Cost plus and others	<ul style="list-style-type: none"> Cost plus, no volume risk, all deviations are corrected by regulator Left handed regulation, volume risk managed by distributors 	France		No impact	
			Belgium			
			Greece			
			Sweden			

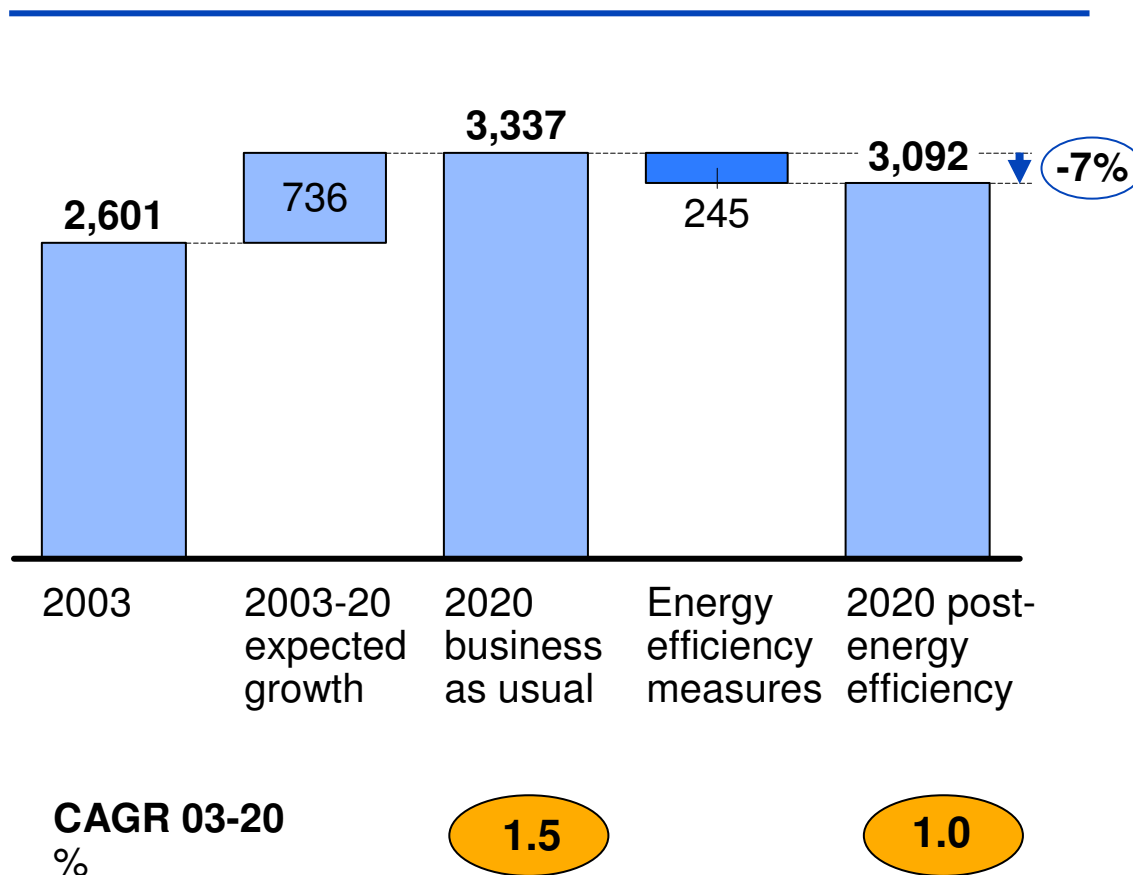
Source: TSOs, McKinsey analysis on regulatory frameworks

In the longer term, energy efficiency initiatives will curb the future growth rate of power demand

Energy efficiency

- Energy efficiency measures limiting demand CAGR to 1% (vs. 1.5% in business-as-usual scenario)
- Energy efficiency opportunities mainly in residential and commercial sectors:
 - More efficient appliances
 - More efficient lighting
 - Standby reduction
 - Insulation

Electricity demand evolution TWh, Europe 25



Source: Team analysis



Uncertain future for current PBR model

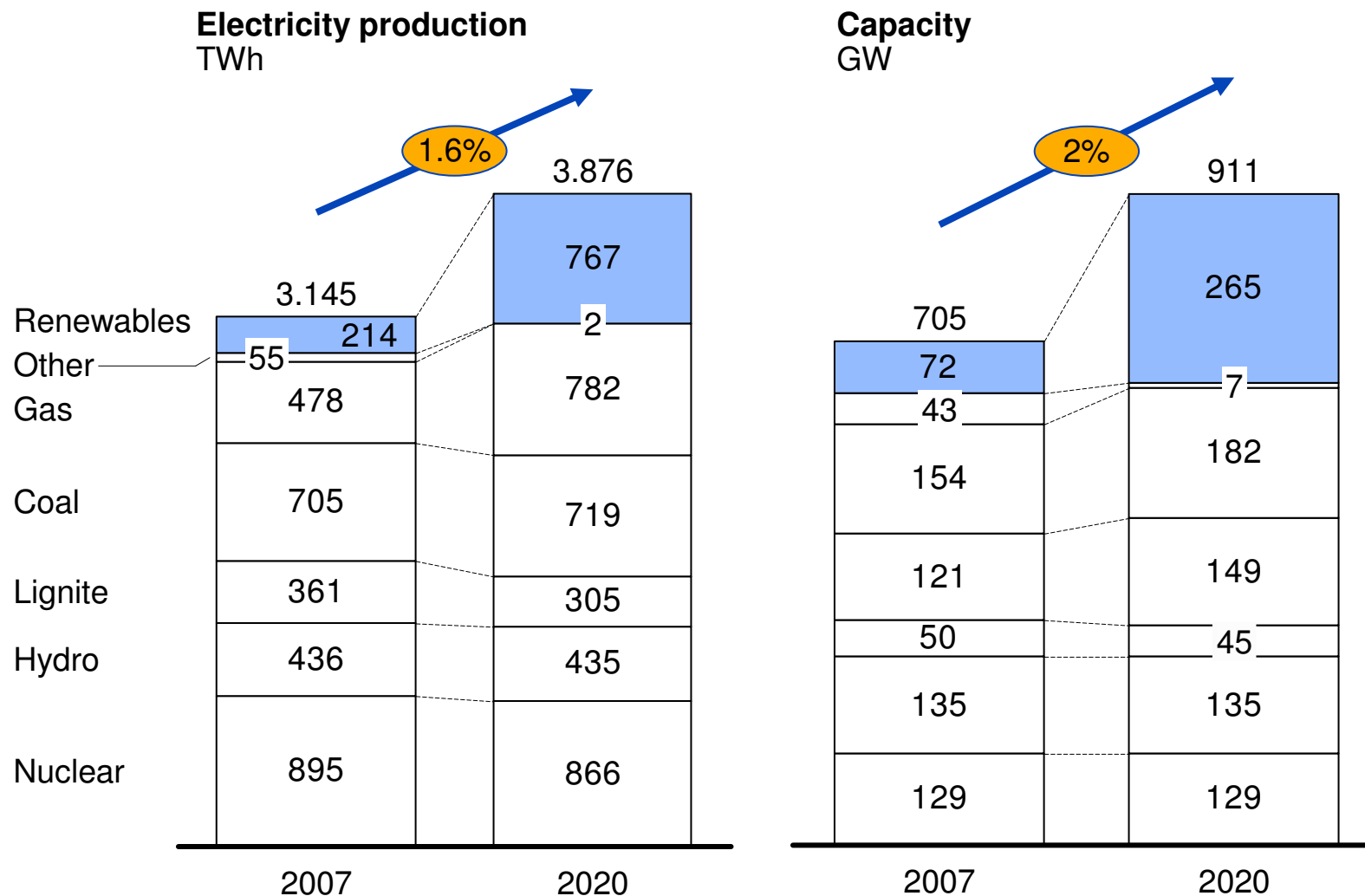
Current PBR model

- Strong push for efficiency... ... **but** ...
- In many regions, no value creation for new investments (especially on power distribution) ... **but** ...
- Rates based on volume increase assumptions ... **but** ...
- No specific regulation for “innovative” investments ... **but** ...

Current distribution context

- ... in many countries, best practice levels already achieved
- ... huge need for new investments in the coming years
- ... crisis and energy efficiency can lead to lower growth in volumes
- ... Smart grid and meters investments required to sustain distributed energy and consumption management

Most of the future demand increase will be met by renewables, most of them distributed energy

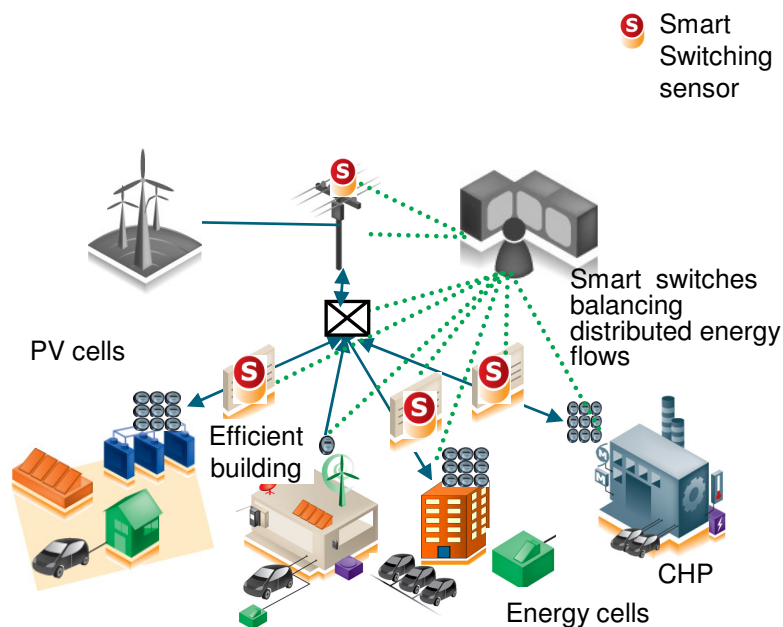


Source: EU power model v5810

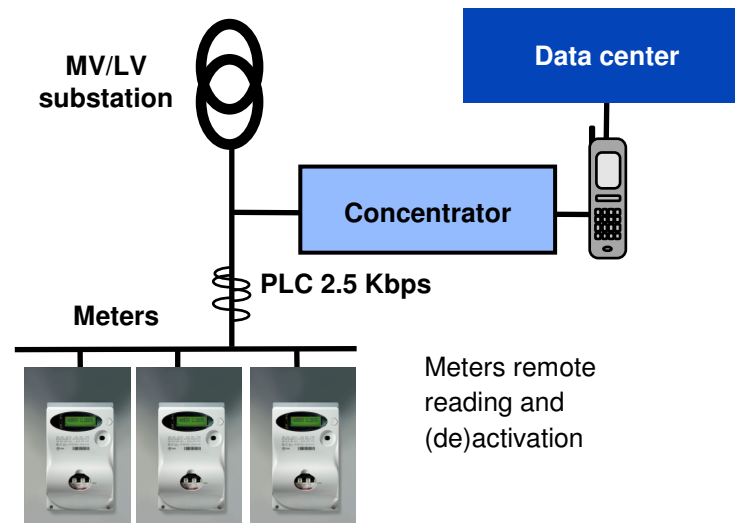


Investments required in smart technologies to accommodate distributed energy generation and allow consumption management

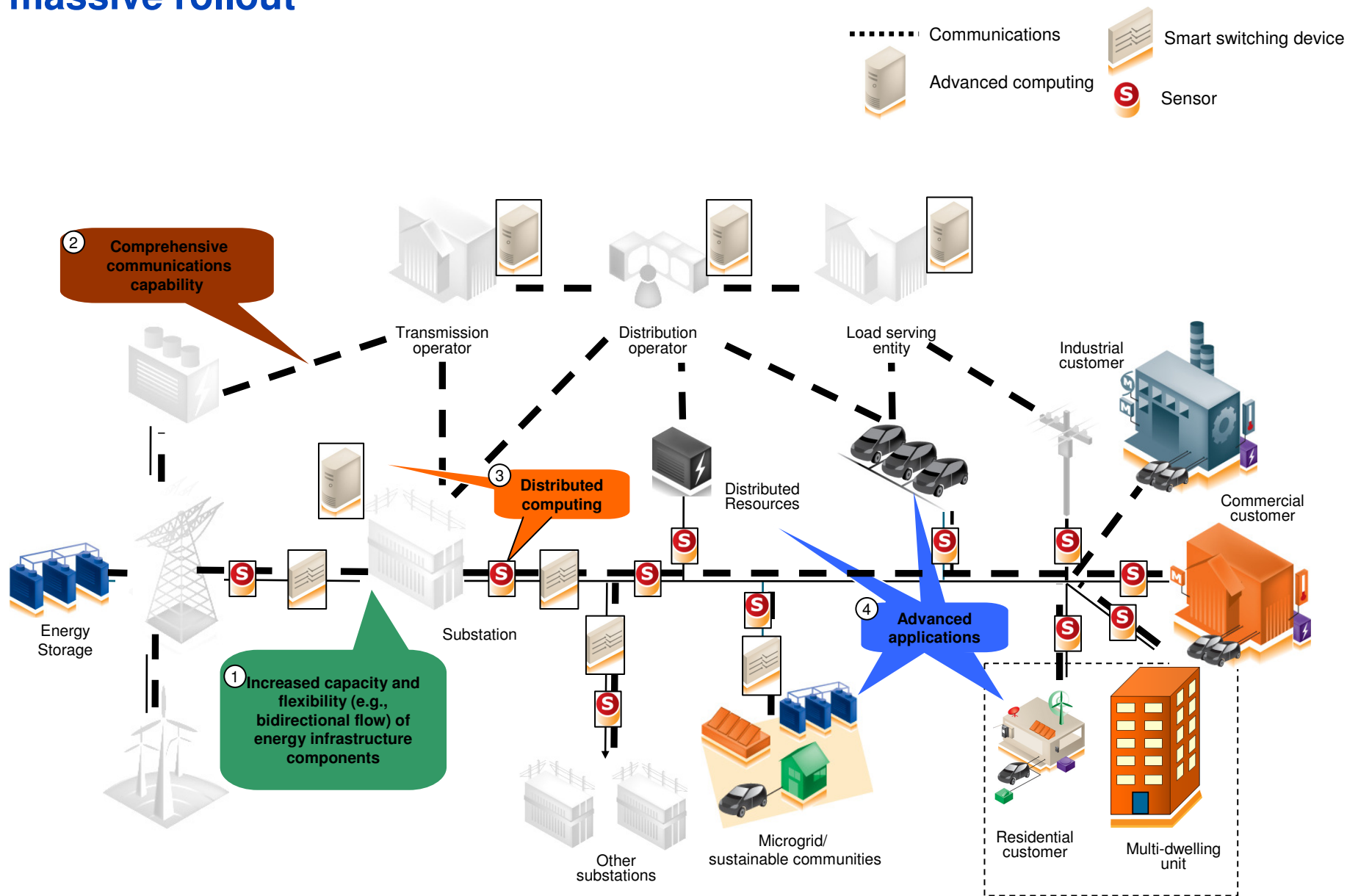
Smart grids: Real-time balance of distributed generation flows



Smart meters: Multihour tariff, peak-valley switch, consumption mgmt.



How the future smart grid might look with distributed energy massive rollout



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Potential guidelines for a new effective regulatory model

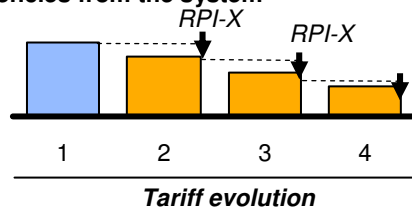
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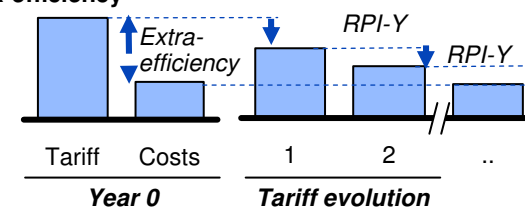
Efficiency kicker for opex



Ex ante efficiency kicker: price cap set to squeeze out inefficiencies from the system



Ex post efficiency kicker: price cap set up to absorb past extra-efficiency



* Tariff return allowed for a €100 new investment

Potential guidelines for a new effective regulatory model

From

To

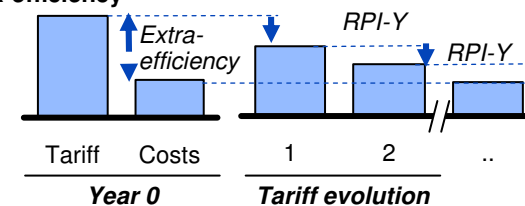
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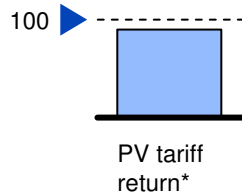
Ex post efficiency kicker: price cap set up to absorb past extra-efficiency



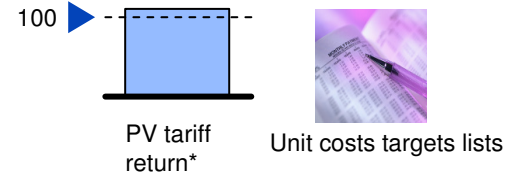
Investment remuneration



Capital expenditure return value destroying

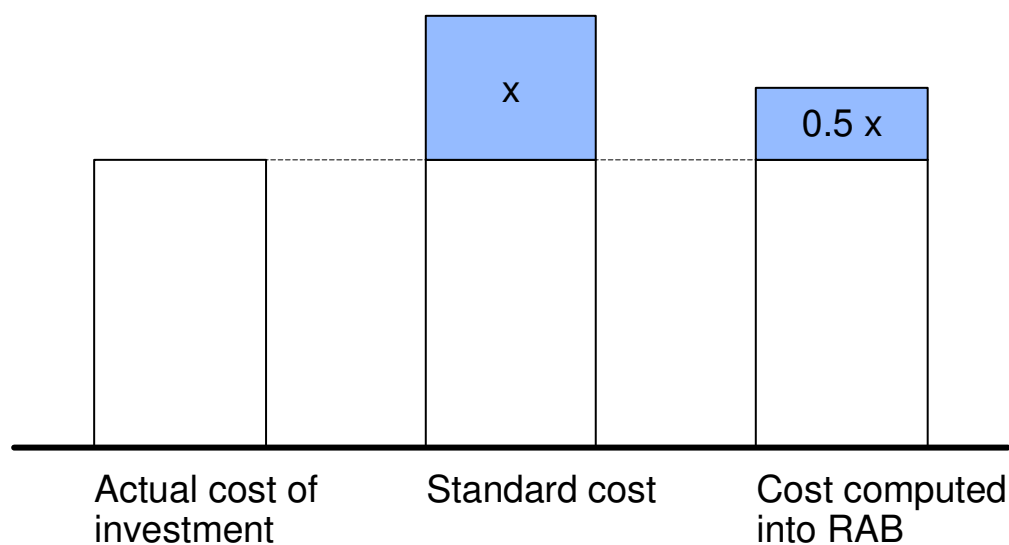


Capital expenditure return value creating, on right investments, with cost efficiency targets



* Tariff return allowed for a €100 new investment

Example of standard cost mechanism to drive efficiency in investments costs: Spanish gas transmission



Standard cost updated by a yearly price cap mechanism:
 $0.4 * (IPI^{(1)} - X) + 0.6 * (CPI - Y)$

- X = 0.5%
- Y = 1%

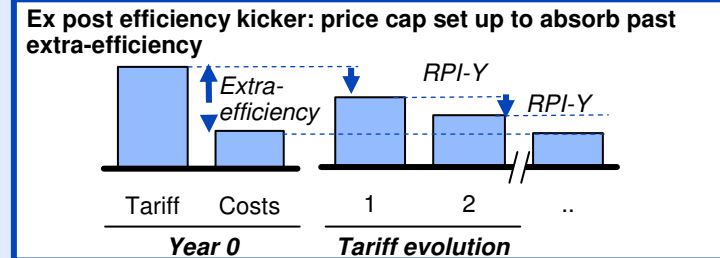
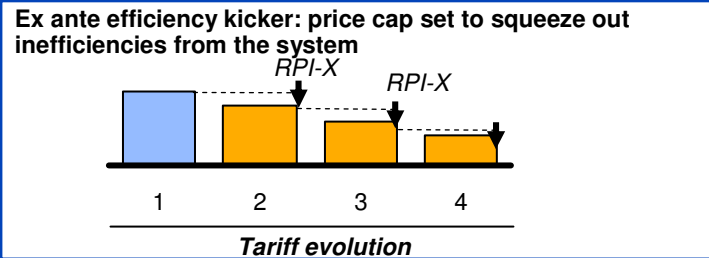
- Efficiency mechanism
 - 50% of underspending is retained in the RAB
 - 50% of overspending is deducted from the RAB
- Rate of return should include premium for construction risk (partially) transferred to the company

Potential guidelines for a new effective regulatory model

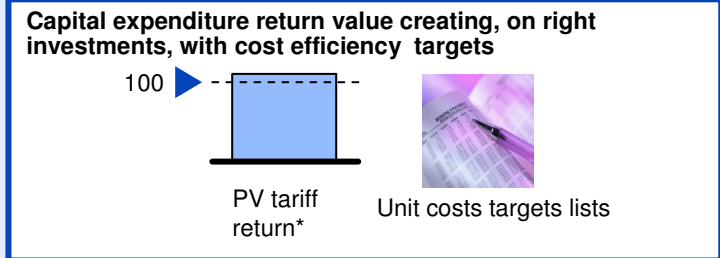
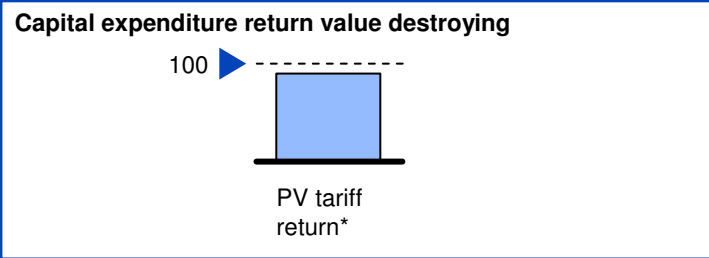
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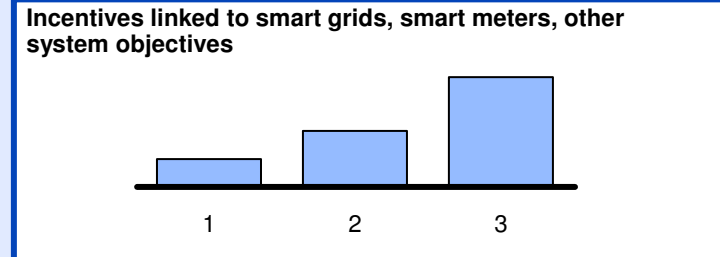
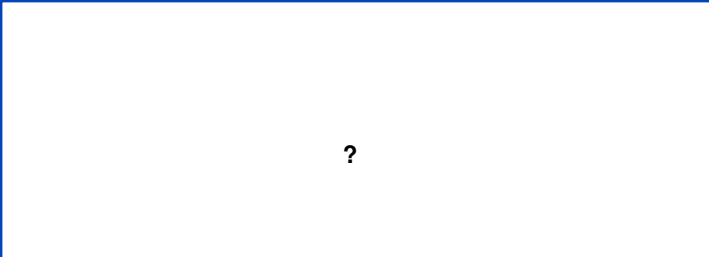
Efficiency kicker for opex



Investment remuneration



Reward of new objectives

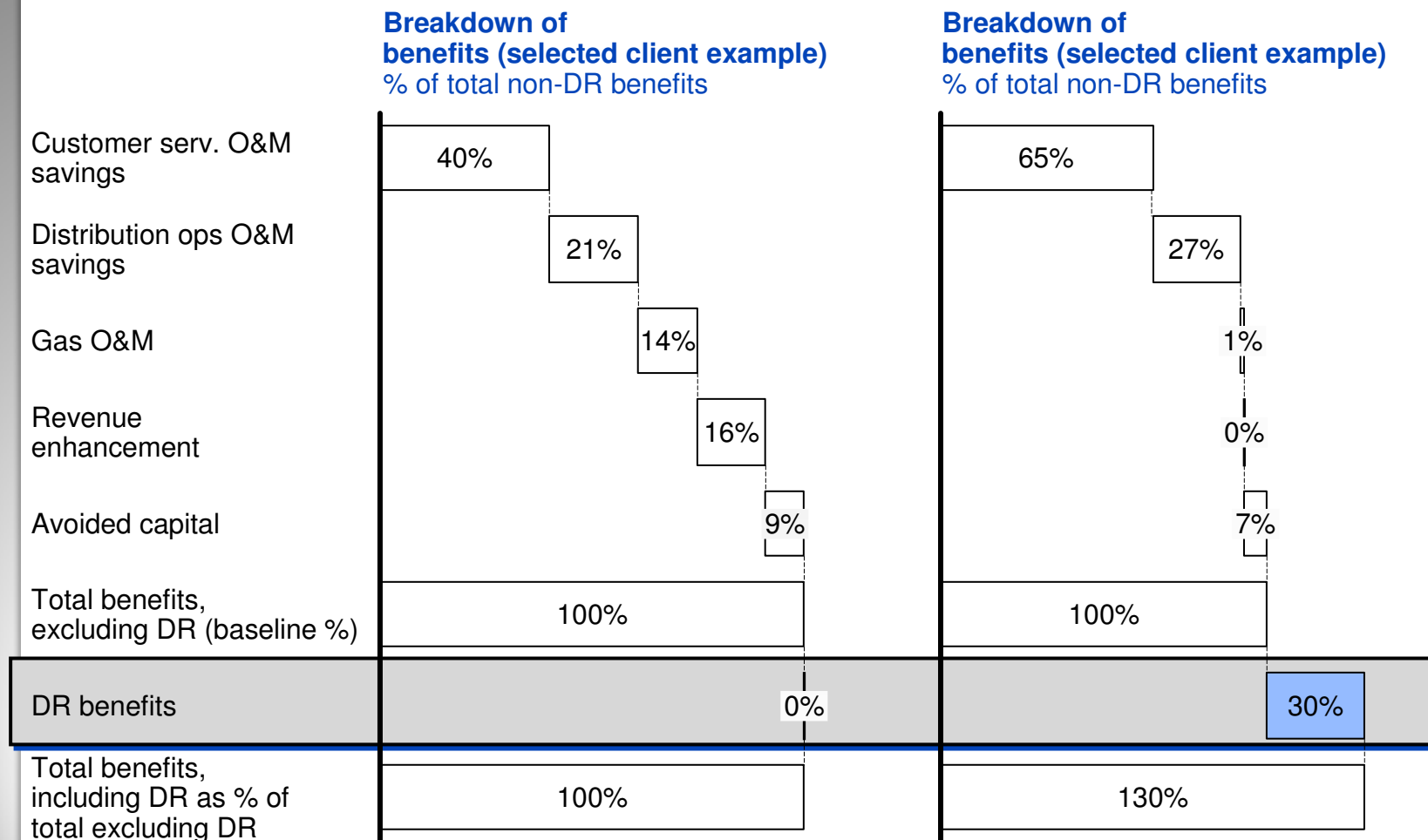


* Tariff return allowed for a €100 new investment

AMR remuneration: In the U.S., rate filings are increasingly incorporating demand response (DR) benefits



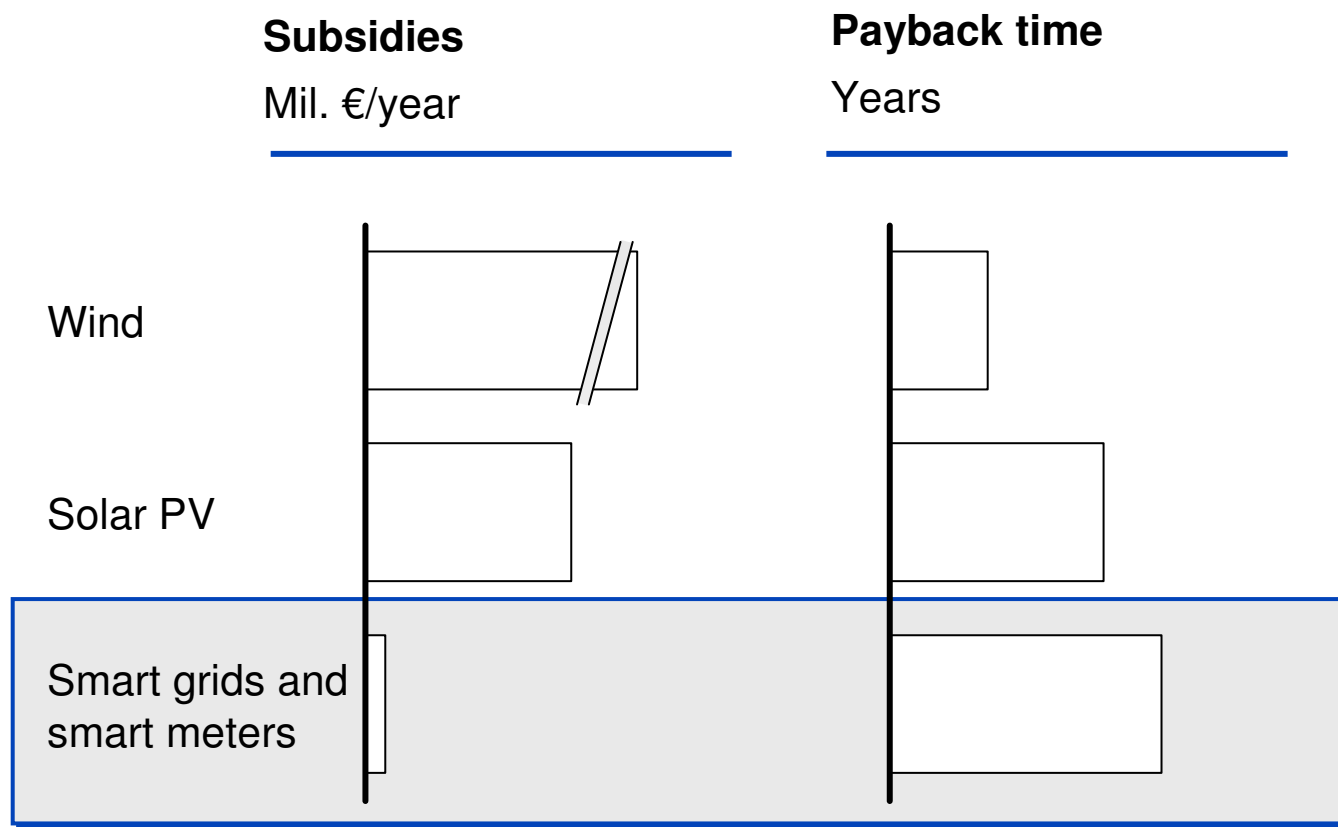
AMR – case study for regulatory filing highlighting various approaches to DR benefits



Source: Team analysis



Renewables subsidies rebalance to sustain smart grids and smart meters development?



Potential guidelines for a new effective regulatory model

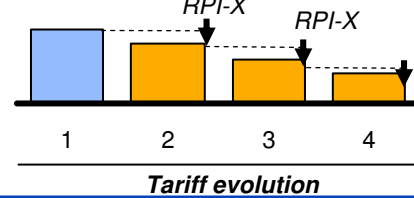
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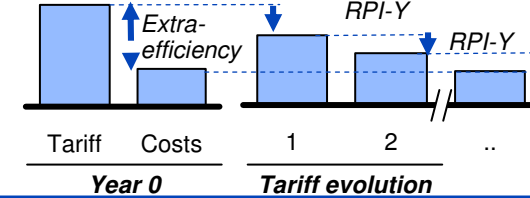
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Ex ante efficiency kicker: price cap set to squeeze out inefficiencies from the system



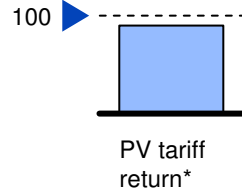
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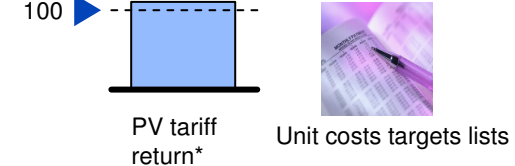
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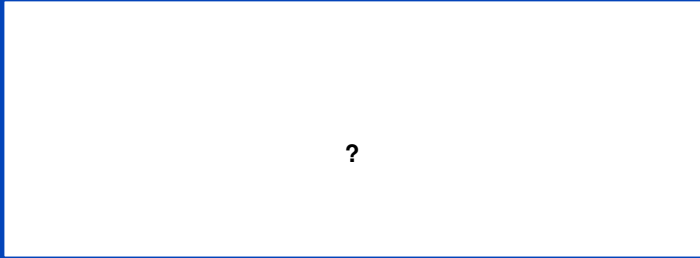
Capital expenditure return value destroying



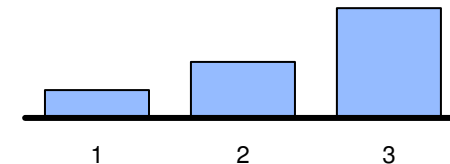
Capital expenditure return value creating, on right investments, with cost efficiency targets



Reward of new objectives



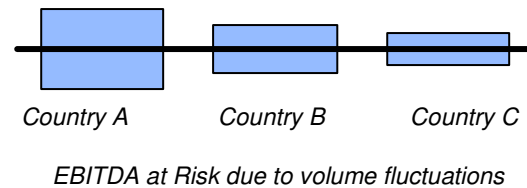
Incentives linked to smart grids, smart meters, other system objectives



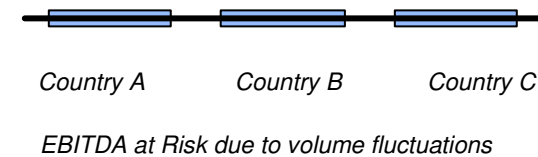
Volume risk



No common treatment, in many countries born by Distributors



No/very limited exposure to volume risk



* Tariff return allowed for a €100 new investment

Some regulators – UK and Italy – are already addressing the need for revenue decoupling when remunerating T&D



UK



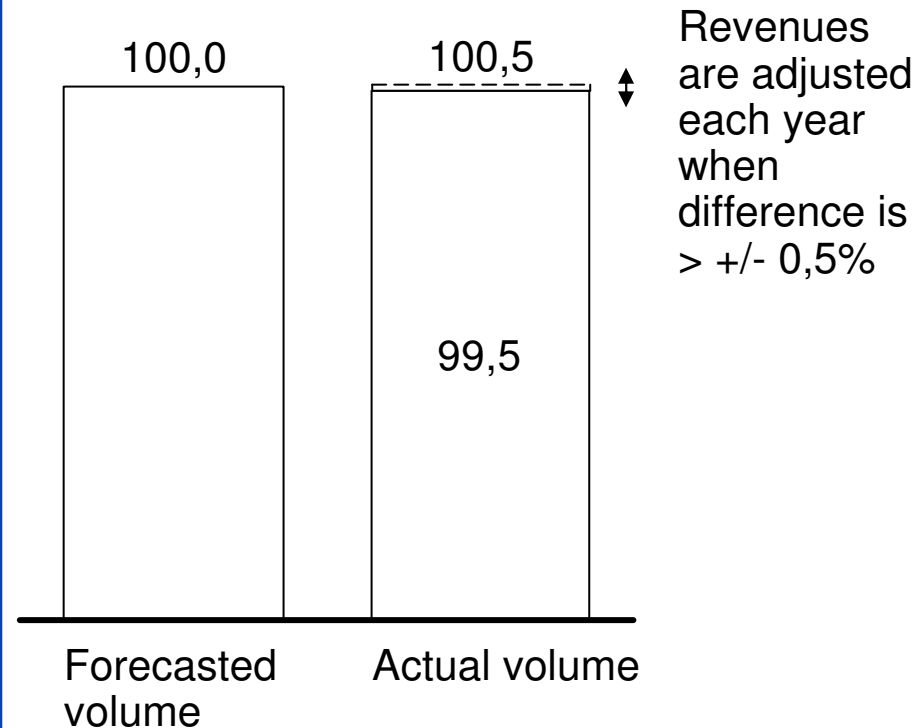
Distribution Ofgem DPCR 2010-2015

“units distributed and customer numbers do not capture relationship between changes in economic growth and costs and may discourage DNOs from using demand side management DSM schemes. We therefore propose to remove these drivers in DPCR5”

Italy




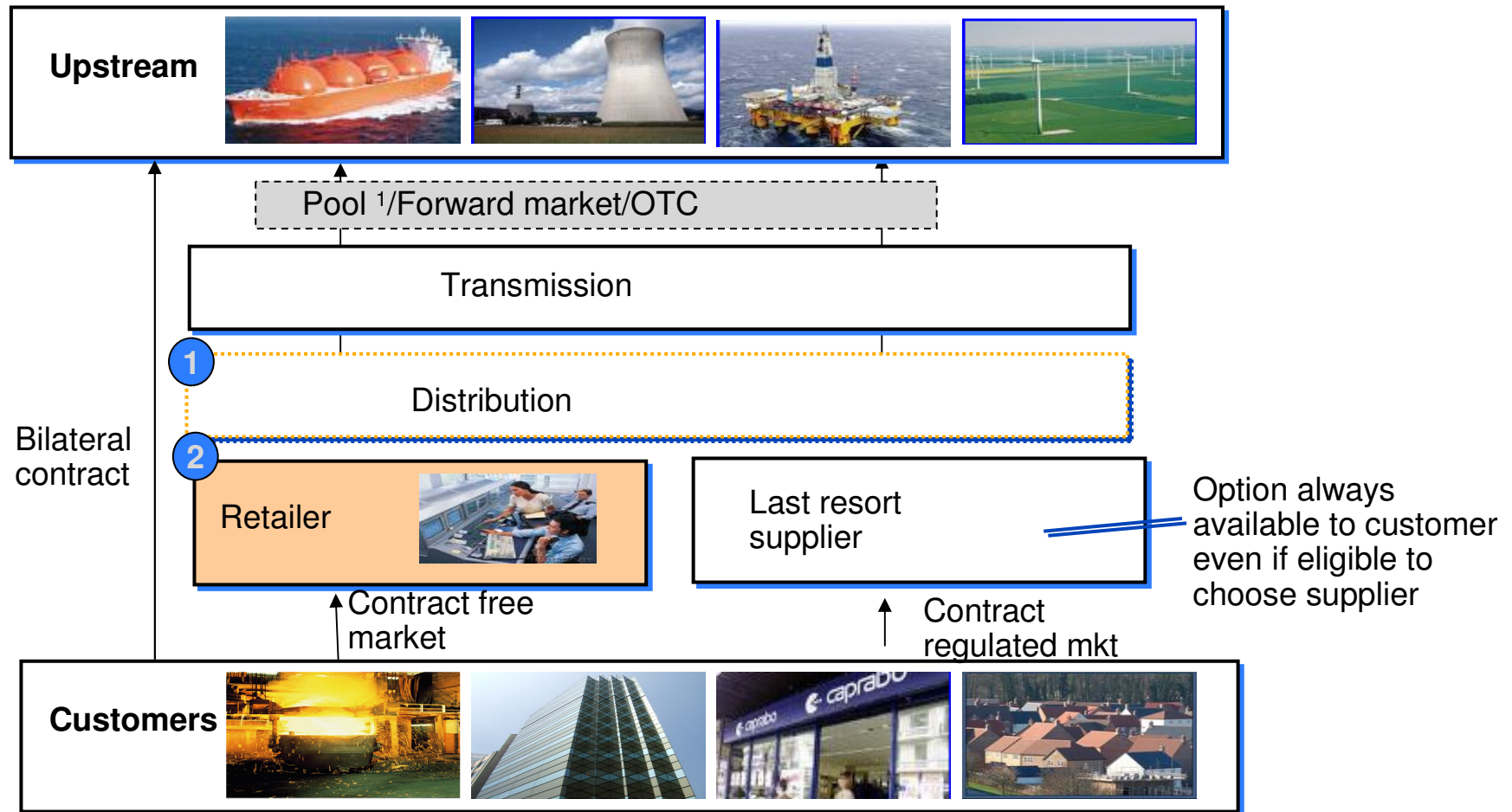
Transmission AEEG



Overall value chain in the European market

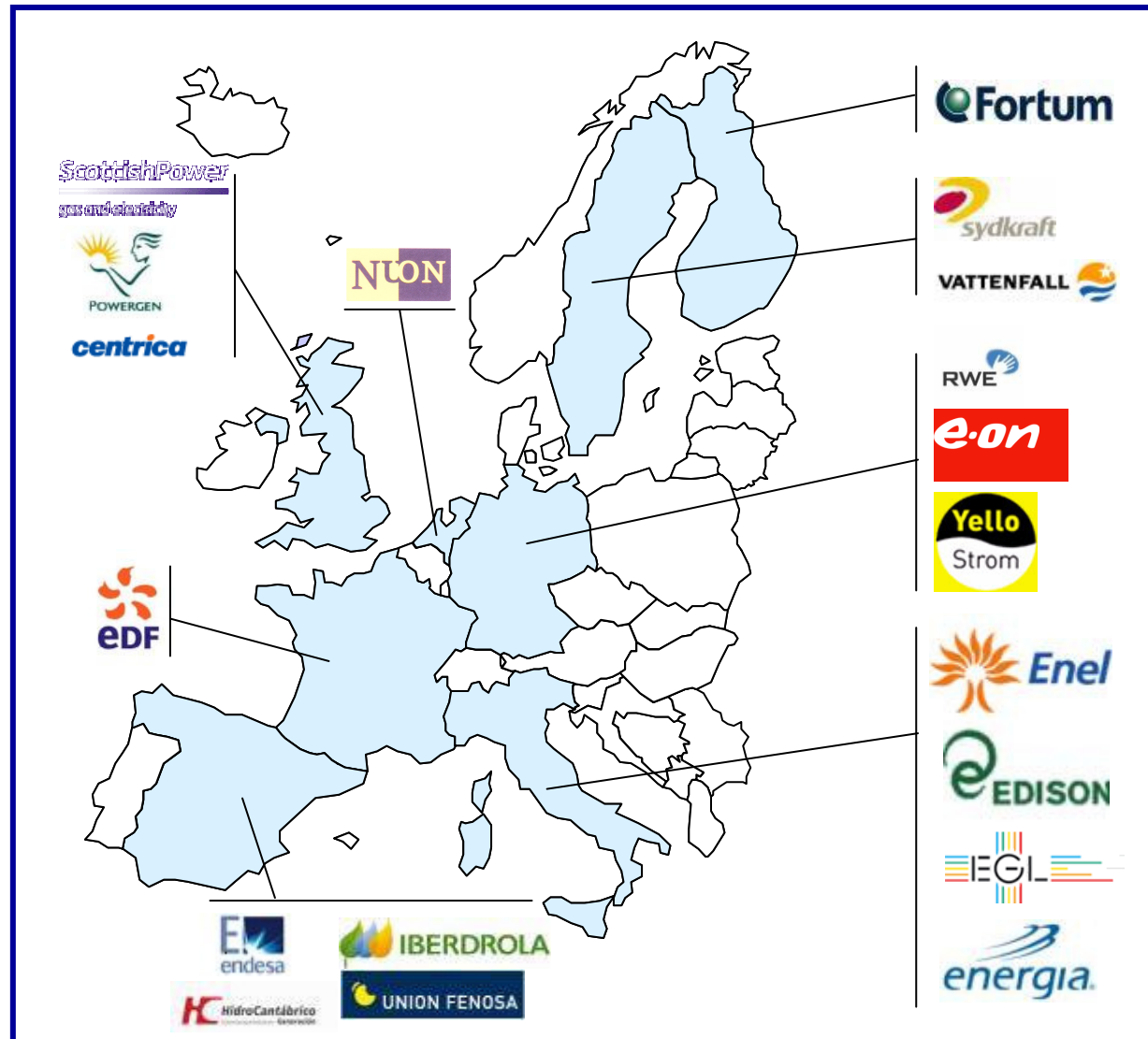
SIMPLIFIED

 Focus of this section



1 Only for electricity

A number of European countries de-regulated their retail markets



- McKinsey surveyed 189 offers...
 - ... from 24 players...
 - ... in 7 major liberalized markets

Retail offers explores a combination of price/convenience with service added resulting in a huge number of offers to consumers

Price/convenience

- ① **Fixed price**
- ② **Fixed + variable price**
 - A. Not indexed
 - B. Indexed
- ③ **Variable price**
 - A. Not indexed
 - B. Indexed
- ④ **Value discount**
- ⑤ **Volume discount**
- ⑥ **Specific segment discount**
- ⑦ **Alternative sources of energy**
- ⑧ **Bundle and others**



Additional services

- ① **Bill/consumption info**
- ② **Financial services**
- ③ **VAS**
 - A. Installations
 - B. Repair & maintenance
 - C. Loyalty
- ④ **Consulting**
 - A. Efficiency and environment
 - B. Plants and others
- ⑤ **Security solutions**
















Each combination has at least one offer
















Price/convenience products currently being offered by Spanish utilities can be grouped into 6 macro-categories

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Product category	Description	Example	Companies
1 Fixed price	<ul style="list-style-type: none"> Flat fixed price for any energy consumption 	<ul style="list-style-type: none"> Customers pay same amount every month and the balance according to real consumption at period end 	
2 Fixed + variable price	<ul style="list-style-type: none"> Fixed monthly/yearly charge and a price for unit of energy consumed 	<ul style="list-style-type: none"> 26.7 €/year Spot price + 0.4c€/kWh 	  
3 Value discount	<ul style="list-style-type: none"> Discount expressed in percentage vs. regulated price (e.g., reported tariff) 	<ul style="list-style-type: none"> Discount vs. regulated tariff 	  
4 Volume discount	<ul style="list-style-type: none"> Discount expressed in volume vs. reference price (e.g., regulated tariff) 	<ul style="list-style-type: none"> 6 kWh free of charge every 100 kWh consumed 	
5 Alternative sources of energy	<ul style="list-style-type: none"> Energy form alternative sources 	<ul style="list-style-type: none"> Green energy at <ul style="list-style-type: none"> – 1,461129 €/month – Regulated tariff + 1 c€/kWh 	 
6 Commodities bundles and others	<ul style="list-style-type: none"> Bundle of multiple 	<ul style="list-style-type: none"> Discounted energy (gas + electricity) 	  

Additional services can be clustered into 5 macro-categories

JANUARY 2009

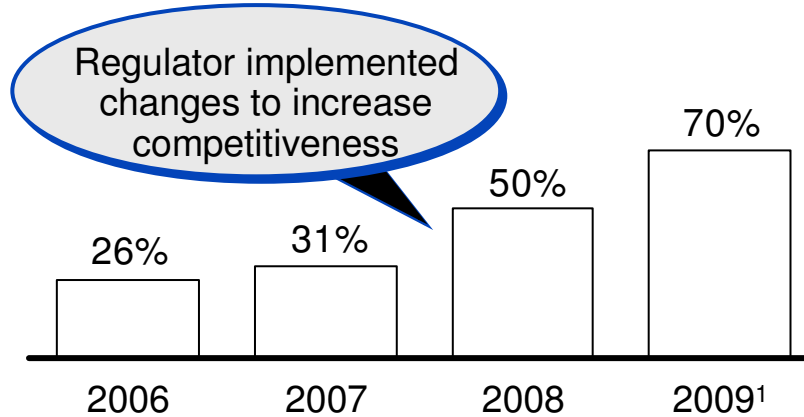
Category	Description	Example	Companies
1 Bill/consumption information	<ul style="list-style-type: none"> Information on prices, load curve, consumptions etc. 	<ul style="list-style-type: none"> Possibility to view, pay, analyze bills on-line 	 
2 Financial services	<ul style="list-style-type: none"> Financial services bundled with energy 	<ul style="list-style-type: none"> Personal loans Debit card Insurance 	 
3 VAS A. Installations B. Repair & maintenance C. Loyalty	<ul style="list-style-type: none"> Installation of energy plants or appliances (e.g., Heating, A/C) Repair & maintenance of energy plants or appliances Services related to loyalty programs 	<ul style="list-style-type: none"> Efficient heating and air conditioning Free home services Gas maintenance services 	   
4 Consulting A. Efficiency and environment B. Plants and others	<ul style="list-style-type: none"> Consulting on consumption efficiency and environmental issues Diagnostics on electric plants' quality and design of new plants 	<ul style="list-style-type: none"> Feasibility studies for cogeneration, elimination waste, solar energy, etc. 	  
5 Security solutions	<ul style="list-style-type: none"> Service-level guarantees for customers 	<ul style="list-style-type: none"> Reading, switching, billing, customer service performed on time or refund 	 



As a result, customers are moving to the free market

Percentage of energy in free market, %

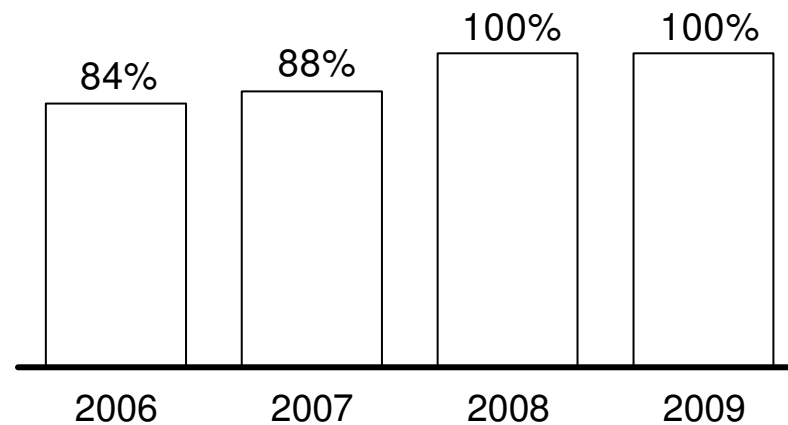
Electricity



2

3

Natural gas



2

7

Number of customers in free market, million

- Integral tariff for high voltage disappeared in July 2008 (except for G-4)
- Integral tariff for low voltage will be substituted with tariff of last resort

- Tariff of last resort already approved for customers connected at low pressure
- All integral tariff removed in 2007/08

¹ At least all consumers except those ones that are eligible for the tariff of last resort (residential with capacity contracted lower than 15 kW)

Brasilia, June 17th, 2008



McKinsey & Company

Distribution Regulation in Europe: Time for Change

ANEEL Tariff Structure Seminar

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