



Capacity-based network tariffs for Italian electricity households

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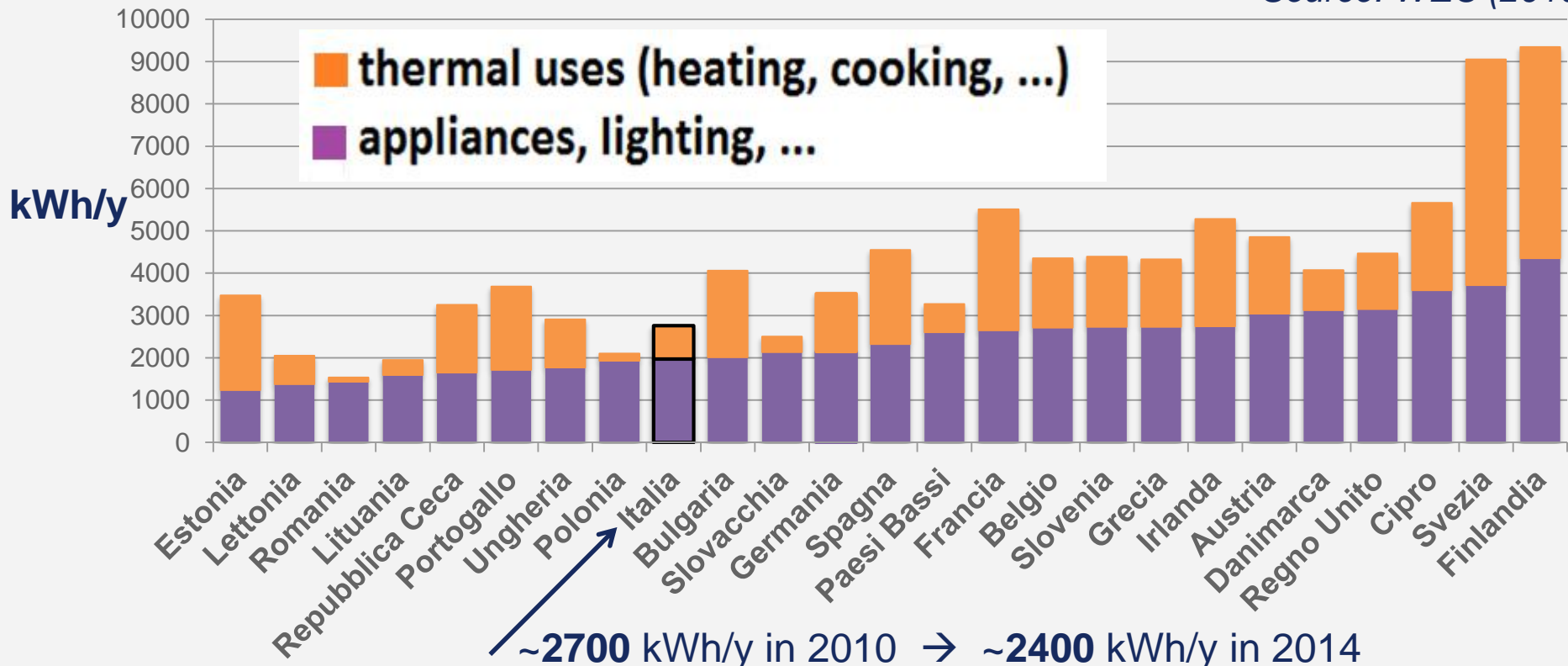
AGENDA

1. The Italian context: electricity household demand
2. Cost reflectivity criteria for network tariffs in Italy
3. Implementation of a “capacity-based network tariff” for households
4. Information about actual power usage and new options for household clients

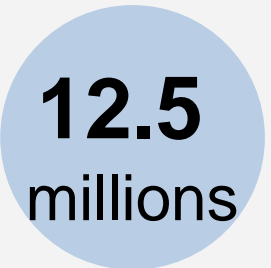




ELECTRICITY IN THE HOUSEHOLDS: VOLUMES

Yearly consumption of electricity in Italian households is **relatively low**, when compared to other European countries and very little is used for thermal uses

Source: WEC (2010)



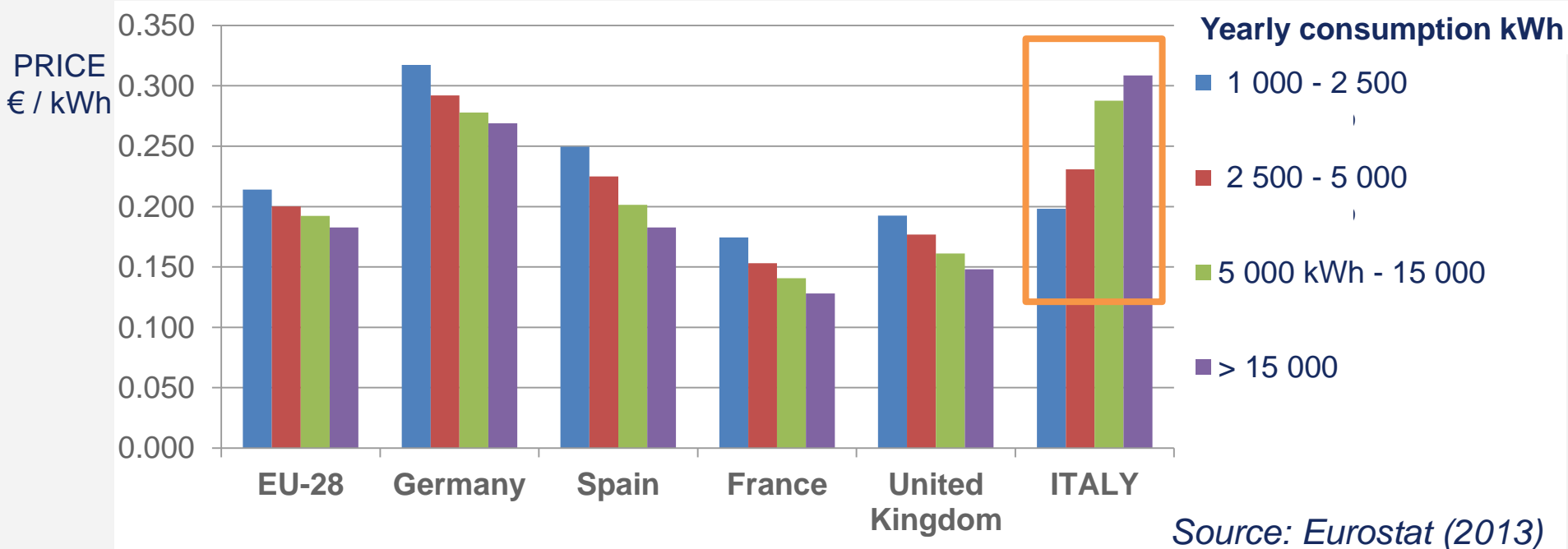
CLUSTERING OF HOUSEHOLD CUSTOMERS (2015)

	LOW consumption (<1800 kWh/y)	MEDIUM consumption (1800-2700 kWh/y)	HIGH consumption (>2700 kWh/y)
PRIMARY houses 23 millions	 <p>12.5 millions</p> <p>~40%</p>	 <p>5.5 millions</p> <p>~20%</p>	 <p>5.0 millions</p>
SECONDARY houses 6 millions	 <p>5.3 millions</p>	 <p>0.7 millions</p>	
	~60%		

ELECTRICITY IN THE HOUSEHOLDS: THE «**ODD**» PRICES

Since the Seventies Italy is the only European country to apply «**progressive tariffs**» (a.k.a. «increasing consumption-block tariffs») to residential customers households.

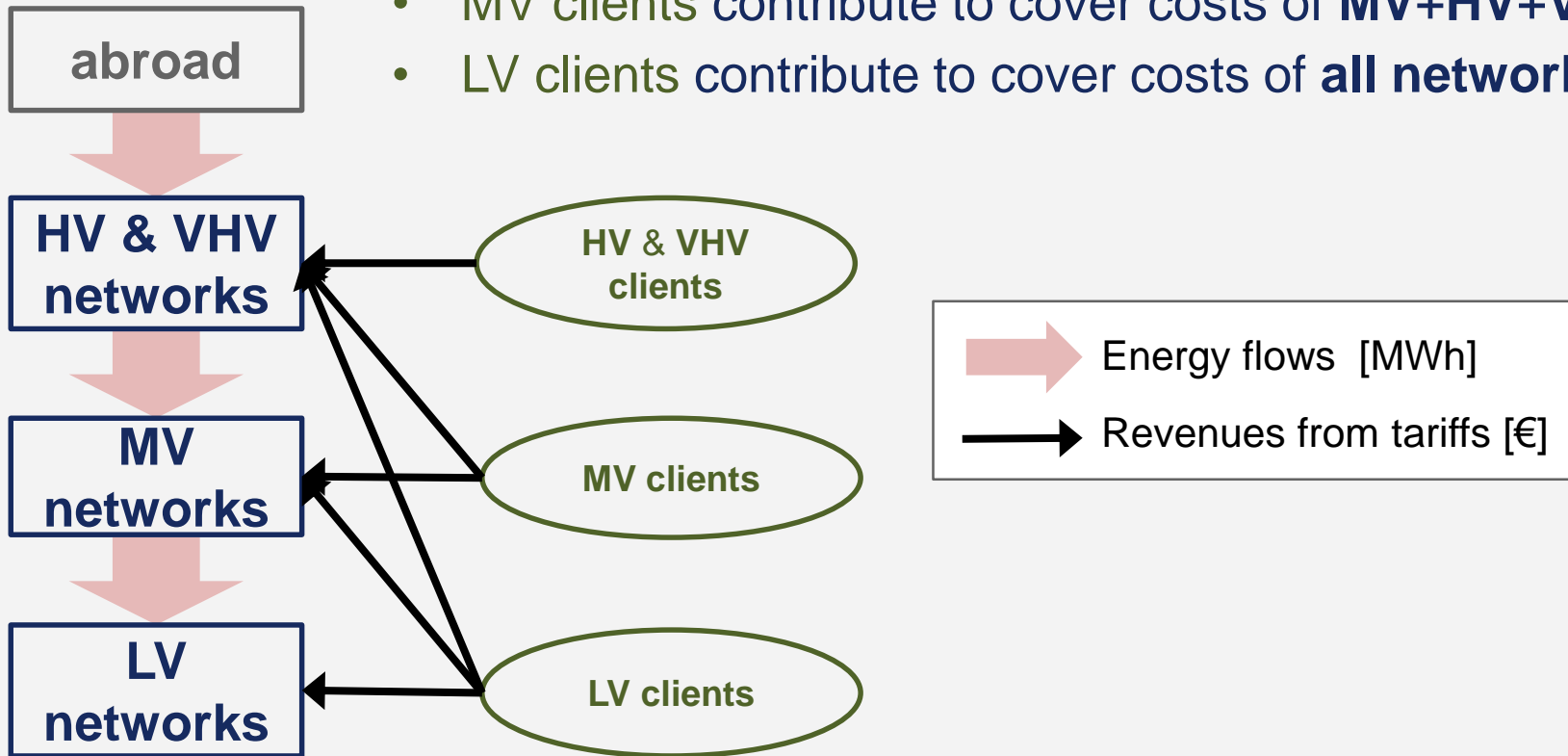
This structure is applied to ~50% of the total household energy bill (transmission, distribution, RES incentives and other levies)



DEFINITION OF A «COST REFLECTIVE» TARIFF

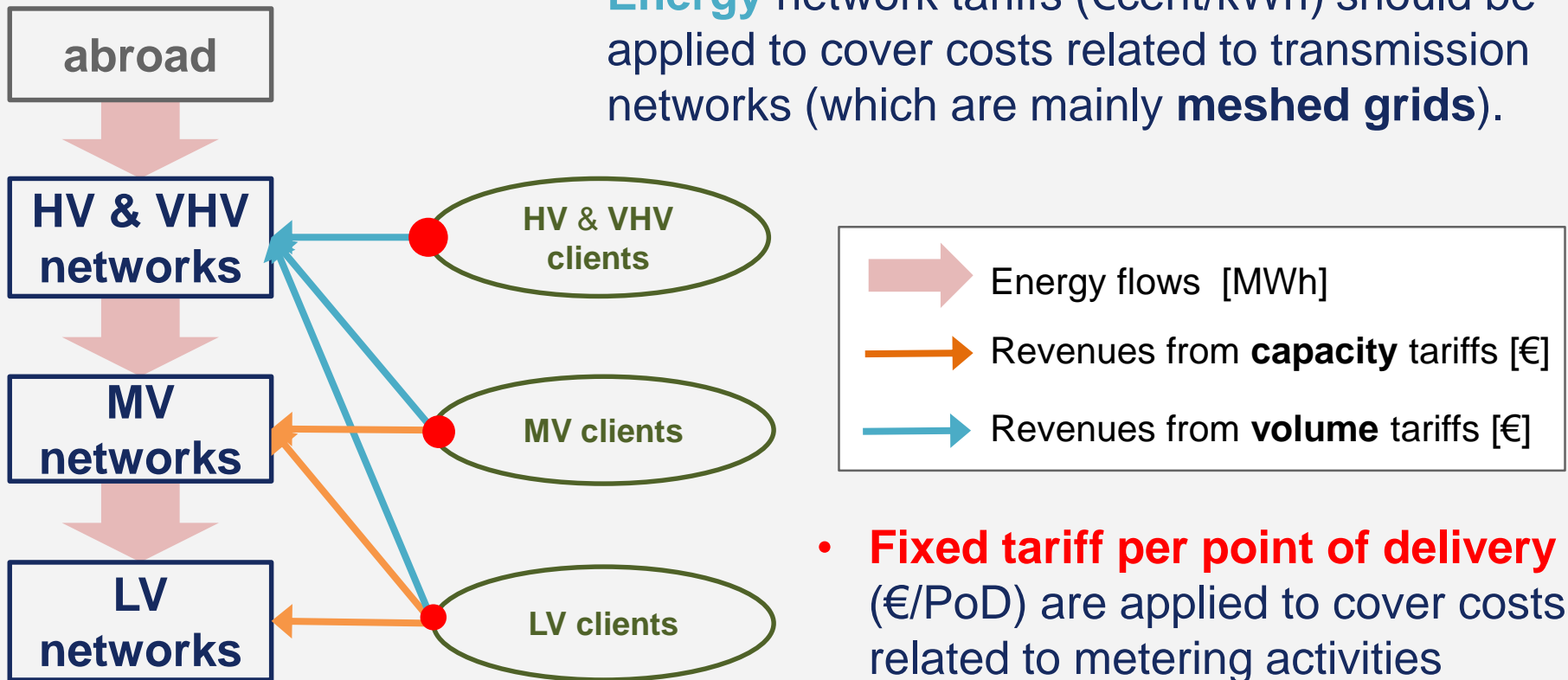
So far, the cost of each network has been covered by clients connected to the same or to lower voltage levels. This means that:

- **HV clients** contribute to cover costs of **HV+VHV networks**,
- **MV clients** contribute to cover costs of **MV+HV+VHV nets**,
- **LV clients** contribute to cover costs of **all networks**.



CHOICE OF DRIVERS FOR COST REFLECTIVENESS

- Choice of the DRIVER:**
- **Capacity** network tariffs (€/kW) should be applied to cover costs related to distribution networks (which are mainly **radial networks**).
 - **Energy** network tariffs (€cent/kWh) should be applied to cover costs related to transmission networks (which are mainly **meshed grids**).



- **Fixed tariff per point of delivery** (€/PoD) are applied to cover costs related to metering activities

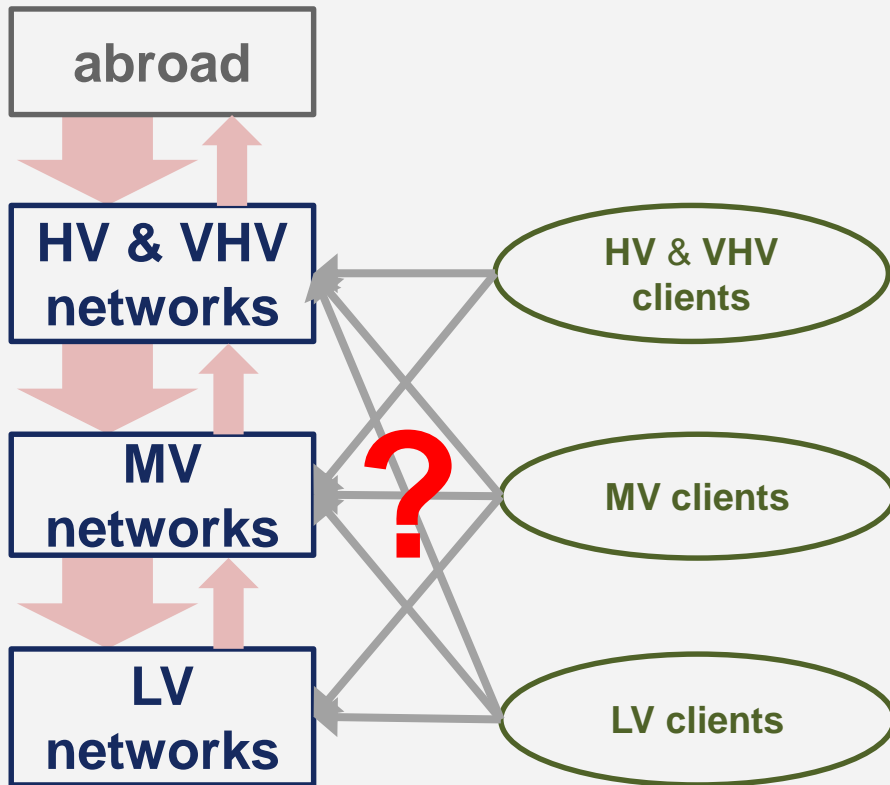
NETWORK TARIFFS: COST-REFLECTIVITY CRITERIA

	COST OF METERING	COST OF LV NETWORK (230-380 V)	COST OF MV NETWORK (1 – 35 kV)	COST OF HV – EHV NETWORK (>35 kV)
EHV-HV customers	€/point	-	-	€/kW + €cent/kWh
MV customers	€/point	-	€/kW <i>(not for publ.light.)</i>	€cent/kWh
LV customers (*)	€/point	€/kW <i>(not for publ.light.)</i>	€/kW <i>(not for publ.light.)</i>	€cent/kWh
GENERATORS	€/point <i>(only for Gen. incentivised)</i>	<i>No G-charge tariff at any voltage level</i>		

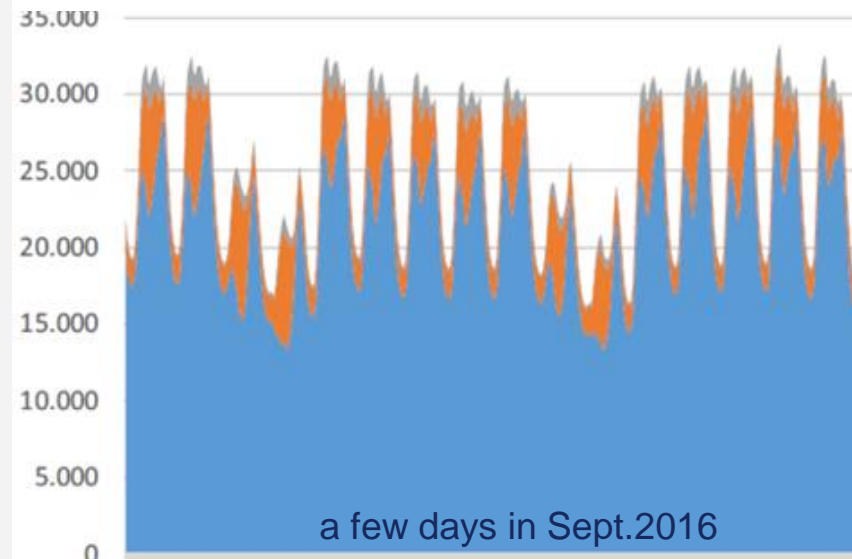
(*) only for non-household customers until 2016; since 2017, also households

EVOLUTION OF THE «COST REFLECTIVE» CRITERIA

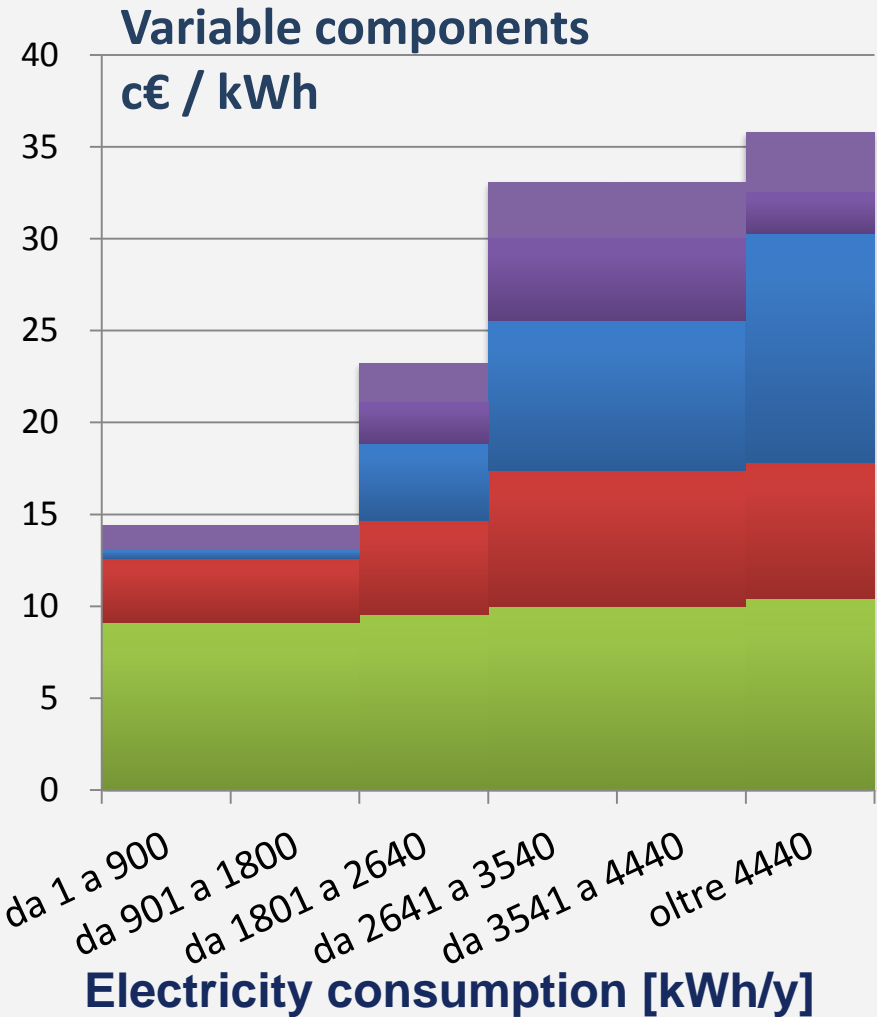
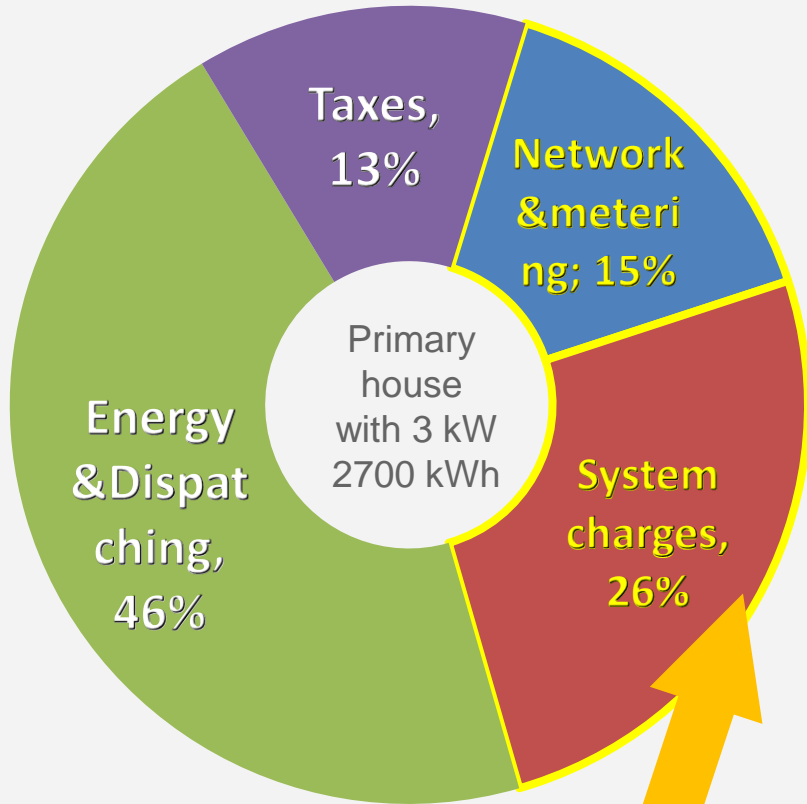
Due to massive spreading of **distributed generation** in the past 6 years, **flow inversions** (from lower voltage levels towards higher ones) are getting more and more relevant and might induce reconsidering cause-effects relationships.



Power injected into the distribution networks:
 ■ from HV networks
 ■ from generators attached to MV networks
 ■ from generators attached to LV networks



Break-up of households electricity bill (default regime in 2015)



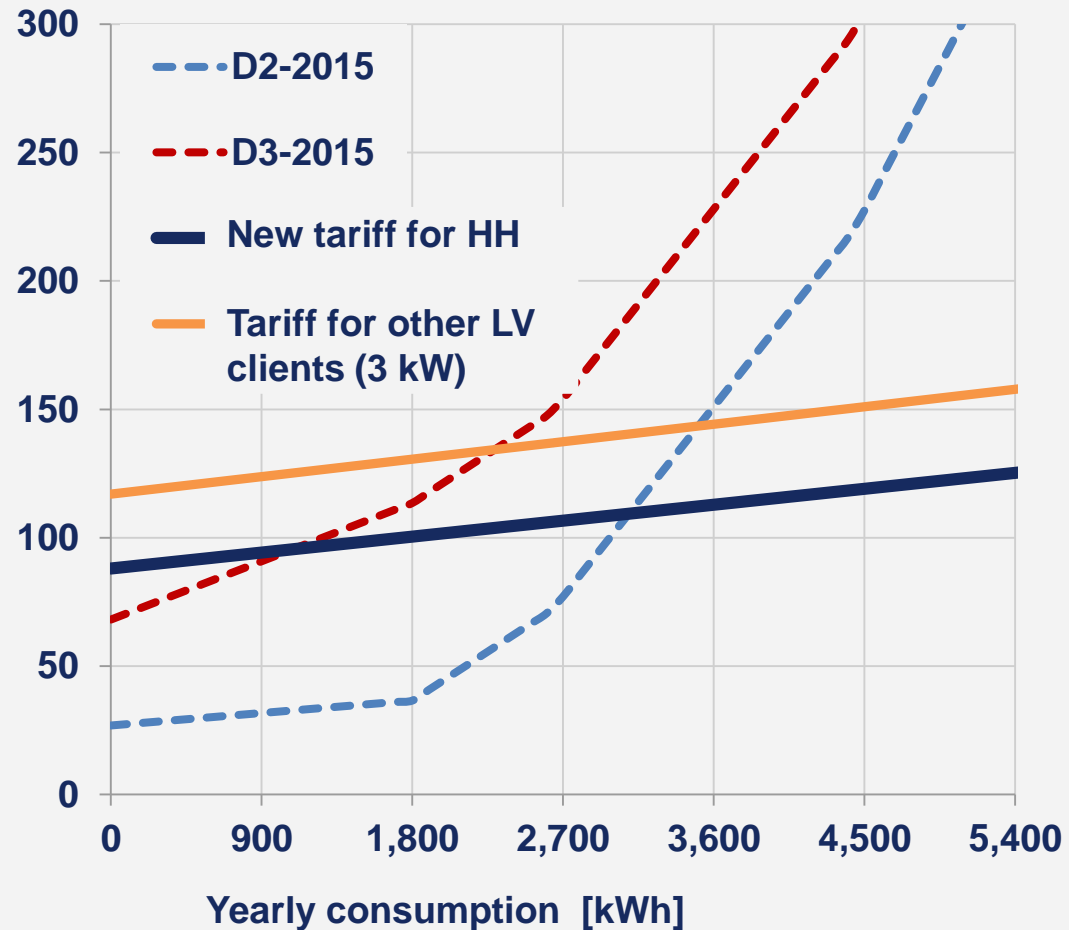
2 components are regulated by NRA and were based on strongly progressive tariffs.

THE NEW COST REFLECTIVE NETWORK TARIFF

Network tariffs are based on a **3 components structure** (yearly fixed amount + cost of contractual power + cost of energy)

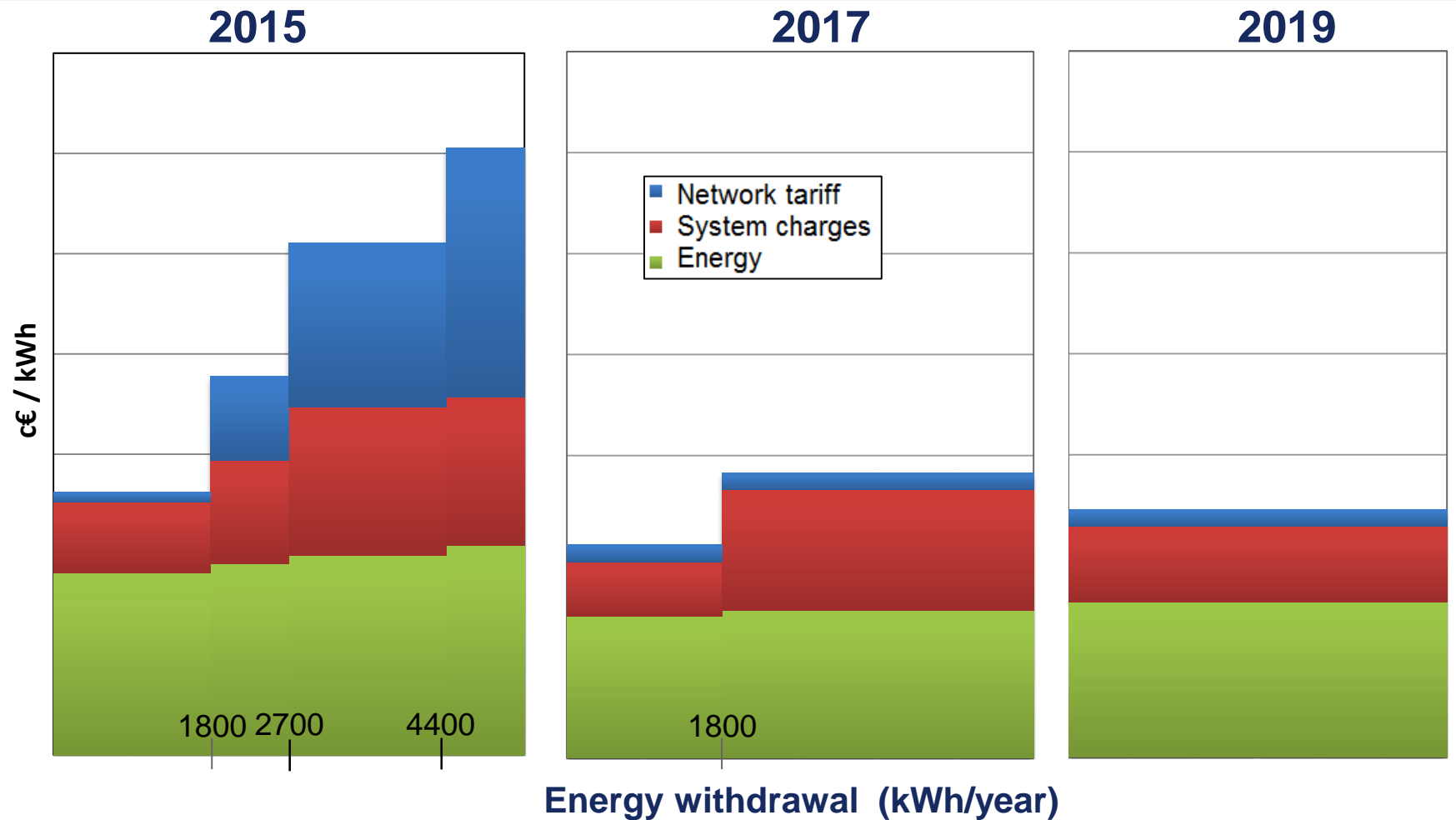
Households and **business** clients connected to LV networks have to share the **same cost of energy**, although they might have different contributions to the peak load (and then different costs for contractual power),

Yearly expense only for NETWORK tariffs [€]

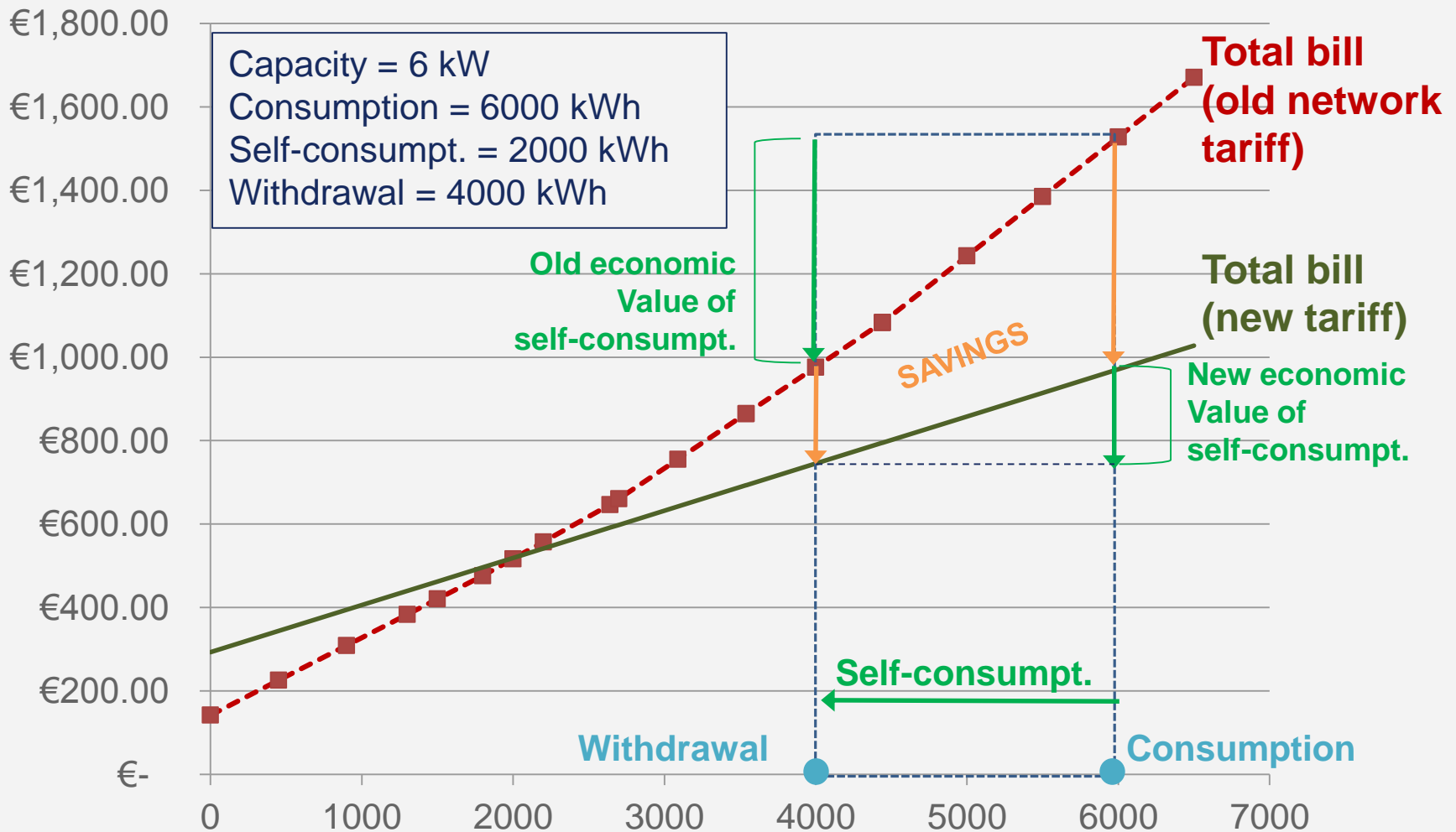




GRADUAL REFORM TO OVERCOME PROGRESSIVE TARIFFS



Self-consumption for «highly electrified» customers (total bill)



RELATIVE WEIGHT OF VARIABLE AMOUNTS in the total bill

Clients' choices (e.g. for energy savings and self-consumption) are influenced by the % composition of the total electricity bill (taxes included) between:

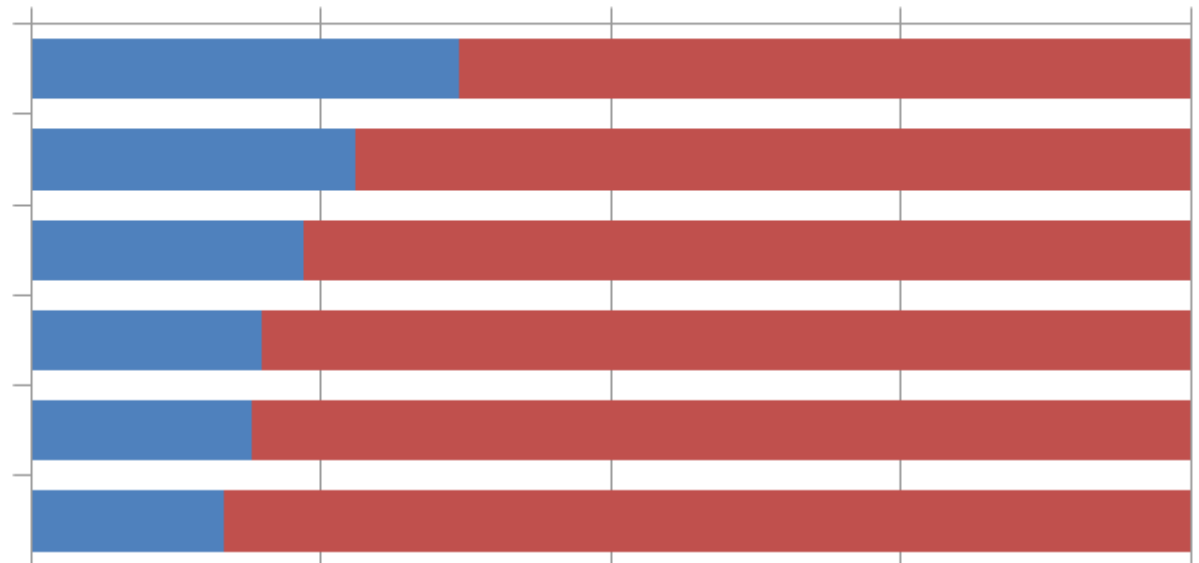
- **FIXED amounts** (€/year and €/kW/year of contractual power) and
- **VARIABLE amounts** (€/kWh of energy withdrawn), still predominant.

■ **% fixed+capacity** ■ **% variable** (proportional to kWh)

0% 25% 50% 75% 100%

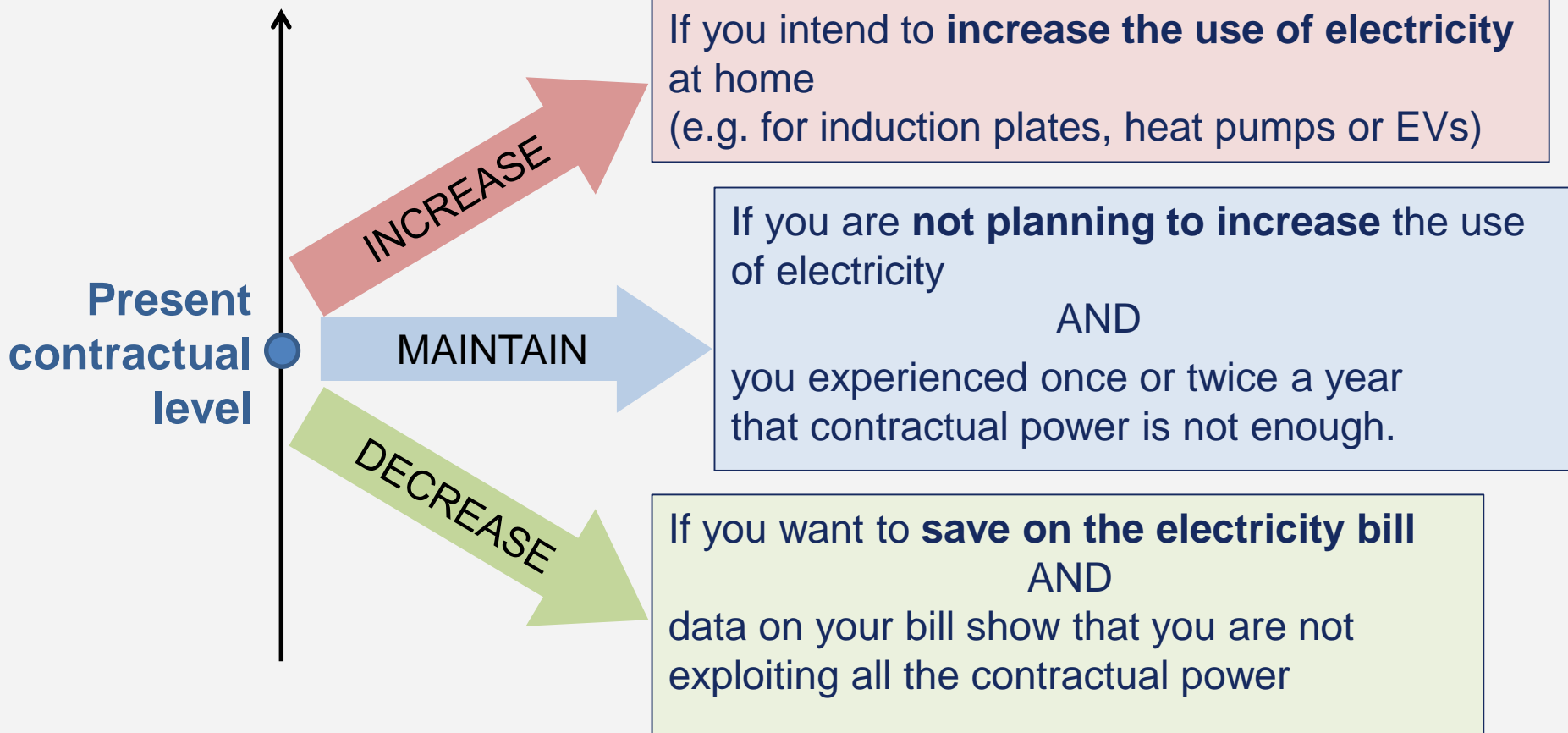
Several different
hh benchmark clients:

A: 3 kW, 1500 kWh
B: 3 kW, 2200 kWh
C: 3 kW, 2700 kWh
D: 3 kW, 3200 kWh
G: 3,5 kW, 3500 kWh
L: 6 kW, 6000 kWh



INCREASE or DECREASE contractual power?

Contractual
POWER



More information about actual power usage

Since 2016 ARERA obliged electricity suppliers to explicitly include in the invoices information related to the **peak power withdrawn**:

- **In every invoice** the maximum load measured in each billed month;
- **In at least one invoice per year, historical data** related to the maximum load measured monthly in the **past 12 months**,

Maximum load data are:

- derived by **smart meters measurements** of energy withdrawn every 15 minutes → $\text{max_Load (kW)} = 4 * \text{max_Energy (kWh)}$
- differentiated among the 3 standard **time bands** (F1, F2, F3);
- Monthly transmitted from DSOs (managing the meters) to retailers

Retailers are anyway free to define their own **invoice layout**, choosing where and how to present such data.



More information about actual power usage

LETTURE E CONSUMI

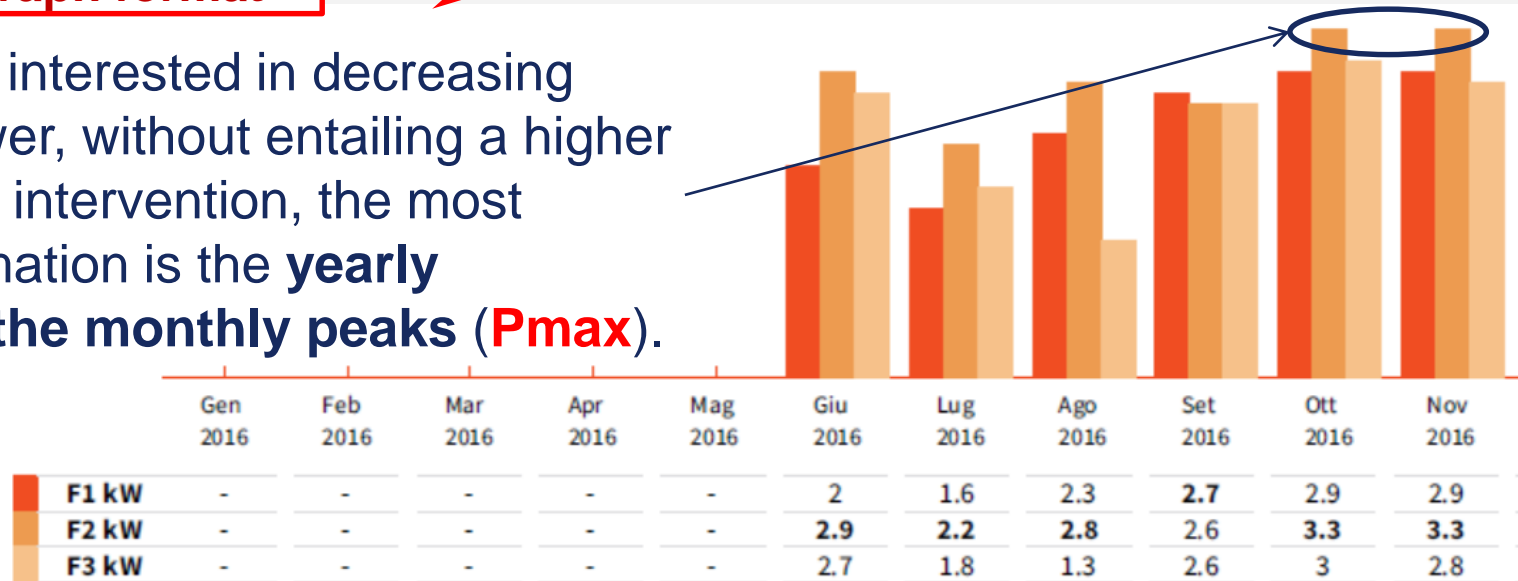
Retailer A: table format

PROSPETTO LETTURE E CONSUMI SU CONTATORE MATRICOLA 0507620119413

TIPOLOGIA	DAL	AL	TIPO LETTURA	DA LETTURA	A LETTURA	K	CONSUMO	FASCIA	%	MASSIMA POTENZA PRELEVATA
ENERGIA ATTIVA F1	01/11/2016	30/11/2016	EFFETTIVA	3.530,00	3.581,00	1,0	51,00 kWh	F1	33,8	1,970
ENERGIA ATTIVA F2	01/11/2016	30/11/2016	EFFETTIVA	4.754,00	4.802,00	1,0	100,00 kWh	F2+F3	66,2	2,360

Retailer B: graph format

When you are interested in decreasing contractual power, without entailing a higher risk of breaker intervention, the most relevant information is the **yearly maximum of the monthly peaks (Pmax)**.





THANK YOU FOR YOUR ATTENTION AND QUESTIONS

Please visit:

www.arera.it

Regulatory impact analysis: www.arera.it/it/docs/15/582-15.htm



AGENDA

BACK-UP: Legislative background and **RIA** process

Implementation of the Energy Efficiency Directive (EED)

In 2012 the new **Energy Efficiency Directive (2012/27/UE)** was issued, promoting the efficiency of heating and cooling, the transparency of billing, the user involvement and the “***removal of those incentives in transmission and distribution tariffs that are detrimental to the overall efficiency (including energy efficiency) of the generation, transmission, distribution and supply of electricity or those that might hamper participation of demand response [...]***”,

In 2013 and 2014 two acts issued by the Italian Parliament and Government for the national implementation of the EED identified the existing structure of Italian households' electricity tariffs as non-compliant with the main objectives of the EED and gave to the National Energy Regulator (AEEGSI) the task of gradually reforming it, revising the old design in order to make it **more cost reflective and transparent**, taking also into account the **social impact** that such reform would have on low incomes and the same time stimulating customers' **virtuous behaviors**.



Development of the overall RIA process

Complete **transparency** of the RIA process was guaranteed not only to the **most relevant stakeholders** (such as consumers' and environmental associations, utilities, industrial associations of equipment manufacturers and installers, etc.) but also to the **general public** through a **full disclosure of all the intermediate steps** via continuous publication of documents and updates to the AEEGSI website.

In order to identify the most relevant **alternative options and objectives** to be considered in the RIA and to perform a complete impact assessment of such options, AEEGSI involved all relevant stakeholders since the very early stages, arranging meetings and public hearings beside the formal written consultations.

Following the results of consultations, many changes have been applied to the RIA.



Development of the overall RIA process

Such involvement stimulated a **lively debate**, producing more than the list of objectives and options; many relevant questions were raised and AEEGSI was asked to address each of them in detail; these were the most relevant ones:

1. What can be expected to be the real positive impact of a non progressive tariffs on the attractiveness and **spreading of electric heat pumps as a replacement for less efficient gas fired boilers?**
2. What can be expected to be the negative impacts of the new tariff structure on households energy bills and especially on **low income households?**
3. What will be the effects of this reform on the profitability of existing and future installations of domestic **rooftop PV plants?**



Main guidelines adopted for the RIA

1. Getting over progressive tariffs should be dealt separately for “**network tariffs**” (can be cost reflective) and for “**system charges**” (levies cannot be cost reflective and should rely on a “political” choice).
2. **Multi-criteria analysis** has to be applied in **qualitative terms and focused mainly on “system charges”**.
3. No more than **4 alternative options** (T0, T1, T2 and T3) should be considered for defining the new “linear” tariff structure of system charges.
4. All relevant **stakeholders** have to be involved and **empowered** to give valuable feedbacks.

Effects of the reform on YEARLY BILLS (after a 3 years transition)

8 Benchmarks to represent clients in all situations (residence, power , energy)	Yearly net bill 2015 (€/year)	Yearly bill VARIATION after reform (€/year)
A (3 kW, 1.500 kWh/year)	233	+71 (+30%)
B (3 kW, 2.200 kWh/year)	343	+50 (+15%)
C (3 kW, 2.700 kWh/year)	438	+19 (+4%)
D (3 kW, 3.200 kWh/year)	563	- 42 (-7%)
F (3 kW*, 900 kWh/year)	260	+117 (+30%)
G (3,5 kW, 3.500 kWh/year)	831	- 261 (-31%)
H (3 kW*, 4.000 kWh/year)	928	- 155 (-17%)
L (6 kW, 6.000 kWh/year)	1.528	- 582 (-38%)

Highest impacts

will be on:

- Houholds with low energy consumption [A, B];
- * Secondary houses [F].

Highest benefits

- Energy intensive households [D],
- High contracted power (heat-pumps? Evs?) [G, L],
- * Students/workers living out of their home town [H].

