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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE  
COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE  
COMMITTEE OF THE REGIONS**

**Energy prices and costs in Europe**

{COM(2019) 1 final}

# **PART IV**

## **IMPACT OF PRICE REGULATION**

## Main findings

### Price regulation

#### *Household markets*

- There has been consistent progress towards phasing out regulated prices in EU Member States household markets during the period of analysis (2008-2016), which comes after the entry into force in 2009 of the 3<sup>rd</sup> energy market liberalisation package. Over that period a significant share of Member States have deregulated prices in household electricity markets while progress was slower in the household gas market, with only Ireland phasing out regulated prices
- Member States that phased out regulated prices before 2008 display markets where there are more suppliers that increase choice for consumers, consumers are more engaged and markets appear to be more competitive, with lower market concentration and more contract diversification. Notably, Member States which have phased out or are in the process of phasing out price regulation have a higher variety of electricity contracts, including dynamic price contracts which are only observed in these markets.
- There is a correlation between the share of households under regulated prices and the dynamism of the household market, even in Member States where regulated prices still exist. A lower share of households under regulated prices correlates with positive developments in indicators for competition, both when looking at individual years and over time. This is evidenced by developments in recently deregulated Member States or those that have gradually reduced the share under price regulation.
- Lower prices and mark-ups (gross margins) are observed in Member States with a majority of households under regulated prices. This could be explained by the fact that general price regulation for households may likely represent a significant squeeze on margins of suppliers, possibly at levels below net costs for suppliers. The frequency of tariff deficits is more frequent in Member States with regulated prices.
- Evidence from households electricity markets does not suggest that regulated prices lead to better affordability nor lower levels of energy poverty<sup>146</sup>. Moreover, evidence does not support either that the phase out regulated prices leads to lower affordability nor higher energy poverty. When assessing these indicators, the impact of the economic crisis in Europe must be discounted for.
- In terms of the consumer perception of the functioning of the market, both regulated and deregulated markets score well, with indications that deregulated markets score slightly better among consumers for electricity, while regulated markets tend to score slightly better among consumers for gas.

#### *Non-household markets*

- In the EU Member States non-household electricity and gas markets there has also been consistent progress towards phasing out regulated prices since the introduction of the 3<sup>rd</sup> energy package.

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<sup>146</sup> Household energy poverty may also significantly be affected by other fuels (e.g. gas, heating oil, gasoline) which were not analysed in this chapter. Economic factors can also impact energy poverty. A full picture of energy poverty could only be attained by looking at all these factors together.

- Regulated electricity and gas prices for business consumers are phased out faster than those for residential consumers.
- End-user price regulation has a decreasing role for businesses. By 2016, the large majority of businesses in the EU were already using non-regulated prices, with the exception of those in Bulgaria (gas and electricity), Cyprus and Malta (electricity) and Greece, Latvia and Poland (gas).
- The energy supply costs for business consumers tend to be higher in Member States relying on price regulation than in Member States that have phased it out.
- Contrary to observations on household markets, higher mark-ups (gross margins) are observed in markets with regulated prices for non-households. However, very few Member States still apply regulated prices and the aggregate results are significantly impacted by high prices in Malta for electricity and Greece for gas.

### Dynamic pricing

- Dynamic pricing contracts (DPC) are currently available in 7 Member States (Estonia, Finland, Sweden, Spain<sup>147</sup>, Netherlands, Denmark and the United Kingdom) and Norway and gradually spreading out to countries that have already opened up their retail markets for competition. As an observation, consumers do not have access to dynamic price contracts in Member States where a majority of households are under regulated prices. The reasons for non-availability may range from a lack of available smart metering infrastructure, regulatory hurdles or needs of reforms in the functioning of the retail markets. The case of Spain with a regulated default dynamic price contract is unique.
- Based on the evidence gathered so far, providing access to dynamic price contracts empower consumers and can in many cases significantly reduce the energy supply component of the electricity bill. For example, in the case of small consumers (Eurostat band A, annual consumption below 1 000 kWh) the annual saving can be in the range of 15 – 80 EUR per year, representing about 22 – 70 % of the energy supply component in the annual bill. Similar, if somewhat lower benefits can be expected in the case of natural gas.
- The specific features of dynamic price contracts need further investigation. Access to real consumer metering data and therefore undertaking subsequent analysis has proven very challenging in many Member States. Providing transparent access to consumer data, while fully protecting data privacy, is not only important for the setting up of the optimal design features of dynamic price contracts, this is also an essential element to reinforce contestability on the retail market. The difficulty of accessing data related to consumer profiles increases transaction costs and can act as a barrier dissuading new companies from entering markets.

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<sup>147</sup> Spain has a system with a regulated dynamic price contract as the default supply contract, in which only the margin charged on top of the wholesale prices is subject to regulation.

## 10 Price regulation

Price regulation exists where the price of energy is subject to control by public authorities, typically the government or the National Regulatory Authority (NRA). Regulated prices stand in contrast to market-based prices, where the forces of supply and demand determine the price of energy. Regulated price schemes vary from country to country in terms of the *type of energy (electricity or gas)* they apply to, the *customers* who pay a regulated price and *how* the regulated prices are fixed. Depending on the country, regulated prices may apply to both electricity and gas although in many cases the price regulation is applied for only one of these. Regulated prices can cover either all customers, only households or only vulnerable households. Finally, the methodology for determining the regulated prices also varies, and may include outright discretionary price setting, price caps, caps on the rate of return of suppliers or caps on margins. This chapter does not discuss or distinguish between the different types of methodologies.

The final retail energy price consists of an ‘energy component’, a ‘network component’ and ‘taxes and levies’. This chapter focuses on the price setting of the ‘energy component’.

The existing EU *acquis* from the 3<sup>rd</sup> Energy Package, as interpreted by the Court of Justice, only permits price regulation if strict conditions are met. The Court has ruled that energy supply prices must be determined solely by supply and demand.<sup>148</sup> However, Member States can impose price regulation in the form of a Public Service Obligation (PSO) that is adopted in the general economic interest, is clearly defined, non-discriminatory and verifiable, guarantees equality of access for EU companies to national customers and is limited in time and the scope of beneficiaries. The European Commission proposal for a recast Electricity Directive of 1 December 2016 (part of the *Clean Energy for All Europeans* Package), has sought to further restrict the ability to impose price regulation.

This chapter analyses the retail markets of EU Member States with both regulated and liberalised ‘energy component’ prices. The objective is to compare these markets and to assess the impact of regulated prices on the prices, costs and the general functioning of the retail market. A series of indicators have been identified to assess competition, prices, consumer satisfaction and tariff deficits. These indicators will be assessed across EU Member States in the period from 2008 to 2016, which corresponds roughly with the implementation of the EU *acquis* of the 3<sup>rd</sup> Energy Package, which entered into force in 2009. The markets for household and non-household electricity and gas are analysed separately.

Similar analyses on the functioning of retail energy markets have been conducted, notably in the ACER/CEER Market Monitoring Report. This analysis is however the first attempt to focus on the effects of price regulation by looking at a range of indicators on retail market functioning. In order to isolate the effects of regulated prices, where they prevail, EU Member States have been grouped according to whether price regulation exists in the market and, if so, how extensively is applied. The prevalence of regulated prices is determined by the share of consumers and the volumes consumed under regulated prices. The countries that deregulated their prices during the period from 2008 to 2016 are also isolated as a separate group, in order to capture the immediate impact of price deregulation on each indicator.

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<sup>148</sup> Case C-265/08, *Federutility and others v Autorità per l’energia elettrica e il gas*. The Court judgement was based on Article 23(1)(c) of Directive 2003/55 of the Second Energy Package which provides that Member States must ensure that all customers are free to buy natural gas from the supplier of their choice as from 1 July 2007. The relevant provisions has remained unchanged in the Third Package Directives.

In addition to a cross-section analysis focusing on the year 2016, most indicators are analysed over time in order to capture the evolution of market functioning across the groups during the period of analysis.

## **10.1 Impact of price regulation on competition, prices, quality of services and investments**

### **Introduction**

The ability of suppliers to set prices freely is essential to develop retail market competition. In markets where suppliers are not able to set prices freely, and especially where prices are set below cost levels, we can expect to observe lower competition in the form of fewer suppliers, higher market concentration, lower savings from switching suppliers and fewer offers available to consumers. Price regulation in retail energy markets may therefore significantly hamper the development of well-functioning retail energy markets.

Because it is inherently difficult to establish cost-reflective prices for energy via regulation, as opposed to via market forces, regulated prices come with the inherent risk of setting prices which are below market costs. That risk could be magnified by the energy transition, as more variable renewable generation could increasingly create mismatches between wholesale prices and regulated retail market prices. This could ultimately lead to consumers paying either too much or too little for energy.

Regulated prices below market costs are particularly detrimental for retail market functioning. In this situation suppliers are forced to absorb losses from supplying their customers, which may lead to tariff deficits, a deteriorating economic health of the companies and ultimately restricted competition. On the other hand, regulated prices below market costs may create skewed expectations among consumers as they receive a de facto subsidies energy price, which could lead to over consumption and popular opposition to establishing cost-reflecting prices.

In practice, Member States that regulate retail energy prices commonly use hybrid systems where regulated prices exist within a liberalised market with competition among suppliers and opportunities for supplier switching. However, experience from deregulation processes shows that the existence of regulated prices in a liberalised market can still be significantly distortive. Distortions occur as the regulated price is set too low relative to net margins required for supplier competition, meaning that even though the gross margin is not below cost, the level of the regulated price effectively eliminates competition. In addition, where the regulated price is set above cost there is a risk that the regulated price becomes a benchmark for price setting which all suppliers cluster around, as opposed to allowing various wholesale prices and purchasing strategies to dictate retail price formation.

As prices in Member States with price regulation are impacted by the administratively set level of the prices and given the challenges of correctly replicating the market equilibrium in administrative procedures, it is expected that prices in markets with price regulation are lower than those of liberalised markets. On the other hand, we can expect that liberalised markets are significantly more dynamic, with more suppliers, lower market concentration and a wider choice of contracts and services available to consumers. In broad terms, we expect to see that liberalised markets are more conducive towards developing the flexible retail energy markets required for a future with higher shares of variable renewable energy and electric vehicles.

### *Structure of the analysis*

The analysis assesses the impact that price regulation on indicators for competition, prices and quality of service in retail gas and electricity markets for households and non-households. The analysis adopts a comparative approach between regulated and non-regulated markets and

markets in-between these two categories. Due to limited data availability, several non-price indicators are only available for the household electricity and gas markets. In addition, a separate analysis investigates the relationship between tariff deficits and the existence of regulated prices.

The starting point for these analyses is to identify the countries where regulated prices exist and to assess how widespread they are. Both ordinary regulated prices available to all consumers and social tariffs are considered to be regulated prices, the determinant of whether price regulation exists is whether there is a form of intervention in the price setting for the supply of energy, regardless of whether it is targeted or not. Due to differences in characteristics, analyses are performed separately for gas and electricity for the following market segments:

- Household electricity.
- Household gas.
- Non-household electricity.
- Non-household gas.

In order to allow the analysis to clearly separate between the Member States that apply price regulation, and those that do not, within each market segment, the analysis distinguishes between four groups depending on the prevalence of regulated prices:

- **Group 1 (< '08):** Markets which fully phased out regulated prices before 2008 (i.e. a maximum of 5% of consumers have regulated prices since 2008);
- **Group 2 ('08-'16):** Markets which phased out regulated prices between 2008 and 2016 (i.e. a maximum of 5% of consumers have regulated prices in 2016).
- **Group 3 (> 50 %):** Markets in which more than 50% of the consumers have regulated prices;
- **Group 4 (5-50 %):** Markets in which 5% to 50% of the consumers have regulated prices;

These groups enable us to nuance the analysis and make meaningful comparisons between countries, while also analysing separately the countries that have deregulated prices historically and more recently. It enables us to make observations corresponding to each of these groups, such as whether the prevalence of regulated prices as a share of the market matters in terms of market functioning. Countries that use social tariffs are also grouped in accordance with the criteria for these analytical groups. Weighted averages are calculated for each group, per indicator, to provide grounds for comparison between the groups. The indicators considered are:

- For **competition**, we consider indicators on the number of active suppliers, the level of market concentration, the annual switching rates and the savings from switching available to consumers.
- For **prices**, we look at the level of the prices, the co-movement and mark-ups to wholesale prices, energy expenditure as a share of disposable income and the levels of energy poverty.
- For **quality of service**, we look at market performance indicators and the level of trust, comparability and perceived ease of switching in the market.
- For **tariff deficits**, we cross-compare countries that had tariffs deficits with the list of countries that regulate prices.

The analysis performed in this section is a comparative analysis between the identified groups. It may also be important to know about the trajectory of market development in each

Member State to complement this analysis. Country detailed information can be found in the country facts-sheets in the *Trinomics et altri* study (Annex I of the study).

## 10.2 Price regulation in household gas and electricity markets

Although several EU Member States still maintained a policy of retail price regulation in 2016, there has been a clear trend towards phasing out regulated prices in recent years, coinciding with the implementation of the requirements of the 3<sup>rd</sup> energy package which entered into force in 2009 (**Figure 210**).

### *Existence of price regulation*

In household electricity markets, the Member States that still maintained price regulation in 2016 were Belgium, Bulgaria, Cyprus, France, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain.

Only Belgium, Latvia, Portugal and Spain had fewer than 50% of household electricity consumers under regulated prices.

In household gas markets, the Member States that still maintained price regulation in 2016 were Belgium, Bulgaria, Denmark, Greece, France, Croatia, Hungary, Lithuania, Latvia, Poland, Portugal, Romania, Slovakia and Spain.

Only Belgium, Denmark, Spain and Portugal had fewer than 50% of household gas consumers under regulated prices.

### *Phase out of price regulation in recent years*

Between 2008 and 2016 several Member States phased out regulated prices for households.

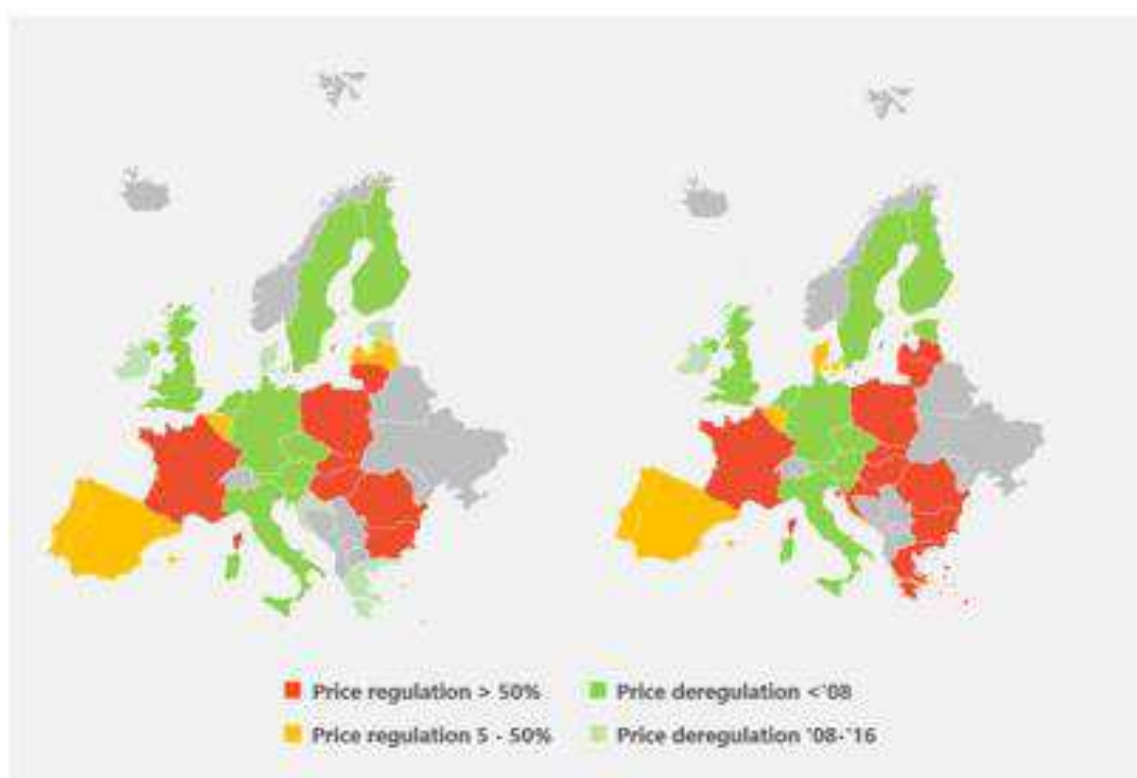
In household electricity markets regulated prices were phased out in Croatia (2015), Denmark (2016), Estonia (2013), Greece (2013) and Ireland (2011).

In household gas markets regulated prices were phased out only in Ireland (2014).



## Electricity

## Gas



**Figure 210- Household price regulation in EU Member States in 2016**

Source: CEER data and NRA representatives

### 10.2.1 Share of households under regulated prices

There are substantial differences in the prevalence of regulated prices in the EU Member States that still use that policy. In some the share of households under regulated prices had dropped dramatically between 2008 and 2016 (the end year of our analysis), whereas in others the share has remained static (**Figure 211**).

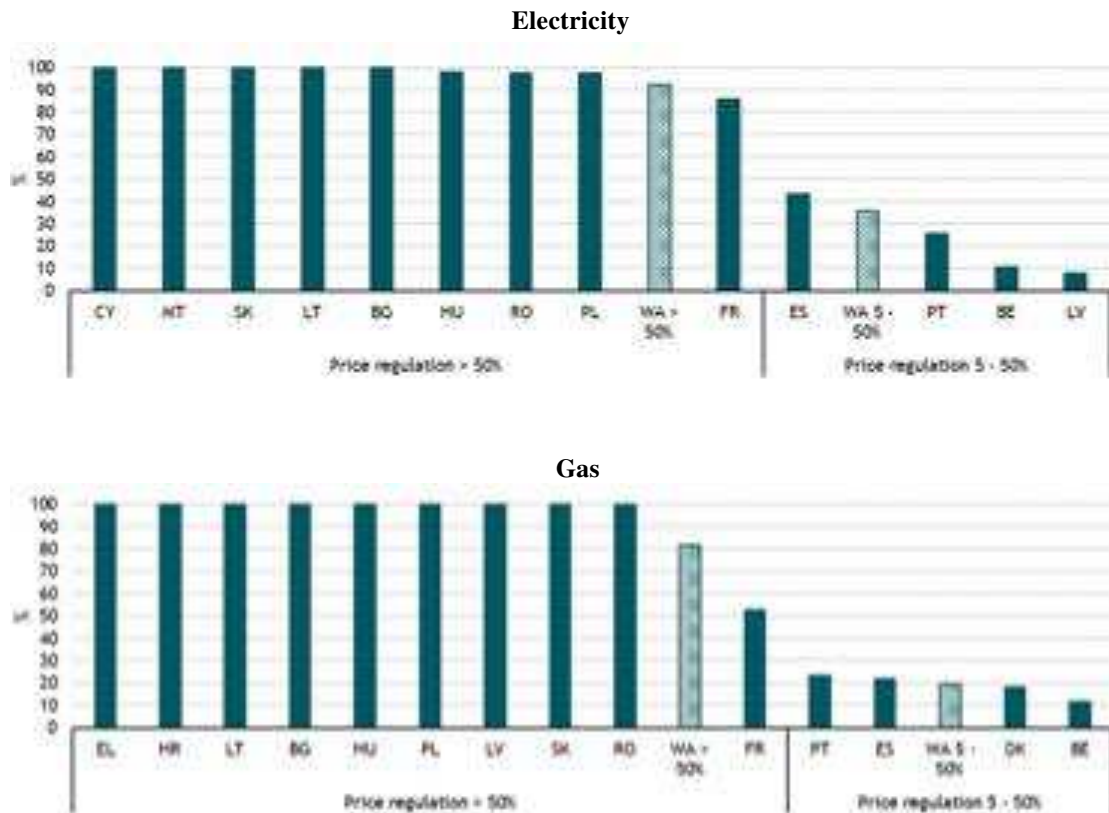
For **electricity**, the weighted average share of households under regulated prices in Member States with more than 50% of households under regulated prices remained high in 2016, at 92.4%.

The weighted average share of households under regulated **electricity** prices in Member States with a 5-50% share of households under regulated prices in 2016 is significantly lower, at 35.8%.

For **gas**, the weighted average share of households under regulated prices in Member States with more than 50% of households under regulated prices remained high in 2016, at 81.6%.

The weighted average share of households under regulated **gas** prices in Member States with a 5-50% share of households under regulated prices is significantly lower in 2016, at 19.5%.

This reinforces the need to separate between those Member States that had made clear and sustained progress towards phasing out regulated prices and those that have made little progress, thereby enabling an analysis of whether a correlation can be made between lower shares of consumers under regulated prices and improved market functioning.



**Figure 211 - Share of consumers under regulated prices in EU Member States in 2016**

Source: CEER data and NRA representatives

Note: Used weights are the total number of household consumers per country and per energy market.

A description of the weighted averages' groups is provided in section 10.2

### *Evolution in the share of households under regulated prices*

The share of consumers under regulated prices in Member States that still maintain price regulation has evolved differently from 2008 to 2016: Some Member States have seen rapid decreases in the share of consumers under regulated prices while other Member States phased out price regulation completely (**Figure 212**).

For **electricity**, significant decreases in the share of households under regulated prices were observed between 2008 and 2016 in Portugal (where the share decreased from 95% to below 30%), Spain (from around 90% to below 45%) and Latvia (from 100% in to 8%).

In addition Croatia, Denmark, Estonia, Greece and Ireland entirely phased out regulated prices for electricity.

For **gas**, significant decreases in the share of households under regulated prices between 2008 and 2016 were observed in Portugal (where the share decreased from 100% to 23%), Spain decreased (from 55% to 21%) and Denmark (which had a share of 18% of consumers under regulated **gas** prices in 2016).

In addition Ireland entirely phased out regulated prices for **gas**.

For the group of countries with more than 50% of consumers under price regulation there was little progress towards phasing out regulated prices between 2008 and 2016, with the only noticeable decreases occurring in France, which slightly reduced the share of households under regulated prices for **electricity** (from 98% to 86%) and decreased more markedly the share of households under regulated prices for **gas** (from 89% to 53%).

This suggests that there are clear differences between the 5-50% group, which has been more successful, and the above 50% group, which has been less successful with the phase out.

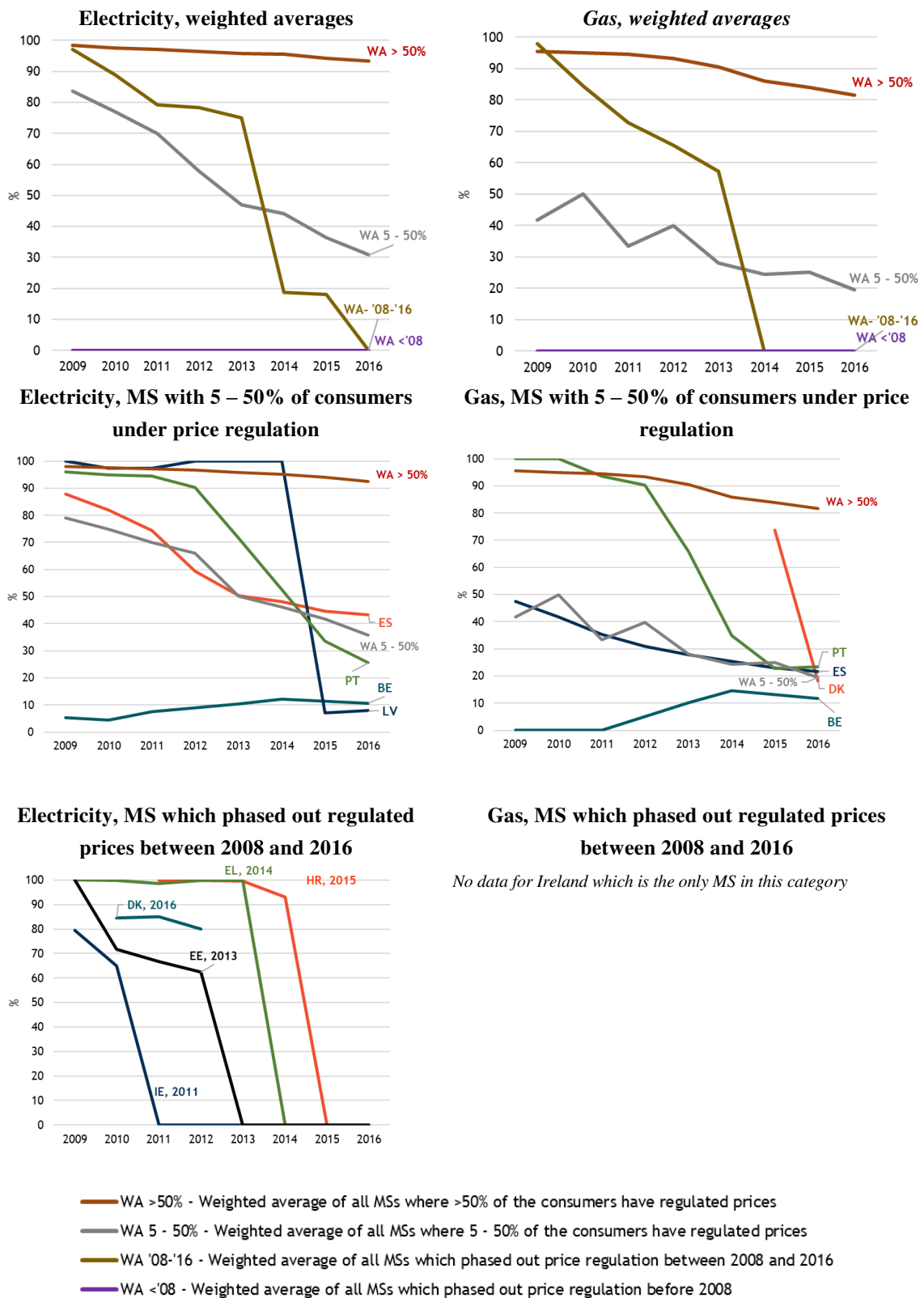


Figure 212 - Evolution in the share of households under regulated prices

Source: CEER data and NRA representatives

Note: the year in which price regulation was phased out is mentioned in the graphs when relevant.

Used weights are the total number of household consumers per country and per energy market. A description of the weighted averages' groups is provided in section 10.1.

## 10.2.2 Share of consumers under social tariffs

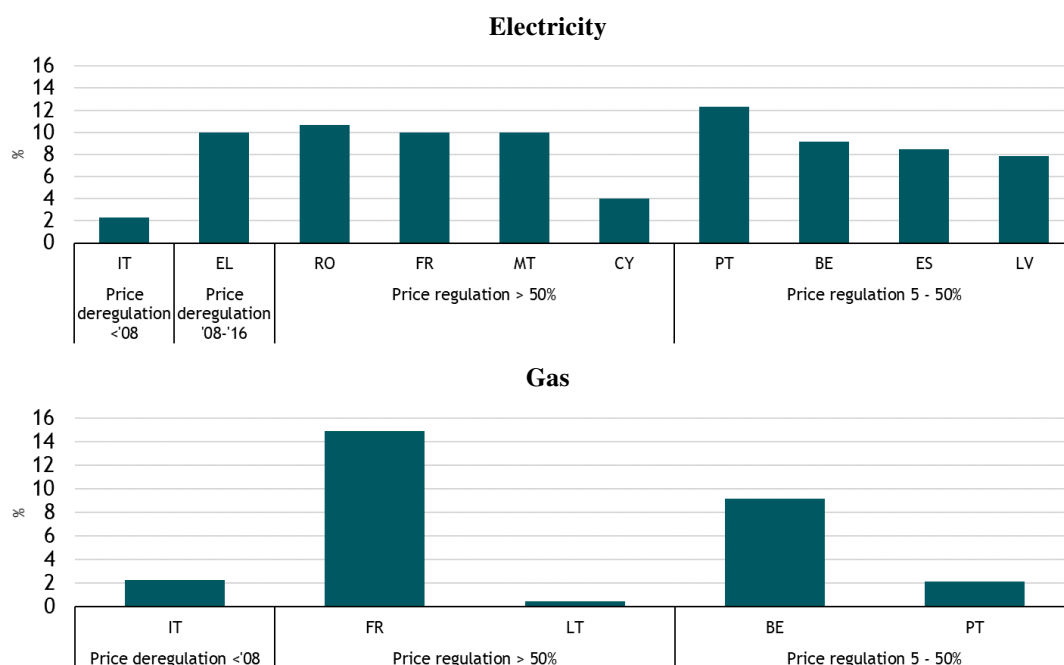
Social tariffs constitute a form of price regulation that is only applicable to a limited group of consumers for purposes of protecting vulnerable consumers with limited financial means. Social tariffs only exist in the household gas and electricity markets. Social tariffs are considered to be price regulation if the social tariff is based on an intervention in the price setting of the energy component.

For **electricity**, Italy and Greece are Member States that are not considered to have regulated prices but have social tariffs. In the case of Italy, the social tariffs constitute an intervention in price setting but it has consistently been applied to only a very small share of households. In the case of Greece, the social tariffs do not constitute an intervention in price setting.

Belgium and Latvia do not apply a general policy of price regulation for **electricity**, however they are considered to have regulated prices due to the relatively large share of consumers on social tariffs based on interventions in price setting. The remainder of the countries that apply social tariffs for **electricity** also maintain a policy of general price regulation.

For **gas**, Italy is the only country that is not considered to have regulated prices but has social tariffs. As for electricity, the social tariffs for **gas** in Italy have consistently applied to only a very small share of households.

Belgium does not apply a general policy of price regulation for **gas**, however it is considered to have regulated prices due to the relatively large share of consumers on social tariffs based on interventions in the price setting. The remainder of the countries that apply social tariffs for **gas** also maintain a policy of general price regulation.



**Figure 213 - Share of households under social tariffs in EU Member States**

Source: CEER data and NRA representatives

Note that MS without social tariffs in 2016 are not shown. BG reported a very low share of consumers with social tariffs slightly greater than zero.

### Evolution in the share of households under social tariffs

The evolution in the share of households under social tariffs appears to be country specific, with diverging patterns across Member States (**Figure 214**).

For **electricity**, the share of households under social tariffs decreased in Malta, Romania and Spain, while it increased in Belgium, France, Greece, Latvia and Portugal. Notably, for Portugal the increase in the share of households under social tariffs from 1% to 12% from 2014 to 2016 coincides with a decrease in the share of households under general price regulation from 53% to 26% in the same period. The same occurred in Latvia, where general price regulation was phased out entirely in 2015 and replaced by a social tariff regime. In France, a correlation between small decreases in shares on general price regulation and increases in social tariffs is also observed.

For **gas**, the share of households under social tariffs remained static in Italy and Bulgaria over the period of analysis. Again, reductions in the share of households under general price regulation for **gas** in France from 89% to 53% coincide with an increase of households under social tariffs for **gas** from 3% to 15%. In Portugal the same correlation is observed, where a substantial decrease of households under general price regulation for **gas** coincides with a minor increase in the share under social tariffs.

Although not uniformly conclusive, data from France, Latvia and Portugal suggests a trend away from general price regulation towards a more targeted policy of social tariffs. For Latvia and Portugal this is more pronounced for **electricity**. While for France it is more pronounced for **gas**.



**Figure 214 - Evolution in the share of households under social tariffs in EU Member States**

Source: CEER data and NRA representatives

Note: Used weights are the total number of household consumers per country and per energy market.

## 10.3 Impact of regulated prices on household retail markets

### 10.3.1 Impact on competition and consumer engagement

This section assesses the impact of regulated prices on selected aspects of competition and consumer engagement. These two aspects are closely interrelated, there cannot be competition without consumer engagement in the form of choosing new suppliers and products, and there cannot be consumer engagement without competing suppliers providing choices for the consumers. In this section consumer choice, consumer engagement and market concentration indicators are assessed in order to better understand the dynamics of retail market functioning across the identified groups of Member States.

#### *Consumer choice*

The ability of consumers to effectively make choices on the market, whether in the form of a new supplier or a new product, and the ability to generate savings from switching, are key indicators to assess the functioning of retail energy markets. A primary objective of EU policies for retail energy markets are to ensure that all consumers have adequate choice and opportunities for engagement, allowing them to be active participants in the energy transition and benefit from a range of products and services, including dynamic price contracts. This means that consumers should have choices on the market that allow them to engage and be active.

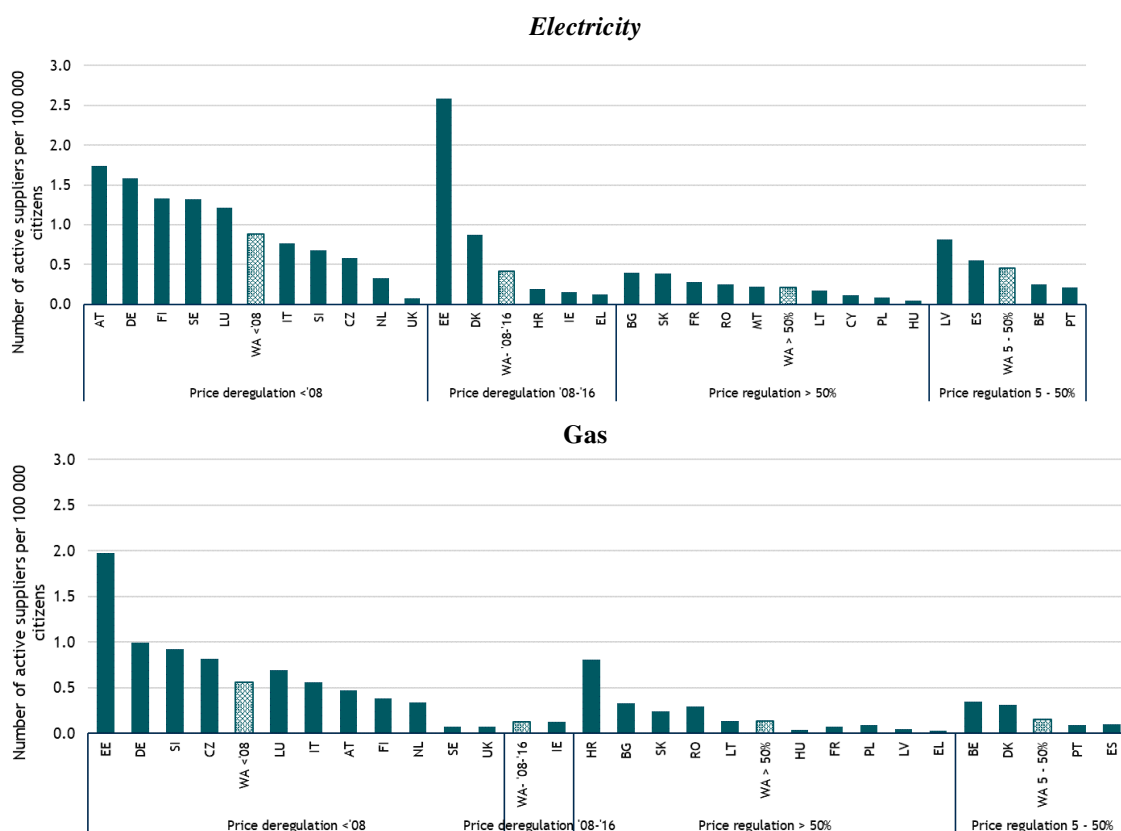
#### *Choice of supplier*

The number of suppliers per 100,000 citizens indicates the level of choice and the number of suppliers competing in the market. There appears to be a relationship between the number of suppliers available per citizen and the existence of price regulation, with liberalised markets performing better than regulated markets (**Figure 215**).

Member States that deregulated **electricity** prices before 2008 had on average 0,88 suppliers per 100,000 customers in 2016, which is 319% higher than in Member States with price regulation for a majority of households. The Member States that had a majority of **electricity** household customers under price regulation, had on average 0,21 suppliers per 100,000 citizens. For Member States that deregulated **electricity** prices in the period from 2008 to 2016 the average number of suppliers is 0,42, which is 100% higher than in Member States with a majority of households under regulated prices. Member States that had a minority of **electricity** household customers under regulated prices had on average 0,46 suppliers per 100,000 citizens, which is 103% higher than in Member States with a majority of households under regulated **electricity** prices.

Member States that deregulated **gas** prices before 2008 had on average 0,56 suppliers per 100,000 citizens in 2016, while the Member States that deregulated between 2008 and 2016 had 0,13 suppliers on average. The Member States that had a majority of household **gas** customers under regulated prices had 0,14 suppliers on average, while the Member States that had a minority of household **gas** customers under regulated prices had 0,16 on average. The Member States that deregulated prices before 2008 therefore had 300% and 250% more suppliers on average than Member States with a majority and minority of household **gas** customers under regulated prices respectively, while Member States that deregulated **gas** prices between 2008 and 2016 had on average 7% and 18% fewer **gas** suppliers than Member States with a majority and minority of household **gas** customers under regulated prices respectively.

This confirms that for **electricity** there was a clear correlation in 2016 between the share of household customers under regulated prices and the average number of suppliers per 100,000 citizens. In particular Member States that deregulated prices before 2008 show a substantially higher number of suppliers compared with the other groups, while the Member States that either deregulated prices between 2008 and 2016 or that have a minority share of households under regulated prices also show a higher average number of suppliers than for countries that have a majority of households under regulated prices. For **gas**, a similar observation can be made for the group that deregulated prices before 2008 versus the other groups, while the differences between the other groups are insignificant. This suggests that there is more choice for consumers and more competition among suppliers in Member States that have phased out regulated prices.



**Figure 215 - Number of active suppliers per 100,000 citizens in 2016**

Source: CEER data and NRA representatives

### Evolution in the choice of supplier

The evolution in the number of suppliers per 100,000 citizens during the period from 2009 to 2016 indicates the trajectory of development in terms of choice and the number of potential competing suppliers in the market in this period (**Figure 216**).

For **electricity**, the evolution is clearly more positive for Member States that phased out regulated prices before 2008, which show a substantial increase in the number of suppliers during the period of analysis between 2009 and 2016. For Member States that deregulated during this period, the evolution is less positive and less consistent, although a consistent positive trend can be observed from 2012 and onwards. For Member States that had a minority share of consumers under regulated prices by 2016, the evolution is very positive, which could indicate an increasing momentum in terms of competition due to a gradual phase



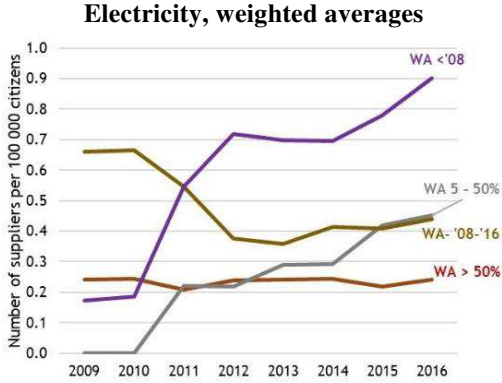
out of regulated prices. The Member States that had a majority share of consumers under regulated prices in 2016 had no evolution during the period, suggesting the existence of less dynamic market structures.

The individual Member States that phased out regulated **electricity** prices during the period from 2008 to 2016 do not appear to give any clear indication on an immediate impact of consumers choice from removing price regulation, a slight decrease is observed from 2013 in Estonia, no change is observed in 2016 for Denmark, while Croatia, Ireland and Greece did not display any significant evolution over the period.

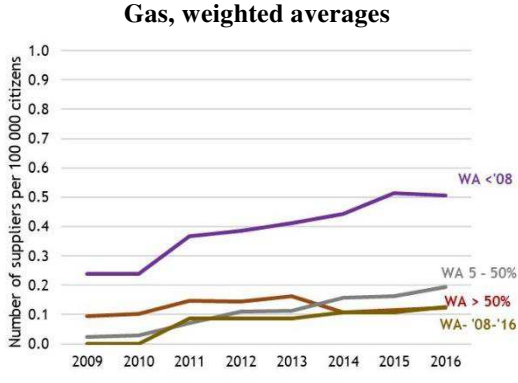
For **gas**, a positive evolution is observed for the Member States that phased out regulated prices before 2008, with marked increase in the number of suppliers per 100,000 citizens between 2009 and 2016. For Member States that either phased out or gradually deregulated during this period a positive evolution is also observed, albeit less significant than for the pre-2008 group. The Member States that had a majority share under regulated in 2016 remained static over the period of analysis.

Ireland was the only Member State that phased out household regulated prices for **gas** during the period from 2008 to 2016, and it does not appear that the event of deregulation in 2014 had any immediate impact on consumer choice.

The evolution in the number of suppliers per 100,000 citizens during the period from 2009 to 2016 shows that there is a clear positive evolution in the Member States that phased out regulated **gas** and **electricity** prices before 2008. Again for **both the gas and electricity markets**, there appears to be a clear positive trend for both the Member States that phased out price regulation completely and those gradually phased out price regulation but which still had a minority share by 2016. For Member States with a majority of consumers under regulated prices there is no evolution in terms of the number of suppliers per 100,000 citizens, which suggests that the market structure has remained static during the period.

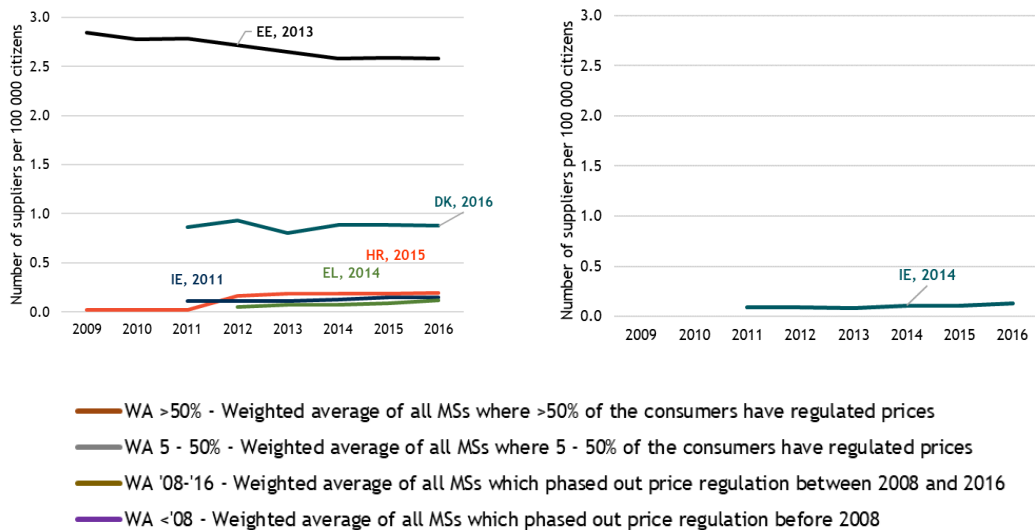


Electricity, MS which phased out regulated prices between 2008 and 2016



Gas, MS which phased out regulated prices between 2008 and 2016





**Figure 216 - Evolution in the number of active suppliers per 100,000 citizens in 2016**

Source: CEER data and NRA representatives

Note: the year in which price regulation was phased out is mentioned in the graphs when relevant.

Used weights are the total household consumption per country and per energy market.

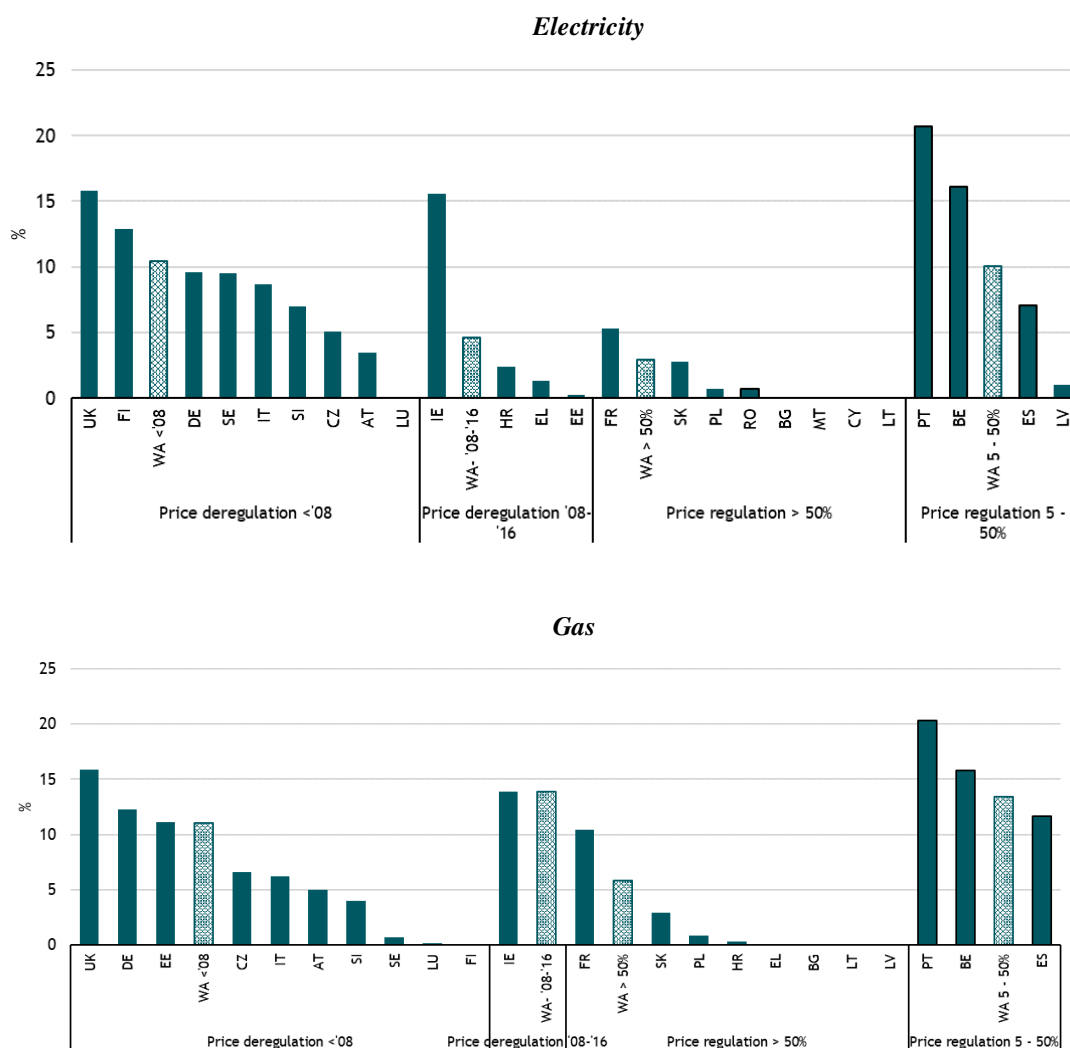
### *Supplier switching*

Supplier switching rates are an indication of the level of consumer engagement and a proxy for the level of competition in the market. There appears to be a relationship between a phased out or lower levels of households under regulated prices and the level of switching rates (**Figure 217**).

For **electricity**, switching rates in Member States that have either deregulated before 2008 or that had a minority share under regulated prices by 2016 are substantially higher than in markets where a majority of households are under regulated prices. Member States that deregulated between 2008 and 2016 display switching rates at twice the level of Member States that have a majority of households under regulated prices, but still only at half the level when compared to the other two groups.

For **gas**, switching rates in Member States that have either deregulated before 2008 or that had a minority share under regulated prices by 2016 are again substantially higher than in markets where a majority of households are under regulated prices. Ireland was the only Member State to deregulate its household **gas** market between 2008 and 2016 and displays a high rate of switching in 2016. The Member States with a majority of households under regulated prices display switching rates at half the level of the other groups.

The data on supplier switches from 2016 reinforce the view that market structures in Member States with regulated prices are more static and less conducive to consumer engagement, as evidenced by the substantially lower switching rates in those Member States.



**Figure 217 - Annual switching rates in 2016**

Source: CEER data and VAASAETT. Switching rates for households in relation to the total number of metering points.

Note: data is missing for NL and HU for electricity and for NL, HU and RO for gas.

Used weights are the total household consumers per country and per energy market.

### *Evolution in the choice of supplier*

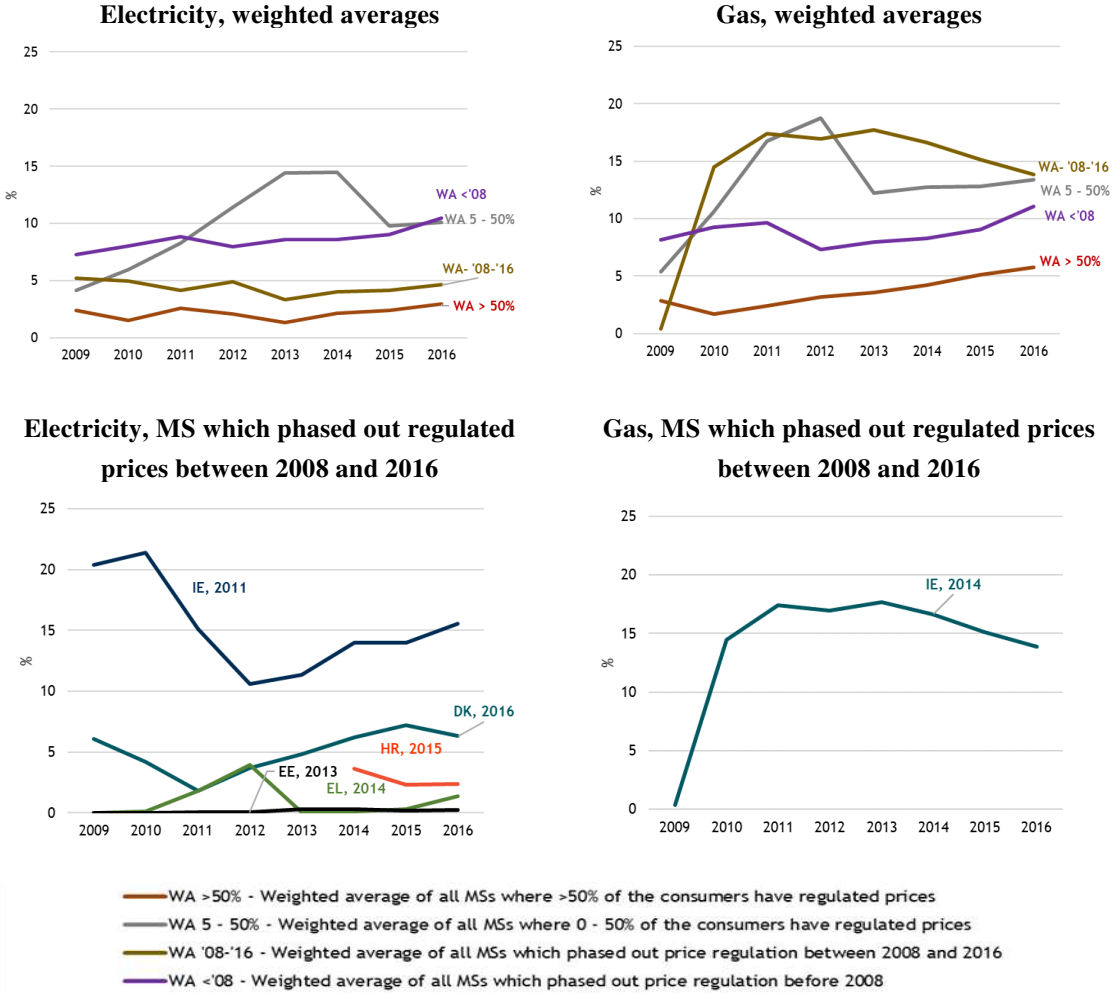
The evolution in switching rates indicates the trajectory of consumer engagement and by proxy the competitiveness of the market, by showing the rate at which consumers are changing suppliers, thereby adding to competitive pressure among suppliers. Switching rates are substantially higher in markets without regulated prices or in markets with a lower share of consumers under regulated prices (**Figure 218**).

For **electricity**, there has been a sustained increase in average switching rates among the Member States that phased out price regulation before 2008, reaching an average above 10% in 2016. The group of Member States with a minority of households under regulated prices in 2016, which have been conducting a gradual phase out, had the largest increases in switching rates over the period from 2009 to 2016. This is likely due to the effects of a policy of a gradual phase out, which is reflected in switching statistics where households are incentivised to switch out of regulated prices, as opposed to a mandated phase out in the group of countries

that fully deregulated between 2008 and 2016, which is not reflected in switching statistics in the same manner as the regulated prices are completely abolished. The Member States that deregulated between 2008 and 2016 had an even trajectory of switching rates at relatively low levels during the period, but still at higher levels relative to the group of Member States that had a majority share of households under regulated prices.

For **gas**, the Member States that abolished regulated prices between 2008 and 2016 and the group that had a minority share of households under regulated prices by 2016 saw marked increases followed by sustained high switching rates in the period. The Member States that deregulated prices prior to 2008 also saw sustained moderate switching rates. Again the Member States that had regulated prices for a majority of households had a low but increasing level of switching rates.

The evolution in supplier switching rates from 2008 to 2016 show that in particular countries undertaking a gradual phase out of regulated prices, which fall under the group that had a minority share under regulated prices in 2016, achieve high levels of consumers engagement during the phase out period. Both for **electricity** and **gas** there is clear evidence that Member States without regulated prices, evidenced by the group that deregulated before 2008 in particular, have higher levels of consumer engagement and a by proxy more competitive markets.



**Figure 218 - Evolution in annual switching rates**

Source: CEER data and VAASAETT. Switching rates for households in relation to the total number of metering points  
 Note: Used weights are the total household consumers per country and per energy market.  
 The country label indicates the phase out year for regulated prices

### Choice of contract

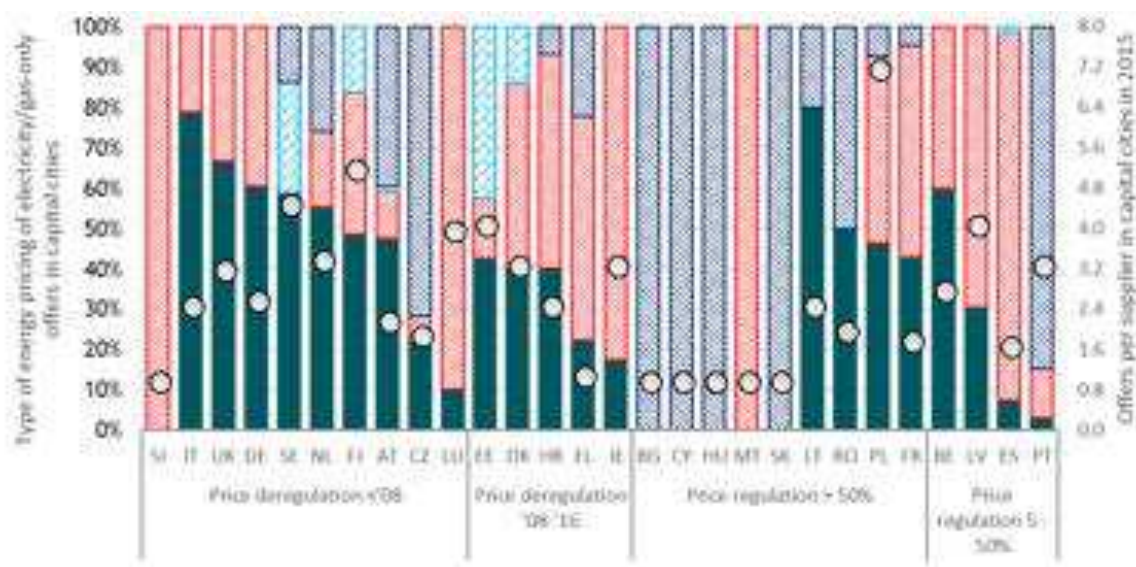
The choice of contracts available in Member States is an indicator for the level of consumer choice and the potential level of innovation in the markets. In markets without regulated prices or with a lower share of regulated prices, there are substantially more offers per supplier which could indicate a higher level of consumer choice.

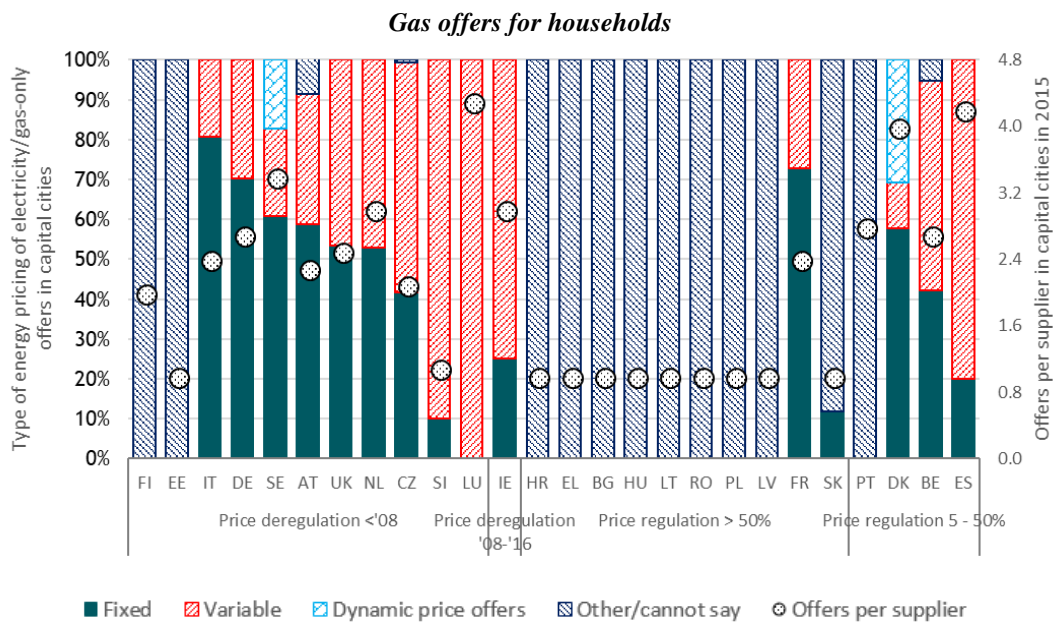
For **electricity**, the distribution of the type of contract across Member States do not give clear indications on whether fixed or variable prices are prevalent in any of the groups of Member States. The exception is for dynamic electricity price contracts, which are only available in Member States that have either deregulated before 2008 or that have deregulated between 2008 and 2016. There also appears to be a correlation between the number of **electricity** offers per suppliers and the existence of regulated prices, as the groups without price regulation or the ones that have a minority share of households under regulated prices have more offers per supplier. The statistical outlier in terms of the offers per supplier is Poland, which has the highest share overall despite having a majority of households under regulated prices.

For **gas**, again the distribution of the type of contract across Member States does not give clear indications on whether fixed or variable prices are prevalent in any of the groups of Member States, while there is unclear data on contract types for many Member States with a majority of households under regulated prices. The exception is again for dynamic price offers, which for **gas** are contracts linked to wholesale market prices, which are only available in Member States that have either deregulated before 2008 or that have a minority share of households under regulated prices. There appears to be a correlation between the number of **gas** offers per supplier and the existence of regulated prices, as the groups without price regulation or the ones that have a minority share of households under regulated prices have significantly more offers per supplier.

Although the distribution between fixed and variable price contracts do not provide clear differences between the groups of countries, it is apparent that dynamic price contracts are only available in markets that have phased out regulated prices or are in the process of doing so. There are also significantly more offers available per supplier in most countries that have phased out regulated prices or that have a minority share of house under regulated prices. This is indicative of a greater of choice, innovation and competition in markets that are deregulated or with lower levels of regulated prices.

*Electricity offers for households*





**Figure 219 - Type of electricity and gas contracts available and offers per supplier**

Source: ACER/CEER (2015) Annual Report on the Results of Monitoring the Internal Electricity and Gas Markets in 2015.

### 10.3.2 Market concentration

The level of market concentration is an indicator on the competitiveness of the market, as lower levels of concentration usually lead to improved competitive dynamics in the market.

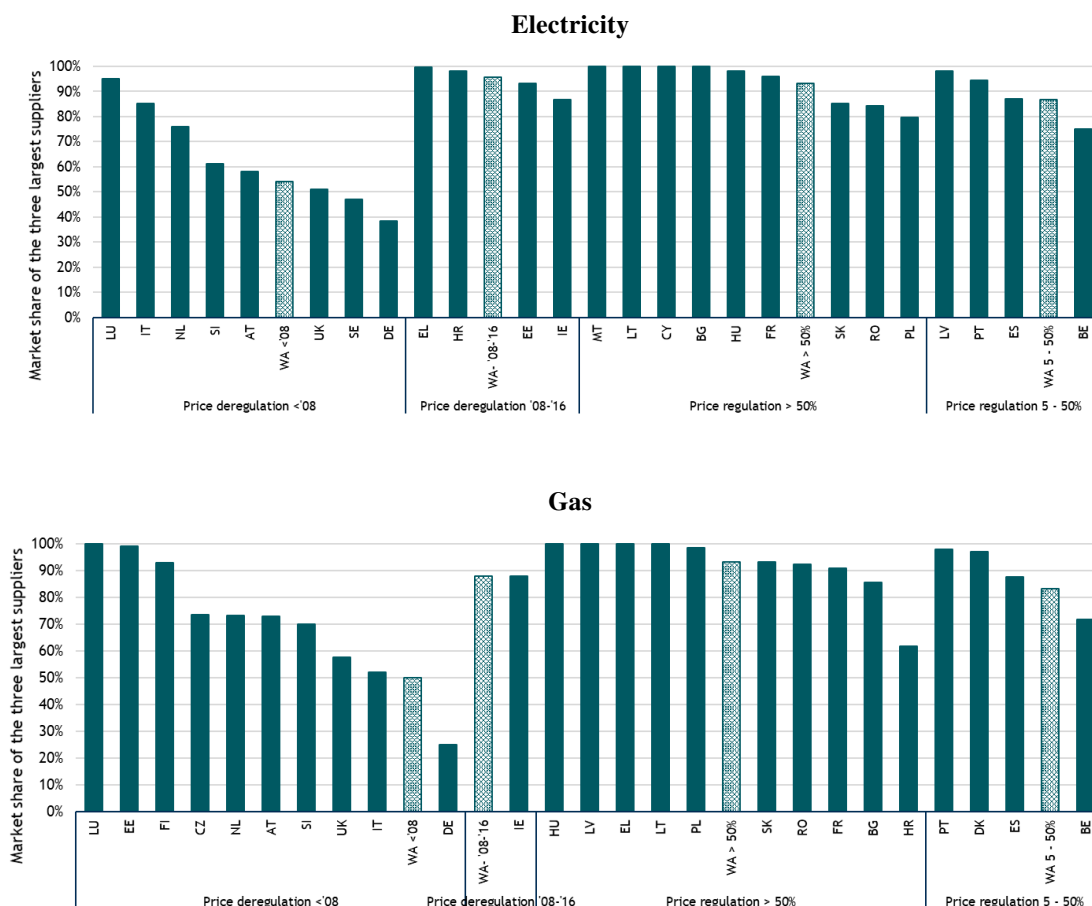
The lower levels of market concentration are on average found in Member States that have deregulated prices historically, whereas there is little difference between other three groups.

For **electricity**, the average market share of the 3 largest suppliers is substantially lower in Member States that phased out price regulation before 2008. For Member States that either phased out regulated prices between 2008 and 2016, or which have a minority or majority share of households under regulated prices, the average market shares of the 3 largest **electricity** suppliers remain high.

For **gas**, again the average market share of the 3 largest suppliers is substantially lower in Member States that phased out price regulation before 2008. For Member States that either phased out regulated prices between 2008 and 2016, or which have a minority or majority share of households under regulated prices, the average market shares of the 3 largest **gas** suppliers remain high.

The data on market concentration indicates that we are observing the strongest competition dynamics in markets that have phased out regulated prices several years ago.





**Figure 220 - Market share of the 3 largest suppliers**

Source: CEER data and NRA representatives

No data available on electricity for the Czech Republic, Finland and Denmark and on gas for Cyprus, Malta and Sweden

### *Evolution in market concentration*

The reduction of market shares of dominant suppliers needs time, as competitive dynamics gradually makes it more difficult for dominant suppliers to retain high markets shares as customers switch to competitors.

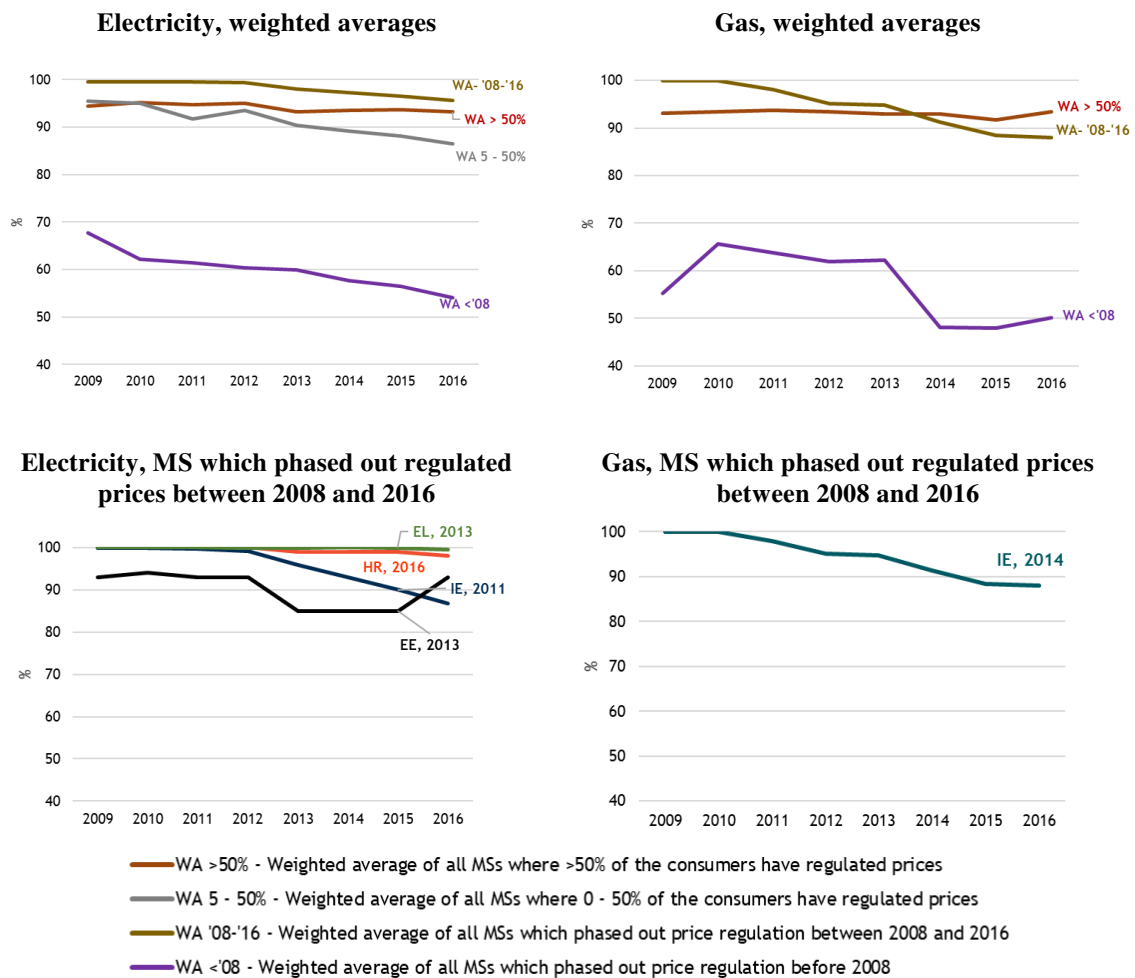
The most positive dynamics over time are observed in markets that have either phased out regulated prices or that have gradually phased out regulated prices but that had a minority share of households under regulated prices in 2016.

For **electricity**, the evolution in market concentration reveals a marked and sustained decrease in Member States that phased out regulated prices before 2008. Similarly in the Member States that either phased out regulated prices between 2008 and 2016 and those that have gradually been phasing out but had a minority share of households under regulated prices by 2016, there have been slight decreasing trends albeit from very high levels, in particular from 2012 onwards. For the Member States that have price regulation for a majority of households, the evolution in market concentration has been at a standstill at relatively high levels.

For **gas**, the evolution in market concentration reveal similar patterns, with a marked decrease over the period from 2009 to 2015 for the Member States that phased out price regulation before 2008. The Member State that phased out price regulation in the period from 2008 to 2016 saw a sustained but slight decrease from high levels from 2010 onwards. Member States

that regulate prices for a majority of households saw a static and high market share for the three largest suppliers.

The data on market shares suggest that markets that have deregulated before 2008 are achieving the best results in terms of reducing market concentration, which suggests an increasing level of competition. It is also clear that the reduction of market shares of dominant suppliers is a gradual process that takes place over multiple years as customers switch suppliers. It is possible to observe the beginning of a reduction trend in market shares of dominant suppliers for Member States that deregulated between 2008 and 2016 and those that had a minority share under regulated prices in 2016, however this trend is moving slowly from relatively high levels of market concentration. Member States that had a majority of households under regulated prices show no signs of reducing the position of dominant suppliers in the market.



**Figure 221 - Evolution in market concentration**

Source: CEER data and NRA representatives

Note: Used weights are the total household consumption per country and per energy market.

The country label indicates the phase out year for regulated prices

### 10.3.3 Impact on prices and costs

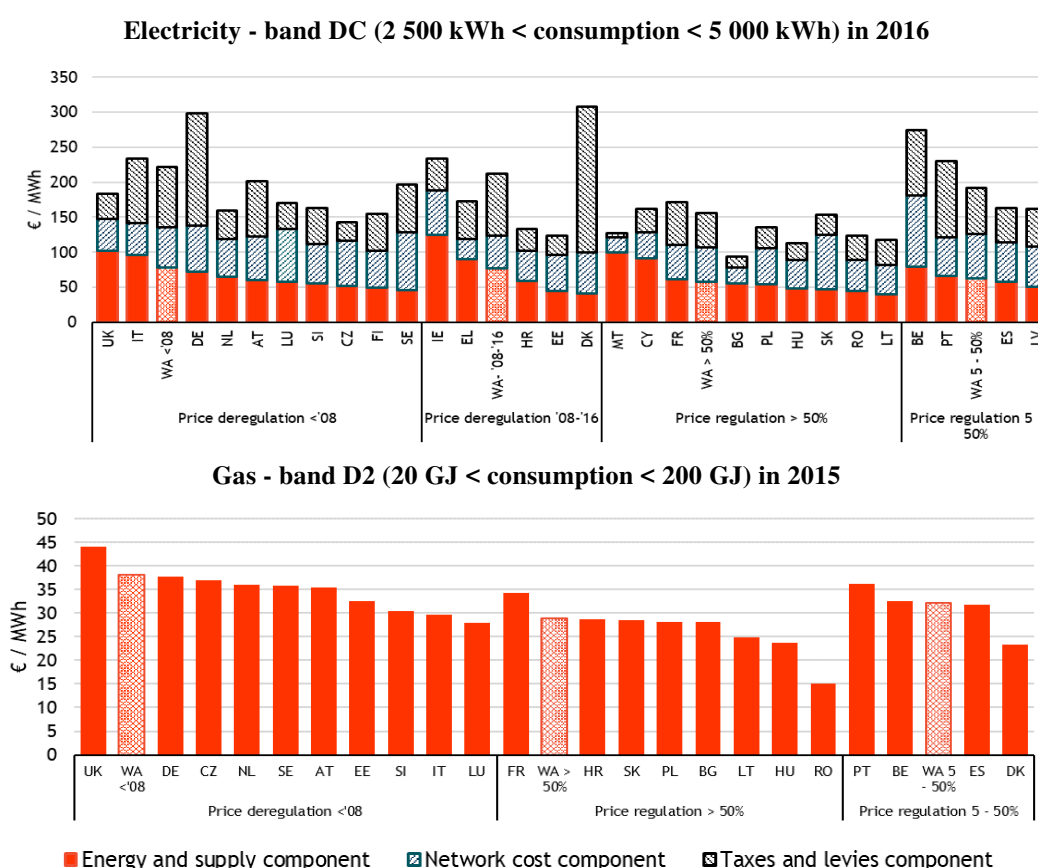
The level of prices and the impact on costs are analysed across the groups of Member States to observe differences between markets with and without regulated prices. Markets with regulated prices tend to have lower prices and lower gross margins than markets without price regulation, which may partially be due to prices that are set below net cost levels. As we will see later in this section, there are no particular benefits of regulated prices in terms of lowering household expenditure on energy. Although many factors impact energy poverty, a policy of price regulation for electricity does not seem to be more effective in terms of alleviating energy poverty.

#### Price levels

For **electricity**, energy component prices are on average slightly higher in Member States that have phased out regulated prices either before 2008 or before 2016, when compared with Member States that maintained regulated prices for a majority and a minority of household consumers.

For **gas**, energy component prices were higher in Member States that deregulated prices before 2008 and in Member States with a minority of consumers under regulated prices, when compared with Member States that had a majority of households under regulated prices.

The data on energy component prices suggest that prices are slightly lower in markets that have a majority of households under regulated prices, as opposed to those groups of Member States that have phased out or have fewer households under regulated prices.



**Figure 222 - Prices for electricity (2016) and gas (2015) on household markets**

Source: Eurostat (and EC ad-hoc data for Spain for the electricity energy and supply component) for electricity data and EC ad-hoc data for gas

Note that for gas, no data is available for Finland, Ireland, Greece and Latvia.

Used weights are the total household consumption per country and per energy market.



## Evolution in price levels

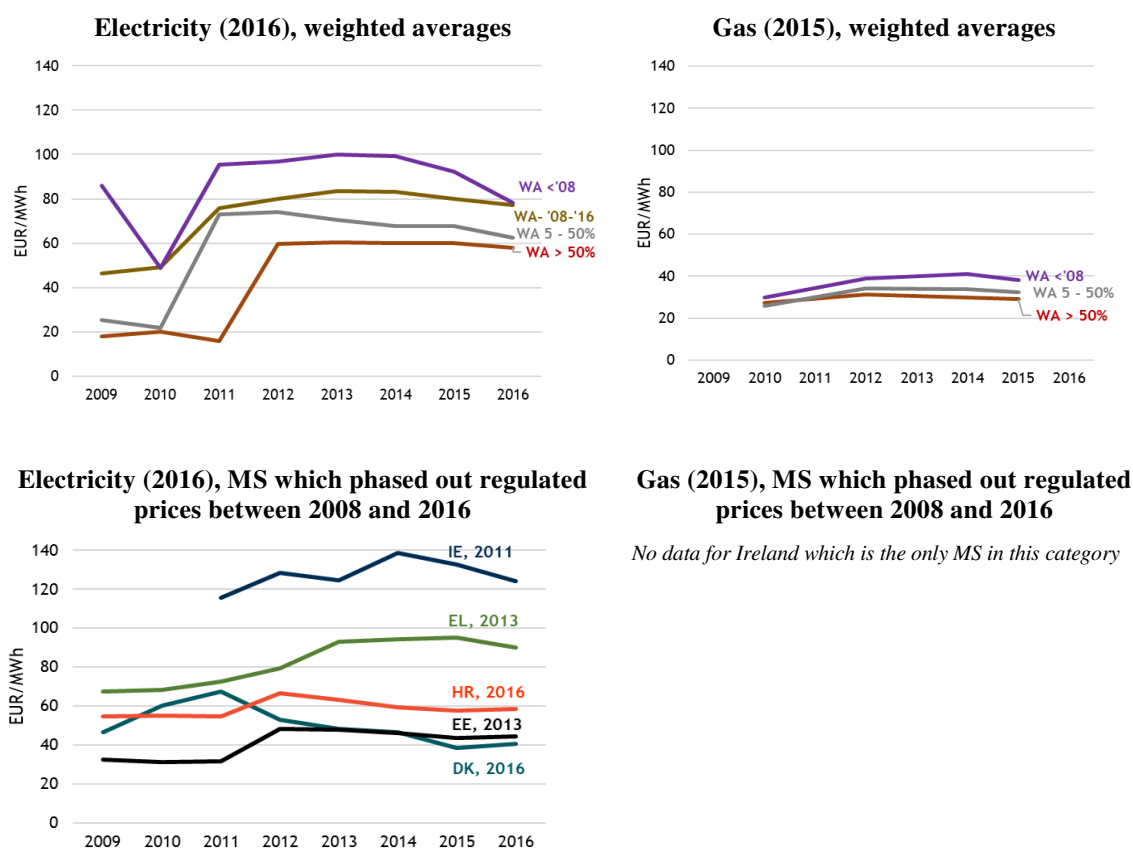
Looking at the evolution of prices is particularly pertinent for the markets that have phased out regulated prices during the period from 2008 to 2016, because as opposed to other indicators, one could expect an immediate impact of deregulation on prices.

For **electricity**, prices have remained at higher levels for Member States that have phased out regulated prices before 2008, although a marked decrease is observed for this group from 2014 to 2016. Prices have remained relatively stable over the period for Member States that phased out regulated prices between 2008 and 2016, while those Member States that had minority and majority shares of consumers under regulated prices have seen slightly lower and stable price level in the period.

For the specific assessment of Member States that phased out regulated prices between 2008 and 2016, there is no indication that the event of phasing out regulated prices have a dramatic impact on price levels, which appear to remain steady following deregulation.

For **gas**, prices remained steady with no significant differences between the groups of Member States.

The evolution of prices do not reveal large differences on average between regulated and deregulated markets in terms the movement of prices over time, with the groups of Member States all remaining relatively stable over the period of analysis. This includes recently liberalised markets, which suggests that Member States that phase out regulated prices are not at risk of increased volatility or price levels as a result of this.



**Figure 223 - Evolution in prices for electricity (2016) and gas (2015) on household markets**

Source: Eurostat (and EC ad-hoc data for Spain for the electricity energy and supply component) for electricity data and EC ad-hoc data for gas.

Note: no data for Ireland (which is the only country in the WA '08-'16 group for gas). Used weights are the total household consumption per country and per energy market.

The country label indicates the phase out year for regulated prices

### Energy component mark-ups

The level of mark-ups is an indicator for the health of competition within a market and also reveals the differences between underlying wholesale prices and the final retail prices that consumers pay. It is difficult to assess the right level of mark-ups, as it depends on the level of margins that suppliers are able to competitively operate with, in terms of a deregulated market. In regulated markets, the mark-ups are determined by regulation and hence run the risk of being set at too low levels that are effectively below net costs, once supplier operating costs are factored in. Therefore despite mark-ups being positive in Member States with price regulation, they may still be set at a level that is too low to enable effective competition.

For **electricity**, we observe the lowest mark-ups in markets that have gradually phased out but that had a minority of consumers under regulated prices in 2016, at €14/MWh. The second lowest mark-ups were observed in Member States that regulated prices for a majority of household customers, at €21/MWh. The mark ups for Member States that deregulated before 2008 were on average €39/MWh, while those that deregulated between 2008 and 2016 had €41 on average.

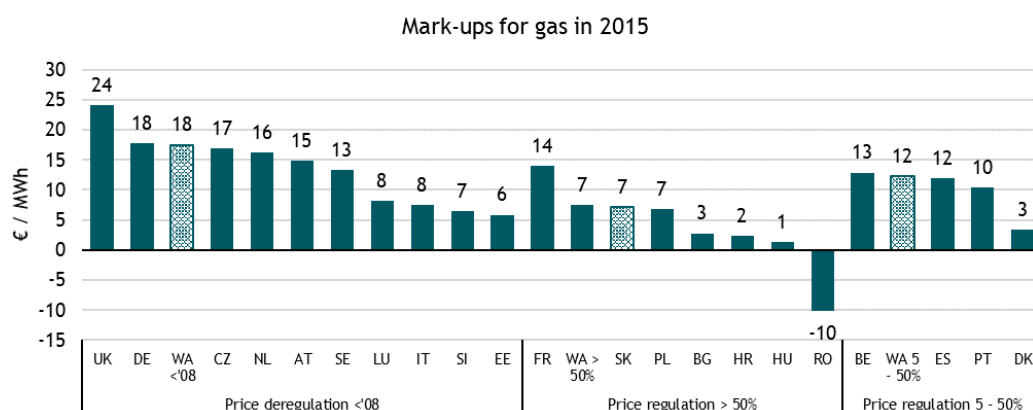
For **gas**, the Member States that regulated prices for a majority of households in 2016 had the lowest level of mark-ups at an average of €7/MWh. The figure for Member States that had a minority share of households under regulated prices was €12/MWh, while it was €18/MWh for Member States that phased out regulated prices before 2008.

It is apparent that mark-ups on average are lower in markets where a majority or minority share of consumers is under regulated prices. The intra-group differences are, however, large.

Electricity - band DC (2 500 kWh < consumption < 5 000 kWh) in 2016



## Gas - band D2 (20 GJ < consumption < 200 GJ) in 2015



**Figure 224 - Energy component mark-ups**

Source: Own calculations based on Eurostat and Task 1 of this report for wholesale prices.

Note: No data available for Finland, Croatia, Cyprus for electricity and no data for Finland, Ireland, Greece, Lithuania and Latvia for gas. Mark-ups are calculated by subtracting the wholesale price from the energy and supply component of the retail price.

Used weights are the total household consumption per country and per energy market.

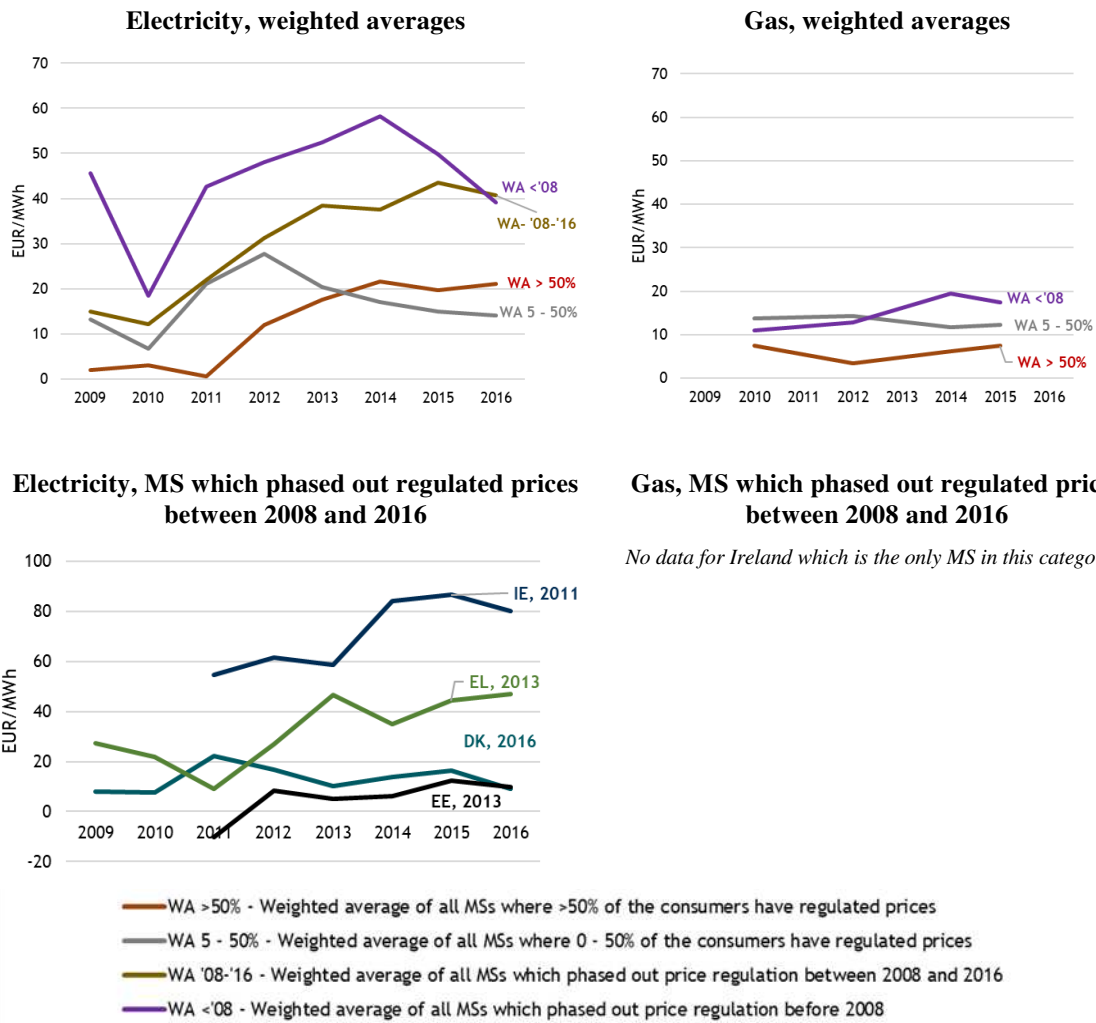
### *Evolution of energy component mark-ups*

The evolution in the energy component mark-up over time allows us to observe the changes in competitive dynamics over time. There are higher mark-ups in markets without regulated prices, than for those that still maintain a policy of price regulation. In the case of regulated markets, average mark-ups have moved up from historical levels that were close to being below gross costs.

For **electricity**, average mark-ups have seen both the largest increases and decreases for the group of Member States that phased out regulated prices before 2008, with marked increases up until 2014 and significant decreases from 2014 to 2016. For Member States that phased out regulated prices between 2008 and 2016, mark-ups saw a steady increase from 2010 to 2016, while the same was observed since 2011 for markets with a majority of households under price regulation when average mark-ups began increasing from almost non-existing levels. The Member States which have gradually phased out regulated prices but which still had a minority share under regulated prices by 2016 have seen gradual declines in average mark-ups since 2012 in conjunction with the phase out.

The specific assessment of Member States that phased out regulated prices between 2008 and 2016 reveal that there were no dramatic increases in mark-ups following the event of deregulation. Mark-ups increased at the fastest rate in Ireland, which later saw a reduction between 2015 and 2016. In Greece the mark-up remains at the same level as at deregulation, while Estonia has had a mostly flat evolution since 2013. Denmark displays no significant change in 2016.

For **gas**, average mark-ups were slightly higher for markets that phased out regulated prices before 2008 compared to the other groups, although all groups remained on a flat trend between 2009 and 2016 with small average differences in mark-ups.



**Figure 225 - Evolution in energy component mark-ups**

Source: Own calculations based on Eurostat and Task 1 of this report for wholesale prices.

Note: no data for Ireland (which is the only country in the WA '08-'16 group for gas). Used weights are the total household consumption per country and per energy market. The country label indicates the phase out year for regulated prices

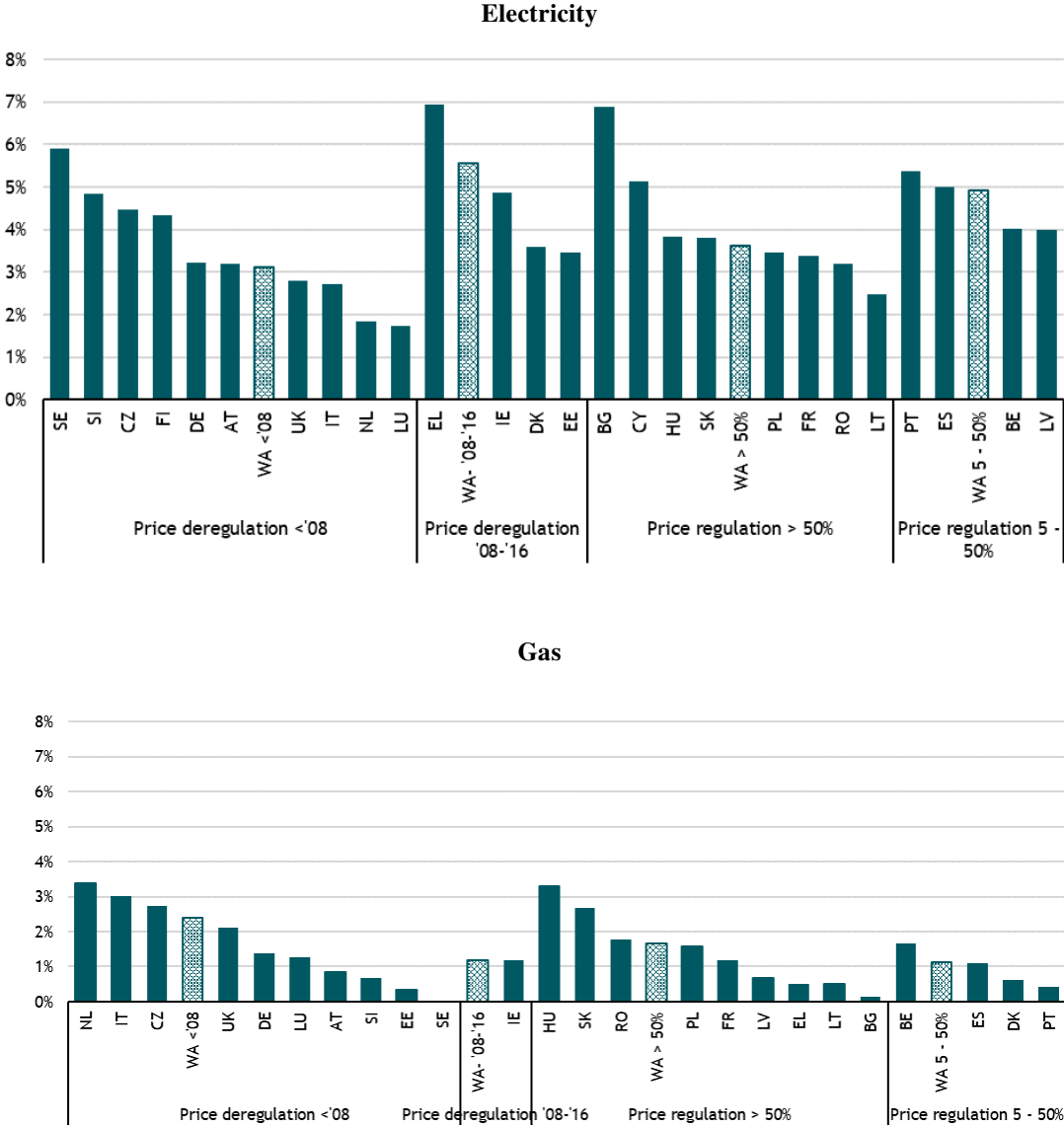
### *Energy expenditure as share of disposable income*

Energy expenditure as a share of disposable income is an indicator about the affordability of energy. In terms of differences between Member States that regulate prices and those that do not, there is no apparent advantage of regulating prices in terms of achieving better affordability for energy.

For **electricity**, the average household expenditure was the lowest in Member States that phased out regulated prices before 2008, while the Member States that phased out regulated prices between 2008 and 2016 had the highest level of expenditure. The latter group is impacted greatly by the impact of the economic crisis in Greece. The second lowest average household expenditure was in Member States that regulated prices for a majority of households, while the Member States with a minority share under regulated prices were slightly higher.

For **gas**, the level of expenditure is the highest in Member States that phased out regulated prices before 2008, while the lowest levels are in Member States that either phased out between 2008 and 2016 or that maintained a minority share of households under regulated prices. The Member States that regulated prices for a majority of households had a slightly higher level of average gas expenditure than the minority price regulators.

The data on **electricity** expenditure as a share of disposable income reveal no apparent advantage of regulating for protecting consumers from high energy costs. When discounting for Greece, the figures for recently deregulated markets are supportive of this, as these Member States do not see exorbitant expenditures as a result of deregulating prices. The same generally also holds true for **gas** where the differences between the groups are relatively small.



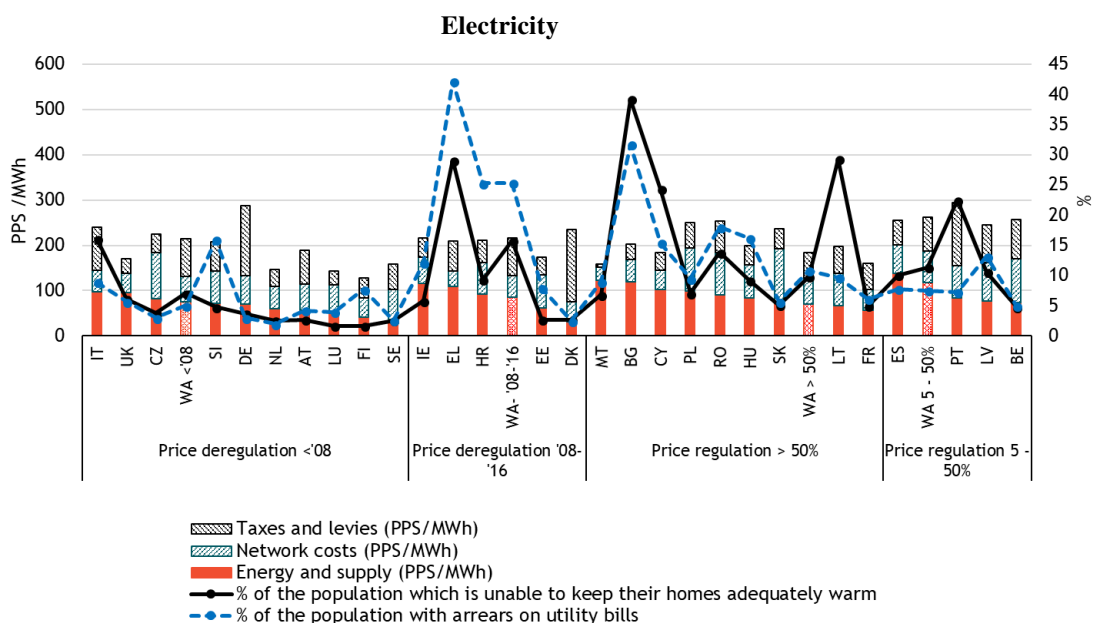
**Figure 226 - Energy expenditure as share of disposable income**

Source: Own calculations based on Eurostat  
 Note: The most recent data available data was used in the calculations. For Hungary, Romania and the UK this was 2015, for all others 2016. No data is available for Croatia and Malta. Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points.  
 Used weights are the total household consumers per country and per energy market.

## Energy poverty

Indicators for energy poverty are mapped across the groups of Member States in order to look at the relationship between regulated prices and energy poverty.

In the data there are no observations that suggest that regulated prices lead to lower levels of energy poverty. Moreover, the lowest levels of energy poverty are found in markets without price regulation (**Figure 226**).



**Figure 227 - Energy poverty**

Source: Eurostat

Note that the % of the population which is unable to keep their homes adequately warm and the % of the population with arrears on the utility bills are not separated for the gas and electricity market.

Used weights are the total household consumers per country and per energy market.

## Evolution of energy poverty

The evolution of energy poverty indicators makes possible to assess the observed trajectories in Member States between 2009 and 2016.

In terms of the *share of the population that is arrears on energy bills*, the lowest and also decreasing levels are observed in the Member States that phased out price regulation before 2008. The Member States that have gradually phased out regulated prices but maintained a minority share of households under regulated prices by 2016 also display a low level of households being arrears on utility bills. The share has also been falling in the Member States with a majority of households under regulated prices, albeit from higher levels.

The specific analysis of the countries that deregulated between 2008 and 2016 reveal large differences between countries, largely due to differences in the economic situation: Greece saw a large increase in households that are arrears on utility bills, which can be attributed to the effects of the economic crisis. In Croatia, Ireland, Estonia and Denmark, the share of consumers being arrears on utility bills have been stable or falling when seeing the period from 2009 to 2016 as a whole.

In terms of the *share of the population which is unable to keep their homes warm*, the lowest levels are again observed in the Member States that phased out regulated prices before 2008.

The Member States that have a majority share of households under regulated prices have the second lowest levels, having seen sharp decreases between 2009 and 2011. The Member States with a minority share of households under regulated prices have seen a mostly flat evolution during the period.

The specific analysis for the countries that deregulated between 2008 and 2016 reveal differences between the countries, with Greece again seeing a large increasing in households unable to keep their house warm, which can be attributed to the effects of the economic crisis.

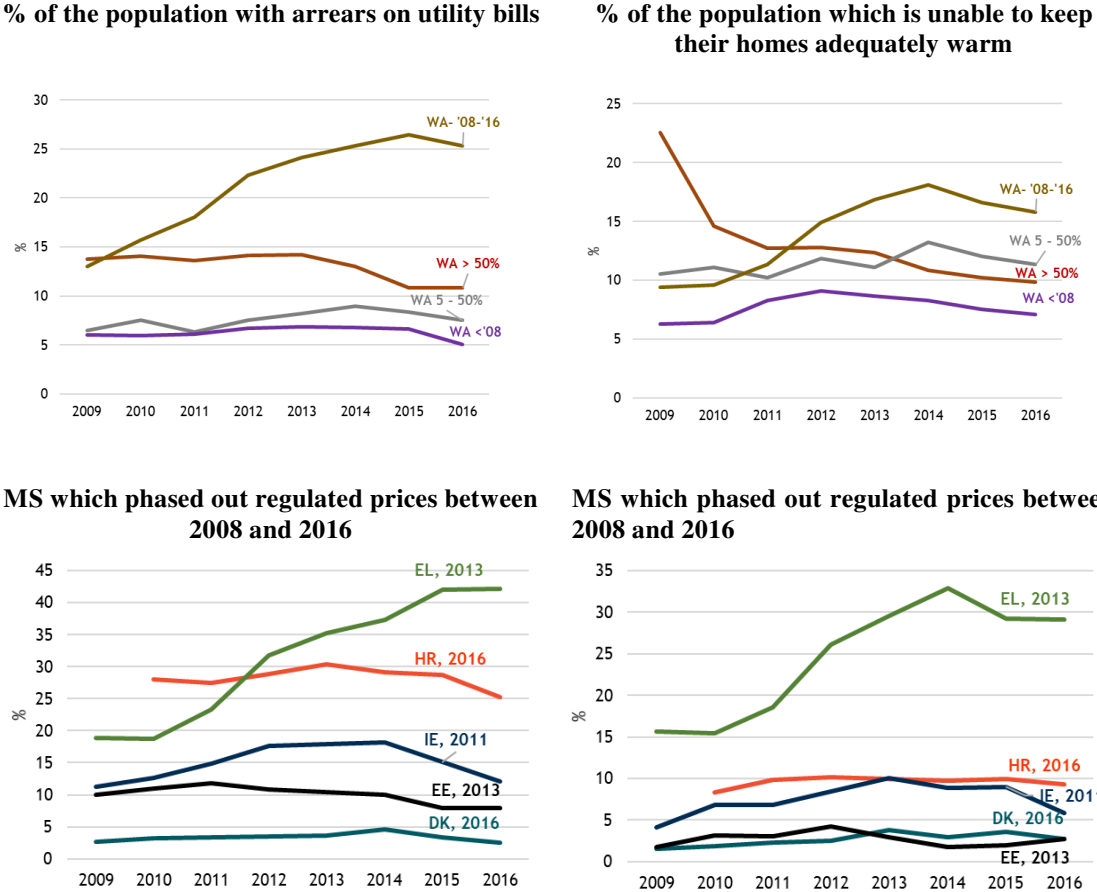


Figure 228 - Evolution of energy poverty

Source: Eurostat

Used weights are the total household consumers per country and per energy market. The country label indicates the phase out year for regulated prices

### 10.3.4 Impact on consumer perception

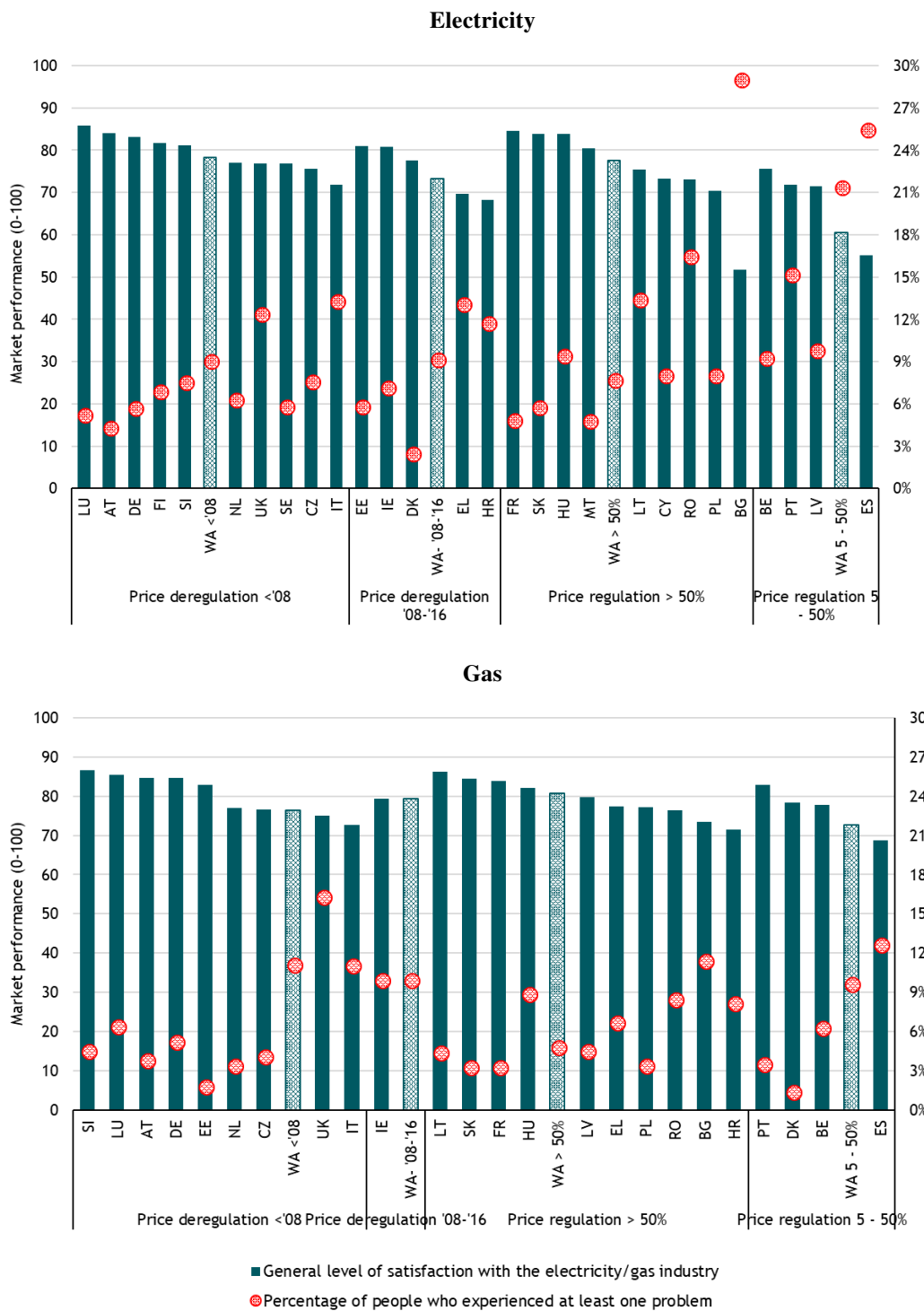
The consumer experience of the market and their reported satisfaction is an indicator of whether the market works for consumers. Households are on average reporting high levels of satisfaction across several groups.

For **electricity**, consumers in the Member States that phased out price regulation before 2008 report the highest average level of satisfaction, marginally above the Member States that had a majority share of households under regulated prices. The Member States that phased out regulated prices in the period from 2008 to 2016 also score well in terms of how consumers perceive the market, while the Member States with a minority share of households under regulated prices report a markedly lower average level of consumer satisfaction, which is impacted greatly by the perception among consumers in Spain. It appears that for **electricity** the share of consumers that experienced a problem was consistently higher in Member States that had regulated prices.

For **gas**, consumers in Member States that had a majority share of households under regulated prices in 2016 report the highest average level of satisfaction, marginally above the Member States that phased out regulated prices in the period from 2008 to 2016. Member States that phased out regulated prices before 2008 also score well in terms of consumer perception relative to the other groups, and the same do the Member States that had a minority share of households under regulated prices in 2016. There is no clear evidence that **gas** consumers experienced more problems in any particular group.

There are no clear observations pointing to say that consumers have a better experience with the market with or without regulated prices. We see that in both groups of Member States, consumers are generally well satisfied; although in **electricity** markets consumers reported fewer problems in markets without price regulation. The least positive consumer experiences appear to be in the Member States which have a minority share of households under regulated prices.





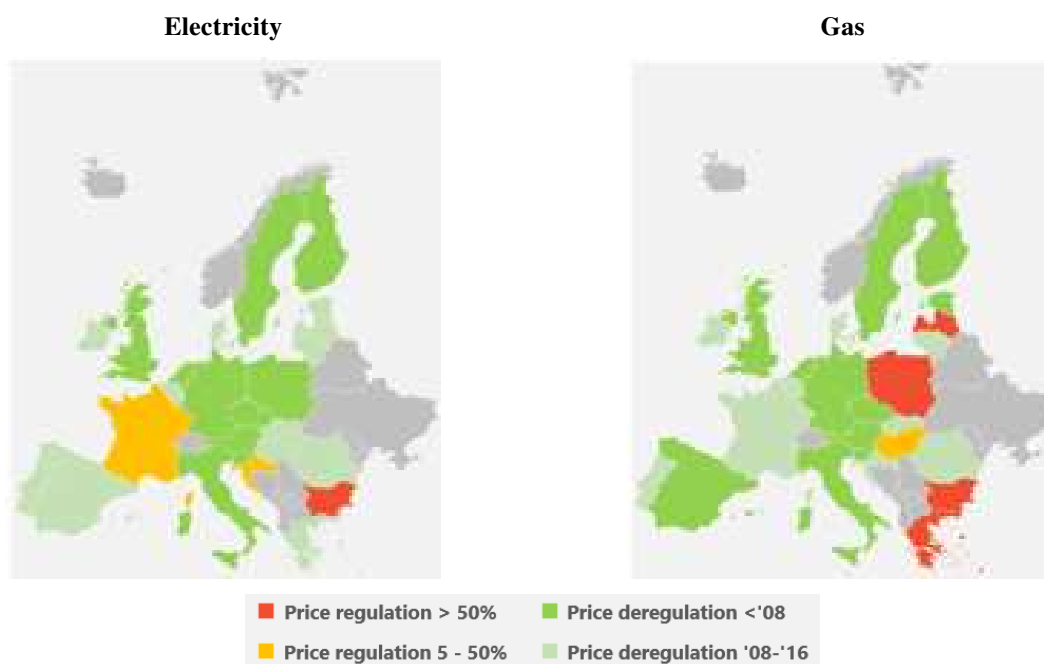
**Figure 229 - Consumer perception of the market in 2015**

Source: Consumer Market Scoreboard data.

Note: Used weights are the total household consumers per country and per energy market.

## 10.4 Impact of regulated prices on non-household retail markets

A study commissioned by EC<sup>149</sup> confirms that by 2016 the majority of EU non-household consumers<sup>150</sup> have essentially moved away from regulated, administered pricing schemes, as shown in **Figure 229** in the case of business consumers of electricity and natural gas. Most of the Member States that applied price regulation for non-household consumers in 2016 were transitioning towards markets with fewer administrative interventions.



**Figure 230 - Non-household price regulation from a geographical perspective**

Source: CEER data and NRA representatives

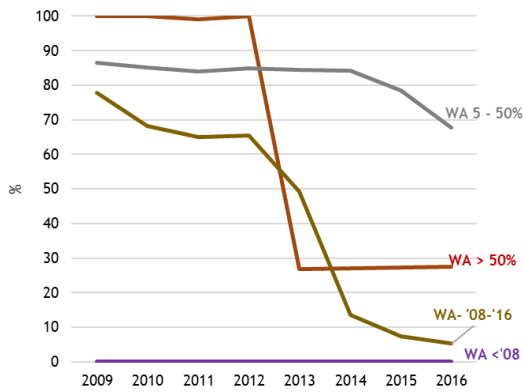
As a rule, businesses are embracing competitive price schemes for electricity and natural gas faster than residential consumers. Recent ACER and CEER reports indicate that in the electricity market in 2016, in nine Member States the share of household consumers paying regulated prices was above 50%. Only three Member States (Bulgaria, Cyprus and Malta) had such a share for non-household consumers. In gas, the corresponding numbers of Member States were respectively 10 for residential and 4 for business (Bulgaria, Greece, Latvia and Poland).

Inside the group of non-household consumers, the decline of the relative importance of price regulation is confirmed both in terms of absolute number of consumers who were paying regulated prices and in terms of a steadily decreasing share of consumption under price regulation. This is a common development for electricity and natural gas, even if the pace of transition varies across energy products and Member States (**Figure 230**).

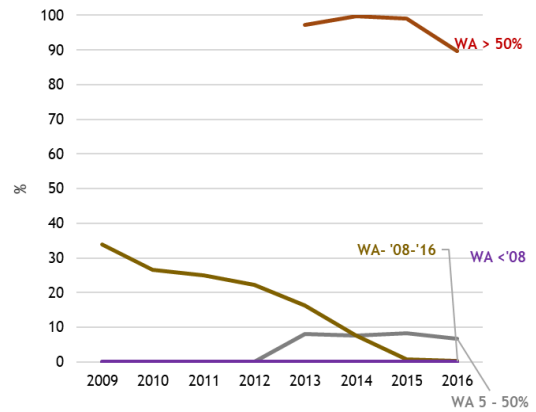
<sup>149</sup> Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households, Trinomics (2018)

<sup>150</sup> The Eurostat group of non-households consumers of electricity and natural gas include end-users from a large variety of sectors, including but not limited to: industry, services, transport, other non-residential, etc.

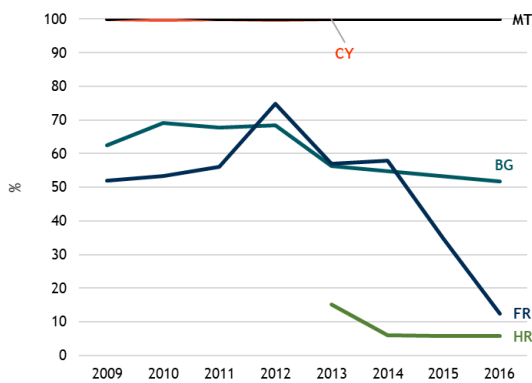
**Electricity non-household, weighted averages**



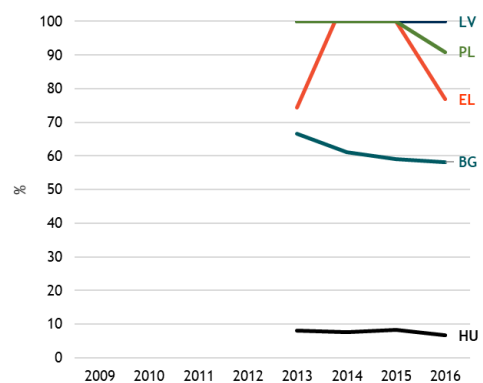
**Gas non-household, weighted averages**



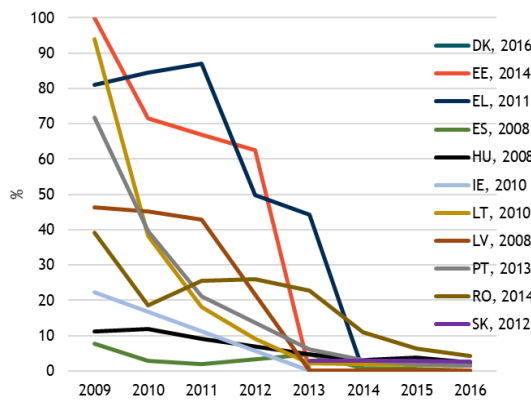
**Electricity non-household, MS with price regulation**



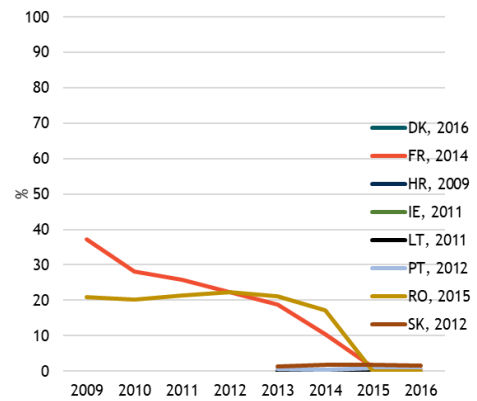
**Gas non-household, MS with price regulation**



**Electricity non-household, MS which phased out regulated prices between 2008 and 2016**



**Gas non-household, MS which phased out regulated prices between 2008 and 2016**



- WA > 50% - Weighted average of all MSs where >50% of the consumers have regulated prices
- WA 5 - 50% - Weighted average of all MSs where 5 - 50% of the consumers have regulated prices
- WA '08-'16 - Weighted average of all MSs which phased out price regulation between 2008 and 2016
- WA < '08 - Weighted average of all MSs which phased out price regulation before 2008

**Figure 231 - Share of non-household consumption under regulated prices**

Source: CEER data and NRA representatives

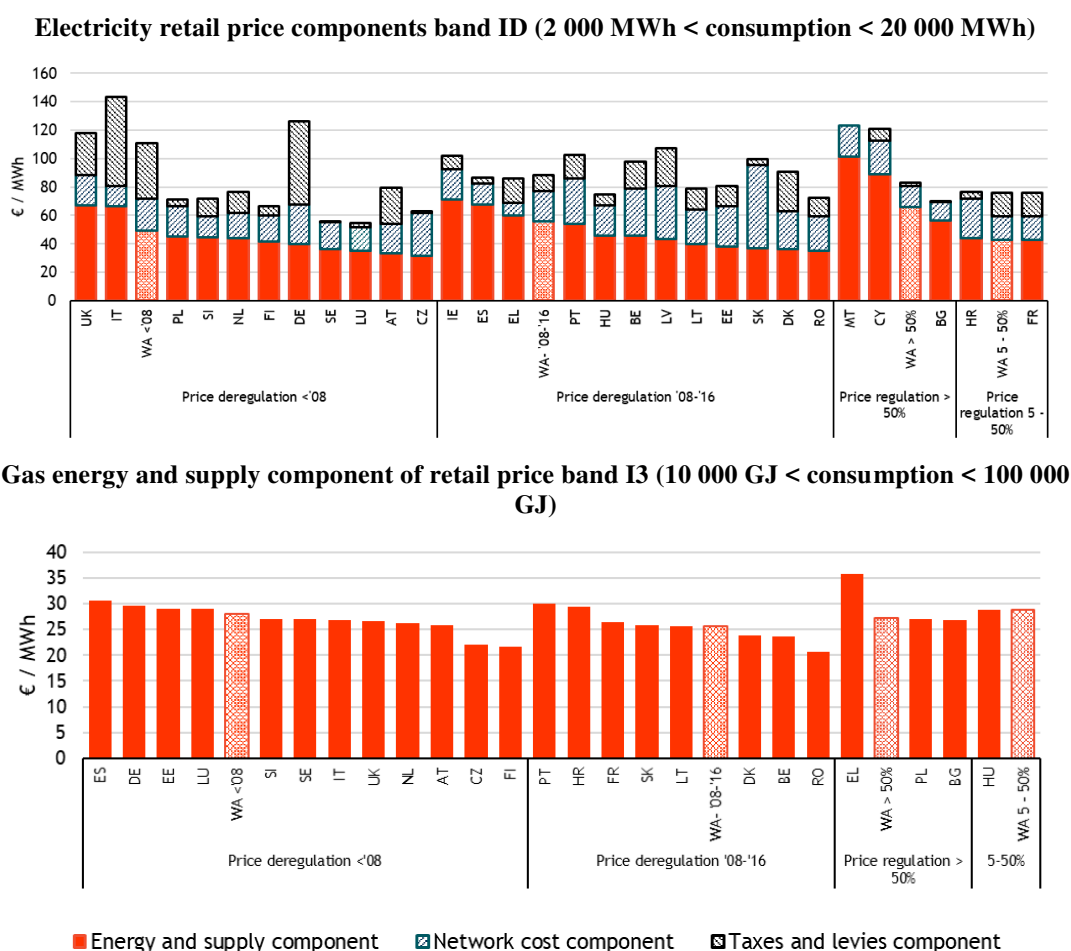
Used weights are the total non-household consumption per country and per energy market. A description of the weighted averages' groups is provided in section 10.1.

The country label indicates the phase out year for regulated prices

### Price levels in the non-household market

**Figure 231** also based on the Trinomics et alri study, provides an indication that could explain why businesses were keen to adopt the change of pricing methods. More attractive contract conditions (price level, flexibility, avoiding cross-subsidization of other consumer groups, etc.) have facilitated the transition to competitive pricing.

The two panels report on the price level of the energy component in the bill for electricity and natural gas. Member States are assembled in 4 groups indicating the level of price regulation, starting from the group of countries that have deregulated their non-household sector prior to 2008, then those that did so after 2008 but before 2016, then 2 groups of Member States where price regulation is still present, according to the size of the regulated segment.



**Figure 232 - Energy and supply component for electricity (2016) and gas (2015) on the non-household consumer market**

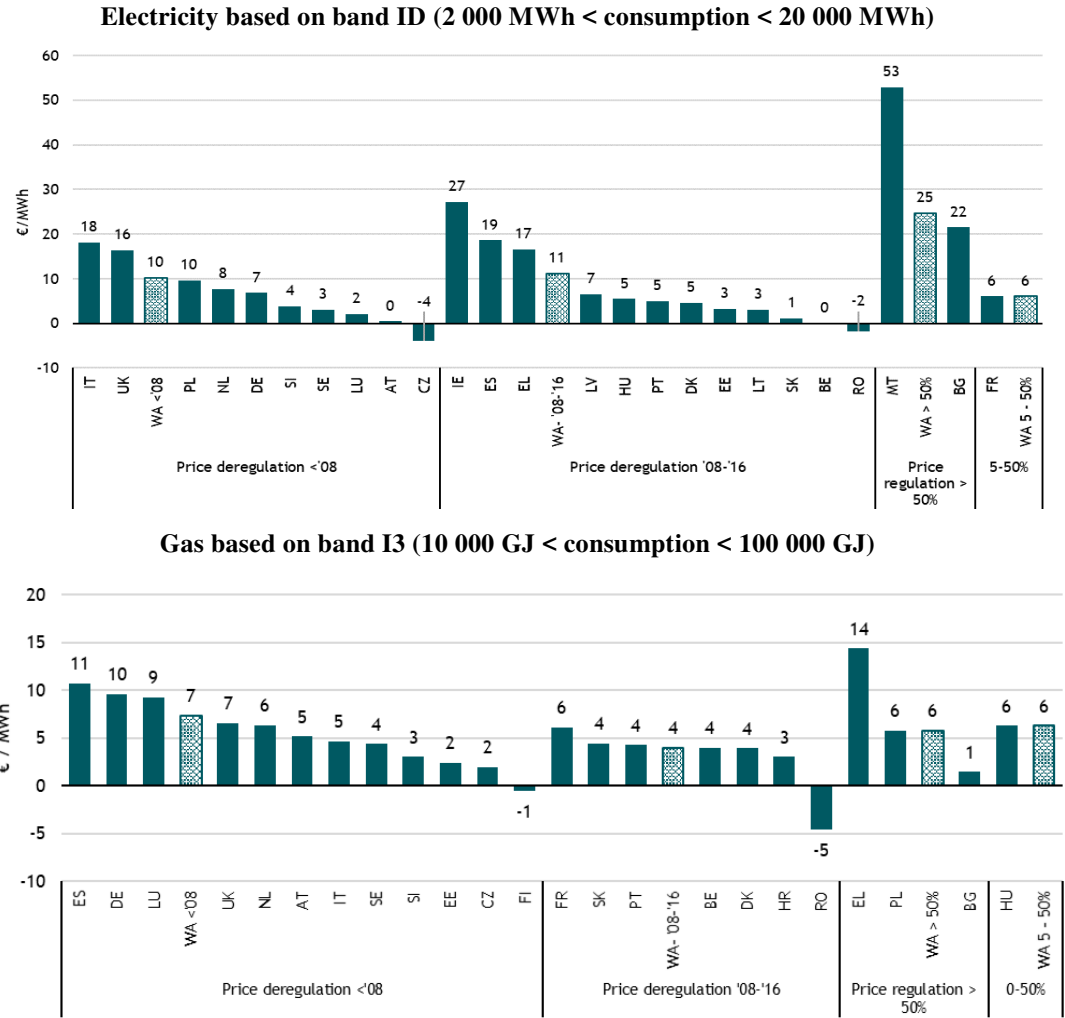
Source: Eurostat (and EC ad-hoc data for Spain for the electricity energy and supply component) for electricity data and EC ad-hoc data for gas.

Note that the scale of the y-axis is different in each panel. No data is available on the gas market for IE and LV. Used weights are the total household consumption per country and per energy market.

The group of Member States where the regulated part of the market is above 50% paid on average the highest cost for the supply of electricity. Likewise for gas, Member States practicing price regulation over some portion of the non-household market paid on average a higher cost for the supply of natural gas. It is also interesting to observe that the variability of pricing conditions is much higher in electricity than in gas.

Similar conclusions in terms of the attractiveness of competitive over regulated pricing schemes are emerging when the cost of energy supply is compared to the wholesale price of electricity and natural gas: from 2009 to 2016 the mark ups<sup>151</sup> for business consumers in Member States that have open and competitive retail markets tend to be smaller and more responsive of price conditions.

The level of mark-ups is an indicator for the health of competition within a market and also reveals the differences between underlying wholesale prices and the final retail prices that non-households pay. Non-household retail markets have progressed further in terms of liberalisation and we there should be a higher level of competitive dynamics at play in determining gross-mark ups. It is evident that non-households in markets without price regulation on average face lower mark-ups than those that are under regulated prices, the exception being one Member State which still retains a minority share under regulated prices.



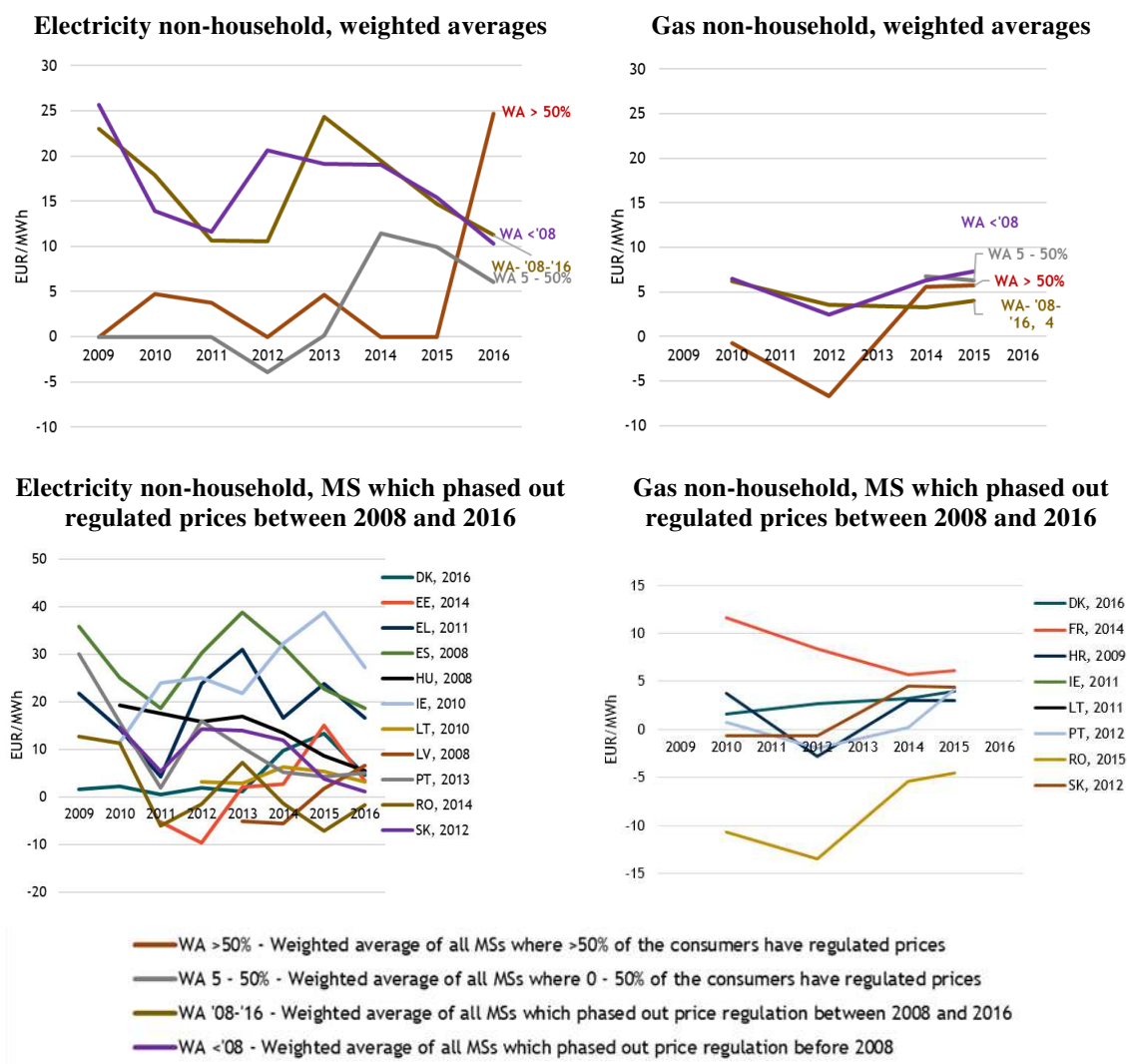
**Figure 233 - Energy and supply component for electricity (2016) and gas (2015) on the non-household consumer market**

Source: Own calculations based on Eurostat and Task 1 of this report for wholesale prices.  
 Note: Mark-ups are calculated by subtracting the wholesale price from the energy and supply component of the retail price. Used weights are the total household consumption per country and per energy market.

<sup>151</sup> Mark-ups are defined as the differences between the wholesale price and retail energy price component. The estimated mark-ups are not meant to assess retail margins of suppliers, but serve rather as an “indication of the level of retail competition and the ‘responsiveness’ of retail to wholesale prices over time”

## Evolution of energy component mark-ups

The evolution in the energy component mark-up over time allows us to observe the changes in competitive dynamics over time. It is clear that markets that have phased out regulated prices have seen a positive trajectory, in particular between 2013 and 2016. The group that maintains regulated prices for a majority of non-household customers saw steeply rising margins in 2016.



**Figure 234 - Energy and supply component for electricity (2016) and gas (2015) on the non-household consumer market**

Source: Own calculations based on Eurostat and Task 1 of this report for wholesale prices.

Note: no data for Ireland (which is the only country in the WA '08-'16 group for gas).

Used weights are the total household consumption per country and per energy market.

The country label indicates the phase out year for regulated prices

## 10.5 Impact of regulated prices on tariff deficits and investments

The data on the existence of tariffs deficits from 2008 to 2016 suggests that the existence of tariff deficits is more frequent in Member States that regulate retail energy prices. This is likely connected with the difficulty of establishing cost-reflective price levels through regulation, as opposed to allowing the market to handle this function. This suggests that even though prices and mark-ups are lower in regulated markets, the downside risk is that prices are set at a level where they are not cost reflective, which is detrimental to the development of competitive markets.

**Table 20 - Overview of tariff deficits in Member States between 2008-2016**

MS	Existence of price regulation		Tariff deficit between 2008-2016
	Electricity, households	Electricity, non-households	
AT	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
CZ	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
DE	Phased out (pre-2008)	Phased out (pre-2008)	Temporary tariff deficit <sup>152</sup>
FI	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
IT	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
LU	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
NL	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
SE	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
SI	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
UK	Phased out (pre-2008)	Phased out (pre-2008)	No tariff deficit
DK	Phased out (2016)	Phased out (2016)	No tariff deficit
EE	Phased out (2013)	Phased out (2014)	No tariff deficit
EL	Phased out (2013)	Phased out (2011)	Electricity tariff deficit (2014) <sup>153</sup>
HR	Phased out (2016)	5 - 50%	No tariff deficit
IE	Phased out (2011)	Phased out (2010)	No tariff deficit
BE	5 - 50%	Phased out (pre-2008)	No tariff deficit
ES	5 - 50%	Phased out (2008)	Electricity tariff deficit (2000s-2015)
LV	5 - 50%	Phased out (2008)	Potential electricity tariff deficit (until 2010-2011)
PT	5 - 50%	Phased out (2013)	Electricity tariff deficit (since 2006)
BG	> 50%	> 50%	Electricity tariff deficit
CY	> 50%	> 50%	No tariff deficit
FR	> 50%	5 - 50%	Electricity tariff deficit <sup>154</sup>
HU	> 50%	Phased out (2008)	Gas and electricity tariff deficit (2011-2012) <sup>155</sup>
LT	> 50%	Phased out (2010)	No tariff deficit
MT	> 50%	> 50%	Electricity tariff deficit (up to 2014)
PL	> 50%	Phased out (pre-2008)	No tariff deficit
RO	> 50%	Phased out (2014)	Potential electricity tariff deficit
SK	> 50%	Phased out (2012)	No tariff deficit

Source: Trinomics et alri study (country fact-sheets in Annex I).

<sup>152</sup> Paid of the subsequent year

<sup>153</sup> Greece faced a deficit in their special account for renewable energy in early 2014, caused by the large investment in RES. Electricity bills include a RES levy, but due to the economic crisis, it was not possible to increase the RES levy to cover the deficit. A suppliers' charge was introduced in 2016 (charge that suppliers pay to offset the cheaper electricity they buy due to RES integration), resulting in an expected surplus of €256 million by end 2018 in the special account for RES.

<sup>154</sup> Not a tariff deficit per se, as the applied regulated tariffs do cover the costs. However, the CSPE (Contribution to the Public Service of Electricity) is sometimes considered tariff deficit. The CSPE is a contribution which covers the costs of support to renewables, support to co-generation, subsidies to electricity costs in Corse and other French overseas territories, as well as the social tariff for vulnerable consumers.

<sup>155</sup> There is also mention of potential losses in 2013, but they are not quantified.

## 10.6 Dynamic pricing

The dynamic price contract (DPC) is defined as a contract between a Supplier and a Customer (Final Consumer) of electricity or natural gas that links the price of the service provided directly to the relevant wholesale market price(s).

Under DPC, price conditions can change dynamically every hour, half-hour or 15 minutes if the Supplier procures at least<sup>156</sup> part of the energy for his/her Customers on the day-ahead market. Suppliers usually charge an annual fee (mark-up / margin) on top of the wholesale price for the services related to the delivery of the energy to the final consumer. All changes of the wholesale price are automatically passed through and Suppliers are not facing any risk related to price. This is also reflected in a lower fee they offer to Consumers. Consumers are equipped with smart reading devices and can react to price signals by adapting their consumption level manually or through automated devices.

DPCs were firstly introduced in the Nordic markets and are known to be among the most competitive contract types available. DPCs are even recommended by regulators and consumer bodies. DPCs are treated as ordinary market offers which do not require any additional regulatory safeguards. Suppliers tend to be clear in their communication that DPCs are based on "moving prices" and also offer add-ons such as winter price insurances.

### 10.6.1 Objective, methodological approach and assumptions

This section will estimate potential benefits of introducing dynamic pricing to groups of consumers in the retail markets of the EU; it will also assess the possibility of setting up DPC as a market measure and compare its performance against established pricing methods.

The main objective is to assess if DPC can bring benefits to different group of consumers. The assessment is based on a comparison of the energy supply component across two sets of price data, as explained below:

- [A] **Current pricing scheme (counterfactual)**, where the energy component is taken as reported by MS for the 5 ESTAT bands of household consumers, as reported in Eurostat table [nrg\_pc\_204\_c].
- [B] **Dynamic pricing**, where the energy supply component is built under the following assumptions:
  - i. an active group of individual household consumers procures on the day-ahead market the energy needed for each hour and for each member of the group; the group is big enough to participate on the wholesale market;
  - ii. the group is paying a fixed mark-up for such expenses as: distribution of the energy and related administrative costs; costs related to the participation on the power exchange, etc...; the mark-up is added directly to the cost of procuring energy on the day-ahead

To build DPC, we use anonymized smart meter data readings for a representative group of real consumers and analyse historical price evolutions and cost effects down to the level of

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<sup>156</sup> The Supplier can also buy energy in advance from the forward and future markets of electricity or natural gas.



individual customers. The data is sourced from National Regulators, Suppliers, data providers or researchers. Dynamic pricing can be also built from synthetic data as a potential source, providing an additional layer of anonymization.

**Box 10.6-1 –Methodological approach**

1. Process the data and prepare it for analysis;
2. Build a user group that is representative of the composition of consumer bands in each Member State
3. Regroup consumers by their annual consumption along the 5 ESTAT bands;
4. For each ESTAT band, and for each consumer belonging to that band, calculate aggregators on the consumption, including: total, average, median, min and max consumption (again, checking for outliers).
5. Construct hourly costs series as a product of individual hourly consumption data and hourly day-ahead price data.
6. For each ESTAT band, and for each consumer belonging to that band, calculate cost aggregators, including: individual and total annual cost; the cost for the average consumer; the price of procuring energy;
7. Add up a pre-defined mark-up and compare prices of energy supply by consumer band to those of the current pricing scheme;
8. For each individual consumer, compare prices of energy supply, as defined by current pricing scheme and DPC. Assess if switching to dynamic pricing is in the interest of each member of the group by estimating parameters related to a switch, such as: number of consumers that would lose out; individual and average group savings in EUR and as share of the annual cost of energy supply.
9. Build aggregate consumer profiles and analyse patterns by type of consumer, consumption timestamp and interlinkages with potential explanatory variables (market-related, meteorological, others).

A standard data set would cover consumption data, as recorded by smart meter devices of around 1 000 individual consumers. The consumption data would be recorded each 15 minutes for at least one full year.

The assumptions underlying our approach and assessment are described in Box 10.6-2 below.

**Box 10.6-2 – Main underlying assumptions of the approach**

- The network and taxation components of the energy bill are not impacted by the switch to dynamic pricing. Any realised saving or diseconomy is attributable entirely to the energy component.
- The DPC Supplier is procuring the entire amount of energy on the day-ahead market<sup>157</sup>, irrespective of the actual level of the day ahead hourly prices. All costs of procurement are passed on to Customers.
- All DPC Customers have price-inelastic consumption profiles; for each period, their level of consumption is not impacted by what the price might be at that point of time. The DPC Supplier knows the total amount needed by the group a day before the energy is actually consumed.
- The DPC Supplier recovers all expenses on energy supply services related to the actual delivery of energy to each one of its DPC Customers. For this service, DPC Customers are charged with a mark-up fee on top of the price paid for the energy they consume.
- The mark-up fee is set per unit of consumption and not per period. It is expressed as euro cents per Kilowatt-hour consumed and has the same value for each DPC Customer. It is equal to the ratio of the total cost of energy supply services over the total number of Kilowatt-hours consumed by the entire group of DPC customers.
- The mark-up fee remains stable throughout the period under analysis covering 2011 – 2016. It is fixed at 0.007 EUR/kWh, a very conservative level compared to actual mark-ups from the 5 countries with active DPCs.
- In cases where consumer data was missing for a given year; existing data from other years was used instead.
- For the case of the current pricing scheme (counterfactual), it is assumed that all consumers belonging to a given Eurostat band are paying exactly the same price, as reported in Eurostat table [nrg\_pc\_204\_c]; the standard deviation is equal to zero.

The majority of the assumptions in Box 10.6-2 are made to reduce complexity and computation time and make the building of the case easier; section 10.6.3 discusses how some of the assumptions can be redefined more realistically and what would be the impact on results. Many of those elements relate to the design options for DPCs and would require further analysis.

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<sup>157</sup> This also implies that either the portfolio of DPC Customers is big enough to match minimal contractual size requirements of the power exchanges or that the Supplier can buy fractions of contracts on the day-ahead..

## 10.6.2 Preliminary results

Obtaining anonymised individual consumer data has been challenging for many Member States. So far, partial information has been collected for 12 countries (Bulgaria, Denmark, Finland, Germany, Greece, Hungary, Ireland, Italy, Norway, Portugal, Spain and the United Kingdom). Complete, fully-processed and analysis-ready data was available by the time of writing for only 7 of those countries (Finland, Hungary, Italy, Norway, the United Kingdom, Spain and Ireland). The findings below are based on information from the seven countries. The reported results are marked as preliminary as further analysis is needed to ensure robustness and applicability for all EU retail markets.

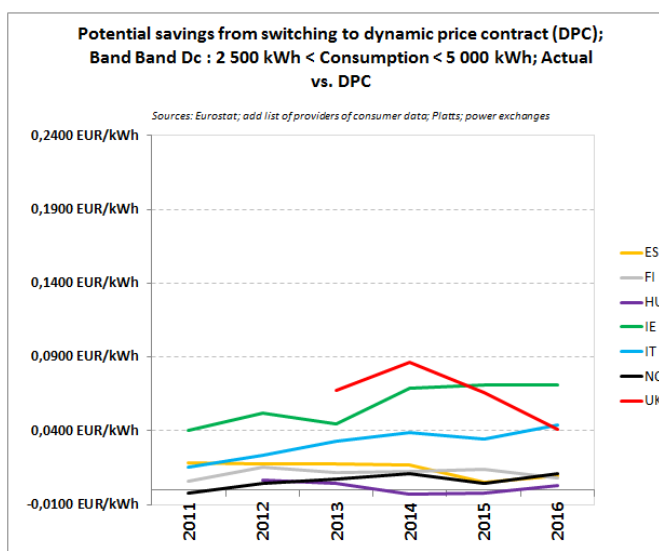
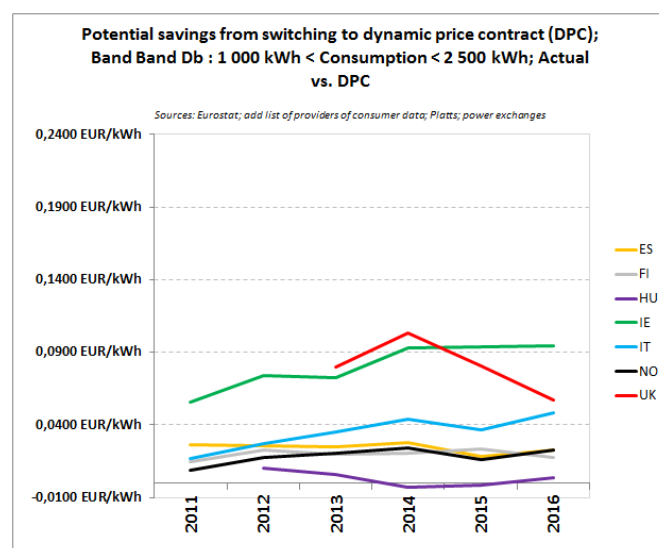
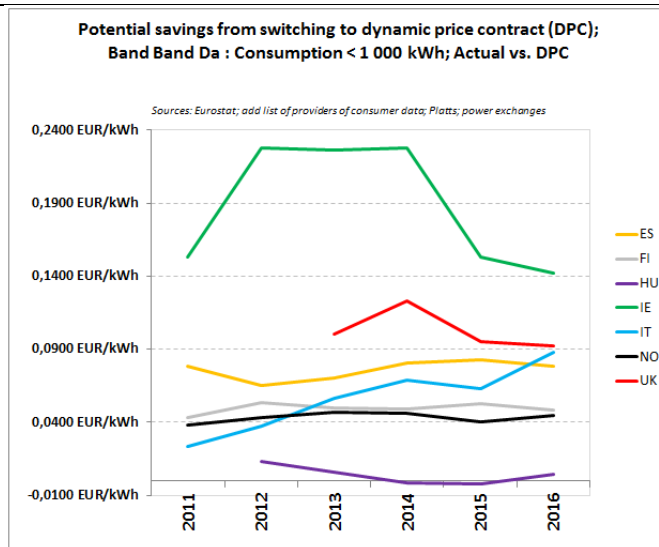
Some forms of DPCs are already marketed in Finland, Norway and Spain. For those countries, the current pricing scheme already integrates elements of DPC and this should be kept in mind when looking at **Figure 234** that reports on the difference of the energy component price for the current pricing scheme (counterfactual) and for DPC.

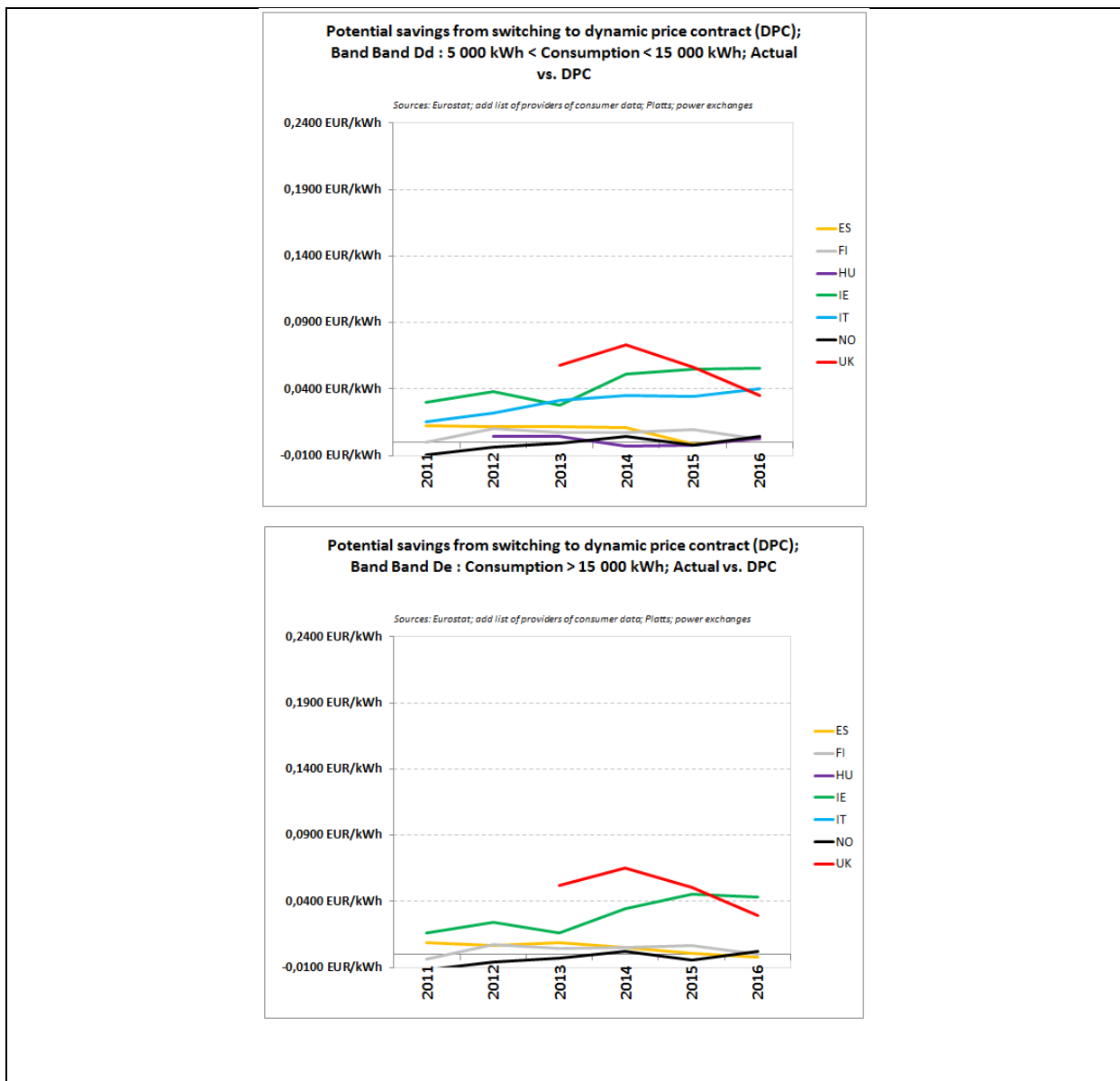
In Hungary, Italy, UK and Ireland DPCs are not yet widely spread. It can be assumed that the counterfactual is mainly composed of pricing schemes that are static in nature, exhibiting few price variations per year and not taking into account dynamic price information from the wholesale markets.

The assessment of price of energy supply under DPC for all of the 7 countries was build following the procedure described in Box 10.6-1 and under the assumptions laid out in Box 10.6-2.

**Figure 234** presents the price differences between the current pricing scheme and under DPC for the aggregated user sub-groups along the Eurostat consumer bands.

The potential savings to be realised appear greater for the lower consumption bands. This is linked to the fact that in the majority of cases DPC levels are lower and less variable than those of the current pricing schemes.





**Figure 235 - Potential savings for households from switching to dynamic pricing in selected Member States ; by consumption band**

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

The difference between the current pricing scheme and DPC appears insignificant for the case of Hungarian consumers, mostly because the counterfactual was reduced by administrative non-market measures which reduced the absolute level of price for the final consumers. As it turns out, similar effect would have been achieved if Hungarian consumers were allowed to use DPCs instead of relying on administered prices.

The spread between the current pricing scheme and DPC seems quite high for the case of UK and Ireland. This is most probably related to the fact those countries report in the energy component other types of costs in addition to those related to the supply of energy. Those costs are concentrated mainly on modest consumers (Band DA) as the spread becomes much smaller for the higher consumer bands.

The next four tables provide details on: group composition, estimated average annual savings per consumer band in absolute and relative terms, as well as the number of consumers that would lose out from the switch to DPC from the current pricing scheme.

Again, caution should be exerted when looking at data for Hungarian consumers, where the counterfactual was influenced by non-market measures.

In addition, the current assumption on the mark-up level<sup>158</sup> impacts the realised level of savings. When more competitive level of mark-ups is chosen<sup>159</sup>, the realised savings appear much higher and all consumers from all bands appear to be benefitting or not being worse-off from the switch.

Irish and Spanish data for the high consumer bands most probably contain non-household consumers and as such the calculated savings are overestimated.

**Table 21 - Composition of user group for estimating the DPC**

ESTAT	FI	HU	IT	NO	UK	ES	IE
<b>Band</b>							
<b>DA</b>	98	166	12	9	94	395	40
<b>DB</b>	93	351	191	11	228	350	202
<b>DC</b>	130	206	185	34	482	213	410
<b>DD</b>	496	54	8	378	189	38	245
<b>DE</b>	478	n.a.	n.a.	563	9	7	12

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

**Table 22 - Estimated average annual savings per Band, EUR, 2016**

ESTAT	FI	HU	IT	NO	UK	ES	IE
<b>Band</b>							
<b>DA</b>	19,94	2,93	18,81	20,54	69,19	30,70	84,63
<b>DB</b>	30,11	5,94	31,26	42,19	110,14	39,33	180,61
<b>DC</b>	30,84	10,78	52,49	41,30	147,76	35,29	278,33
<b>DD</b>	25,33	20,37	89,98	46,10	256,38	20,48	526,16
<b>DE</b>	1,60	n.a.	n.a.	58,02	573,12	-77,41	1534,68

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

<sup>158</sup> Mark-up set at 0.007 EUR/kWh).

<sup>159</sup> For example, 0.0016 EUR/kWh which corresponds to the top 25% percentile mark-up based on all commercial offers with DPC in the 5 countries who are using it)

**Table 23 - Estimated average annual savings per Band, share of energy supply component, 2016**

ESTAT	FI	HU	IT	NO	UK	ES	IE
<b>Band</b>							
<b>DA</b>	51,34%	9,47%	22,28%	58,16%	60,58%	65,25%	73,98%
<b>DB</b>	30,07%	7,49%	16,80%	41,03%	48,77%	31,96%	64,59%
<b>DC</b>	16,97%	6,75%	15,94%	24,46%	40,14%	17,04%	57,48%
<b>DD</b>	5,76%	6,56%	15,61%	11,15%	36,56%	5,30%	51,21%
<b>DE</b>	0,15%	n.a.	n.a.	6,69%	8,28%	-5,93%	44,82%

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

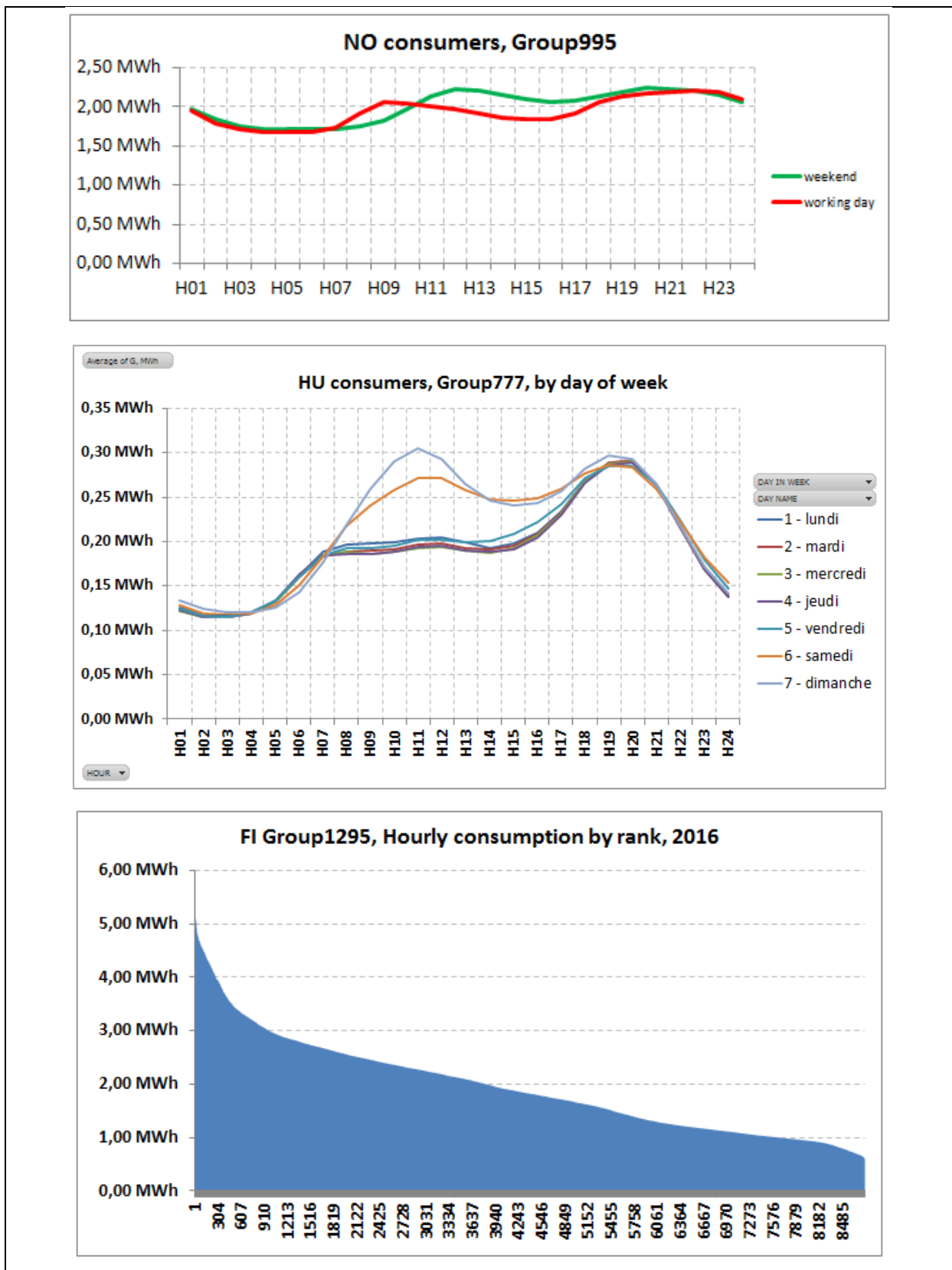
**Table 24 - Estimated number of consumers losing out from the switch to DPC**

ESTAT	FI	HU	IT	NO	UK	ES	IE
<b>Band</b>							
<b>DA</b>	0	1	0	0	0	0	0
<b>DB</b>	0	3	0	0	0	0	0
<b>DC</b>	0	1	0	0	0	0	0
<b>DD</b>	9	0	0	0	0	3	0
<b>DE</b>	223	n.a.	n.a.	1	0	7	0

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

**Figure 235** provides an example for organising and grouping of aggregate data that can be suitable for analysing different aspects of aggregate consumer profiles. The charts are mainly illustrating time-related patterns.

More generally, analytical tools relying on data from the constructed user groups can be useful in providing elements to better understand consumer behaviour and the drivers that are influencing it.



**Figure 236 - Elements to understand consumer behaviour and agregation for analysis**

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)



### 10.6.3 Robustness of results and further research

Several of the assumptions in Box 10.6-2 were introduced to facilitate the building of a test case and can be replaced with more realistic ones. The following discussion concentrates on the expected effect on price of energy supply under DPC or the current pricing scheme from releasing some of these assumptions.

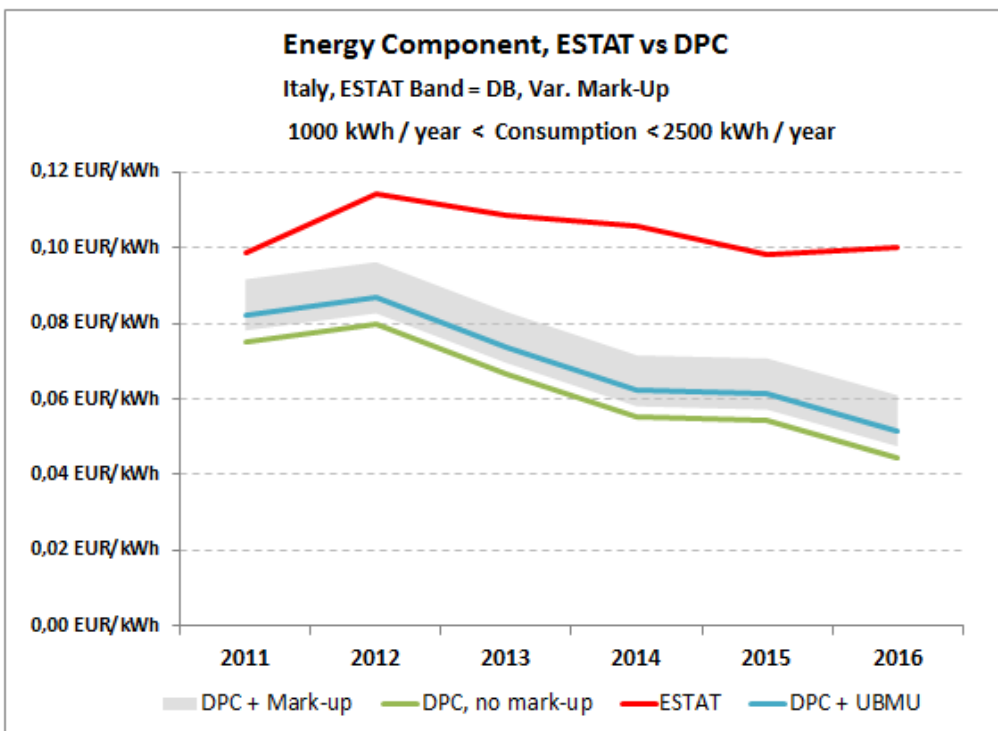
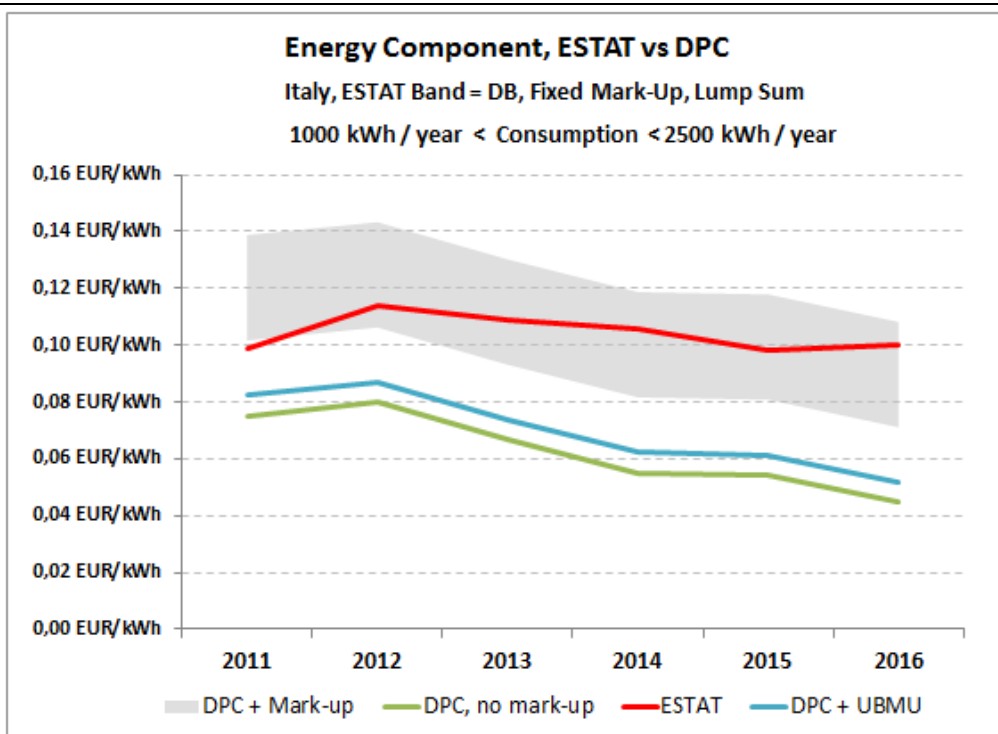
The mark-up fee used so far was set up per unit of consumption and using the same level for all bands (Fixed Mark-Up, Uni-Band). It can be designed in alternative ways. For example, it can be introduced as a lump sum to pay per year, irrespective of the consumed level (Fixed Mark-Up, Lump Sum). Modest consumers will have to spread this lump sum over fewer kWh. When this mark-up fee is converted per kWh consumed, those consumers are paying up higher fees.

Alternatively, it can be set as a variable margin, trying to proxy consumer awareness and sophistication when selecting DPC offers (Variable Mark-Up).

The effect of the alternative mark-ups on DPC levels are illustrated in **Figure 236**. The "Fixed Mark-Up, Lump Sum" uses as ranges respectively 50 EUR/year and 120 EUR/year. The "Variable Mark-Up" builds on collected data for mark-up levels from the 5 countries that have introduced some form of DPC. Consumer awareness and sophistication is set to match the mark-up resulting from the top 25% percentile of all offers available. The low and high level of the top 25% percentile from the 5 countries is set as 0.0016 EUR/kWh and 0.0092 EUR / kWh respectively. Those levels are applied to the consumers from the most representative band; for consumers in other bands those ranges are rebased using the median consumption in each band.

**Figure 236** shows results for Italy, consumer band DB, they are representative for the majority of cases. Lump sum mark-ups have opposite effect on consumers from different bands. Compared to a mark-up fee set per unit of kWh, lump sum fees tend to erase saving from DPC for modest consumers and increase savings further for larger consumers. The same effect, but to a lesser scale is observed for the variable mark-up design.

Overall, when alternative designs of mark-ups are introduced, the reported level of savings, especially for the modest consumer bands might appear as overestimated.



**Figure 237 - Potential savings from switching to DPC with alternative mark-ups in Italy**

Sources: Price data: S&P Global Platts; Consumption data: Elenia Oy (Finland), Vaasa ETT and EDF-DEMASZ (Hungary); Regulatory Authority for Electricity, Water and Gas (Italy); Norgesnett (Norway); UK Data Archive - Centre for Sustainable Energy - EDRP project (UK); ENEL Group - Endesa Distribución Eléctrica (Spain); Irish Social Science Data Archive - Commission for Energy Regulation (CER) - CER Smart Metering Project (Ireland)

On the other hand, replacing some of the assumptions of Box 10.6-2 with more reasonable ones might result in an underestimation of the potential savings from the switch to DPC.

For example, DPC suppliers will not purchase all of the required energy on the day-ahead market. They can manage better their price risk exposure by using derivative contracts in the wholesale market. This could reduce the overall price of purchased energy and some of the realised savings can be passed over to consumers.

Likewise, the absence of demand price response, especially for consumers equipped with smart meters and automated control systems might appear as a realistic assumption. When demand responsiveness is introduced, the DPC supplier will be better equipped to reduce its bill for procuring or producing of the needed energy and the amount of realised savings for each consumer in the group can be expected to increase.