Household Energy Price Index

E-CONTROL vaasaETT MEKH Hungarian Energy and Public Utility Regulatory Authority

Household Energy Price Index for Europe

APRIL 30, 2024

April Prices Just Released

The most up-to-date picture of European household electricity and gas prices: VaasaETT and two leading European energy market authorities collaborate to track monthly energy prices in 33 European countries.

Energie-Control Austria, the Hungarian Energy and Public Utility Regulatory Authority (MEKH) and VaasaETT are delighted to publish the results of our study of residential electricity and gas prices covering 33 European countries. Our price survey now includes every EU Member State in addition to selected members of the European Energy Community (Montenegro, Norway, Serbia and Ukraine), plus Great Britain and Switzerland.

We would like to use this opportunity to thank the energy market authorities, energy suppliers and distributors for their time and cooperation to ensure the quality of our data.

If you would like to know more about the latest developments in residential energy prices, visit our project webpage at www.energypriceindex.com and subscribe to the free monthly update of the HEPI index for Europe.

IN THIS MONTH'S EDITION

Electricity price increases in Luxembourg City, Nicosia and Oslo

Electricity price decreases in Athens, Copenhagen, Lisbon, London, Madrid, Rome, Vienna and Vilnius

Natural gas price increases in Athens, Berlin and Madrid

Natural gas price decreases in Amsterdam, Lisbon, London, Luxemburg City, Paris, Riga, Rome, Tallinn, Vienna and Zagreb

Fixed vs variable tariff analysis: fixed prices are slightly higher than variable.

European Energy Price Development

Figure 1 shows the evolution of residential energy and distribution prices excluding taxes between January 2009 and April 2024 in 15 European capital cities. The index is calculated by weighing prices in each of the capital cities by the respective national electricity or gas residential consumption.

Residential electricity prices steadily decreased over the first half of 2009 and reached a trough at 96 index points in June 2009 as the economic crisis took its toll on demand and wholesale prices plummeted. Prices started to recover in the second half of 2009 together with (temporary) green shoots in economic activity and a general feeling that the worst of the crisis was behind us. They have been on an upward trend since then. The index for electricity reached as high as 116 index points in October 2014. Since then, it faltered and remained around 108 index points in 2016 and 2017. During 2019, the index was fluctuating around 115 and 119 points. However, the recent developments on the wholesale markets due to COVID-19 restrictions dropped the index rate down to 112 points in 2020. During 2021, the index followed an increasing trend as people and businesses were resuming their activities, hence there was higher demand, and the energy crisis was gradually developing. The extraordinary weather conditions, the record high wholesale natural gas prices and the lack of storage materials to cover demand led to repetitive record high prices in most of the European capitals by the end of 2021. The increasing trend became more extreme during the second half of the year, reaching 164 points in December 2021. After climbing the sharpest step in its historical data in January 2022 and its largest peak in October 2022, the HEPI electricity index has followed a decreasing trend and it currently stands at 184 points (EUR-15).

The economic downturn which impacted energy demand and wholesale prices in 2009 is much more visible in the development of residential gas prices. The gas price index dropped significantly in 2009 and reached its lowest value only in February 2010 at 81 index points (nine months after the lowest value in the electricity price index). Retail prices started to recover in the winter of 2010 when a cold wave hit many parts of Europe. The index steadily increased until the beginning of 2013. It remained between 105 and 110 index points ever since despite a significant drop in natural gas prices on international markets during the year 2015. In 2016 however, gas prices plummeted reaching a 6-year low in September 2016 at 93 points. After a small hike up to 96 points in March 2017, a bigger one followed to 103 points in November 2018. There was a decreasing trend for two years, up until the gas price index started increasing, surpassing November 2018 levels for the first time in August 2021. The ongoing energy crisis greatly affected the gas price index, which was almost doubled within 2021, going from 87 points in January 2021 to 163 points in November 2021. Since then, its value was doubled again in November 2022, reaching 350 points; it currently stands at 157 index points.

When examining the averages of the end-user prices for both electricity and gas, the following changes can be observed; from a year ago, April 2023, both the electricity and the gas bills in all EU capitals have decreased by 9%.

Figure 1: Evolution of residential energy and distribution prices excluding taxes in the EUR-15

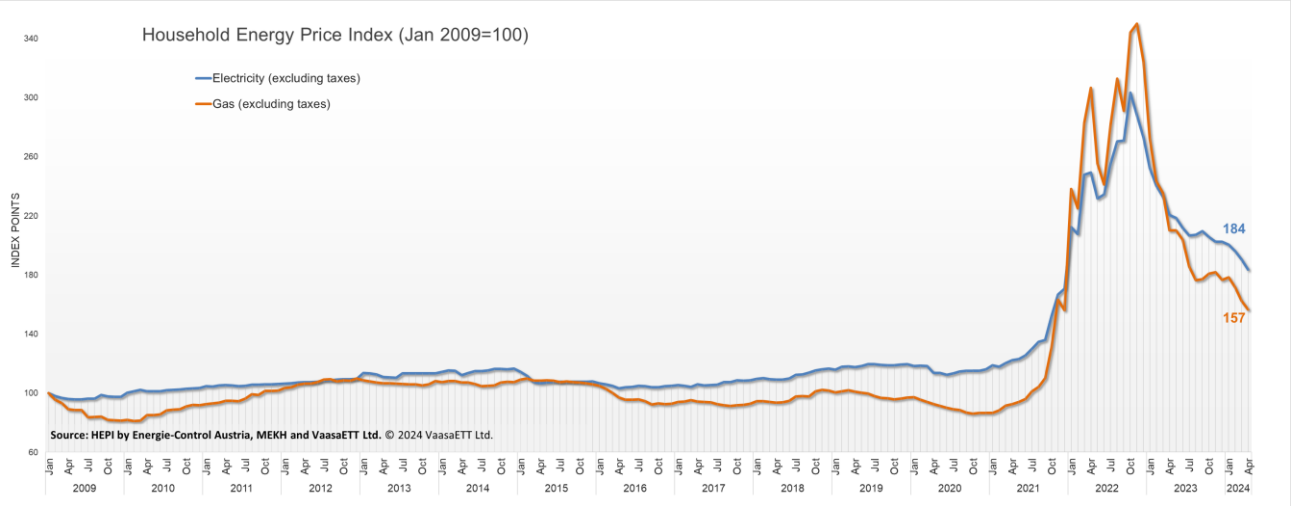
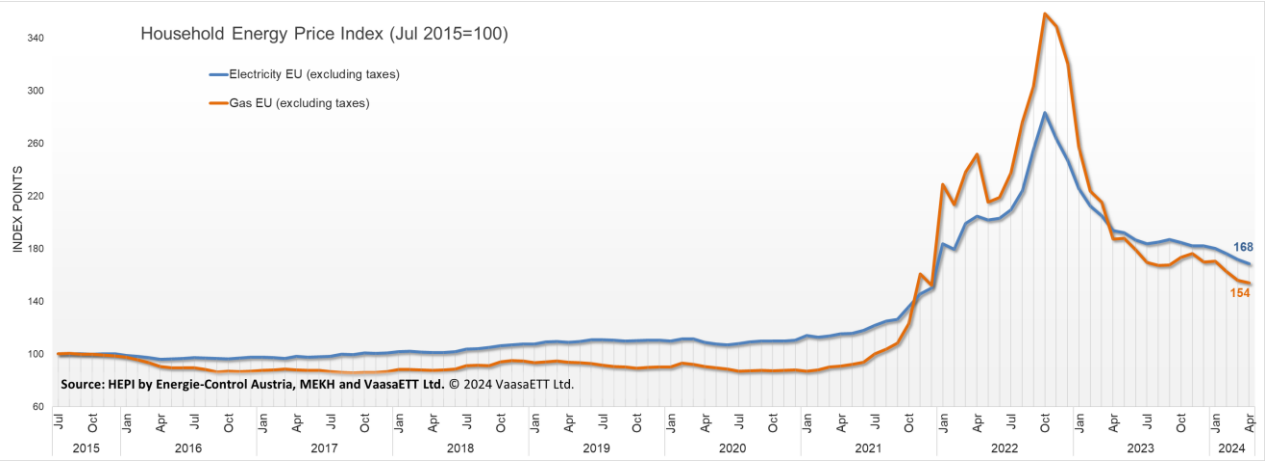


Figure 2: Evolution of residential energy and distribution prices excluding taxes in the EU[1]



[1] EU-28 values were used between July 2015 - January 2020. EU-27 values are used from February 2020 onwards.

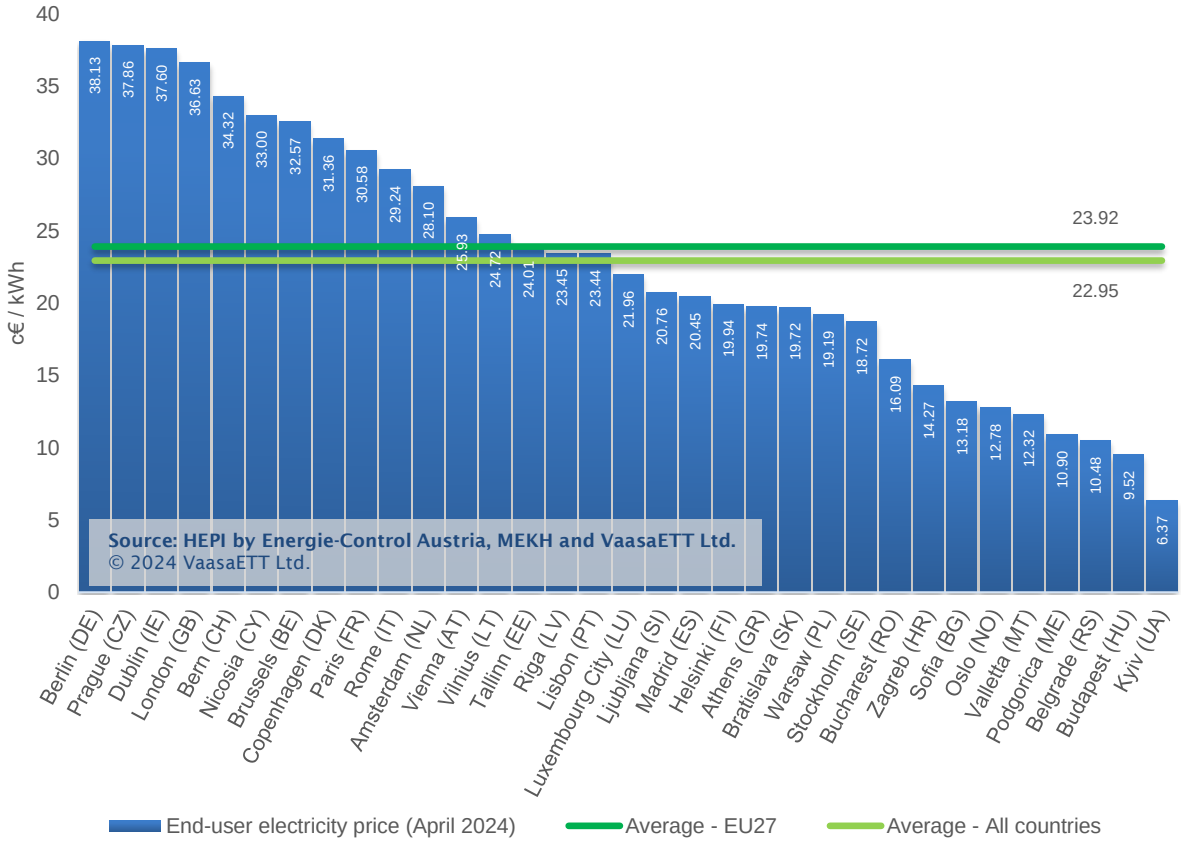
Residential Electricity Prices

Figure 3 shows the end-user price of electricity in the 33 European capital cities as of April 1st, 2024. It shows that depending on where a customer lives in Europe, the electricity price can vary by a ratio of 6. Berlin and Prague are the most expensive cities for household customers in Europe, followed by Dublin, London and Bern.

Kyiv appears to have the least expensive electricity price, followed by Budapest, Belgrade and Podgorica. In nominal terms, prices in the capital cities of Central and Eastern Europe (CEE) tend to

be lower than average; Prague, Tallin and Vilnius are the only capital cities among the CEE countries in which the price of electricity is above the European average.

Figure 3: Residential electricity prices including taxes



The most significant changes that took place in the electricity market this month were as follows[1]:

- A 7% price increase in Oslo, due to increases in the energy and energy taxes components;
- A 2% price increase in Luxembourg City, due to an increase in the energy component;
- A 2% price increase in Nicosia, due to increases in the energy and distribution components;
- A 13% price decrease in Copenhagen, due to decreases in the energy and distribution components;
- A 7% price decrease in London, due to decreases in the energy and distribution components;
- A 3% price decrease in Lisbon and Madrid, due to a decrease in their energy component;
- A 3% price decrease in Vienna, due to decreases in the energy and energy taxes components;

[1] The change in each capital city is calculated using the prices in their local currency to exclude the impact of exchange rate fluctuations.

- A 2% price decreases in Athens, due to decreases in the energy and energy taxes components;
- A 2% price decrease in Rome, due to a decrease in the energy component;
- A 2% price decrease in Vilnius, due to decreases in the energy and distribution components.

The average European electricity end-user price continues its downward trend, marking a 2% decrease in April. In most of the capital cities under review, prices remained unchanged from the previous month, with only 5 markets experiencing some degree of price increase, notably Oslo showing the most significant change. On the contrary, decreases in electricity retail prices have been generally marginal this month, except for Copenhagen and London.

The largest price increase in electricity end-user price in April was observed in Oslo (7%) due to an increase in the electricity tax[2]. Fee rates are set by the government and change twice a year, on January 1st and April 1st.

On the other hand, the seasonal transport fee changes in Denmark, alongside an 11% reduction of the energy component, led to an aggregate 13% decrease in the electricity end-user price[3]. The significant decrease of the energy component can be attributed to reductions of quarterly fixed price contracts (prices only change every three months) that now reflect the downward trend of wholesale prices in the previous months.

The adjusted price cap in Great Britain, which is set by the energy regulator, resulted in a 7% decrease in electricity end-user prices in London[4]. With the new reduction, the price for a typical consumer this month is almost 40% lower compared to two years ago, however, remains 45% above the corresponding price of April 2021 and well above the European average.

In an effort to shield consumers from continuous soaring energy prices, European governments have adopted multiple measures during the energy crisis, which are incorporated in the prices shown in the HEPI methodology. Nevertheless, in some cases occasional or seasonal energy schemes are introduced to end users as one-time refunds and compensations, that in fact correspond to a longer period of consecutive high prices. The impact of such measures is compared separately, in Figure 4.

In Ireland[5], residential consumers are eligible for a €450 credit, applied in 3 instalments of €150, starting from December 2023. The first credit concerns the period between 1 December and 31

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[2] Elvia: "Hva er elavgift og hvem kan få fritak for avgiften?"
[3] Migogaarhus: "Store besparelser på vej: Nu bliver din strøm billigere", 31.03.2024
[4] BBC: "Typical energy bill to fall £238 a year from April under new price cap", 23.02.2024
[5] Citizens Information: Electricity Account Credit (citizensinformation.ie)

December 2023, the second between 1 January and 29 February 2024 and the third between 1 March and 30 April 2024. The credit will be transferred directly through suppliers to their customers' electricity bills. Assuming a typical electricity customer in Dublin, for the fourth month of 2024, the compensation reaches 57% of the monthly electricity cost, resulting in a monthly electricity price of €16.17 cents/kWh.

Figure 4: Comparison of electricity end-user price with and without energy refund incorporated

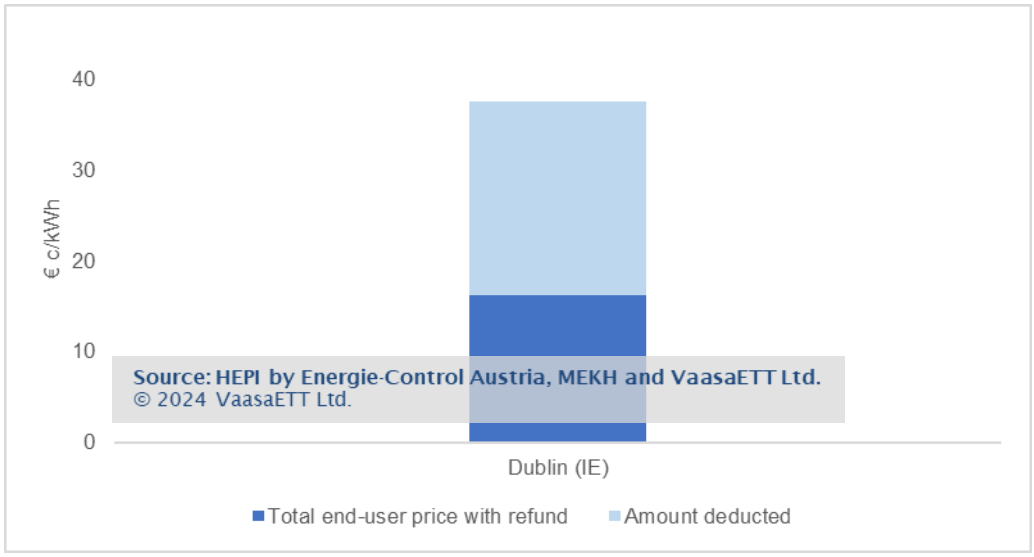
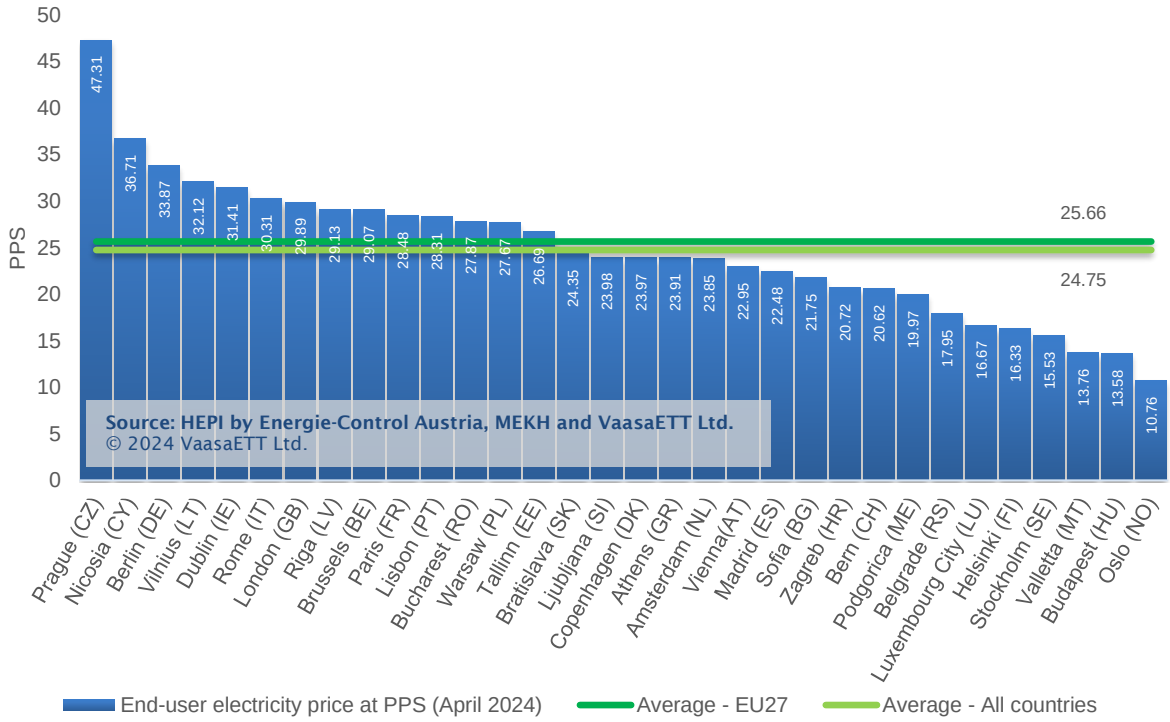


Figure 5: Residential electricity prices including taxes at PPS



When adjusted to purchasing power standards (PPS) in each country, the picture changes dramatically. PPS is an artificial common reference currency that eliminates general price level differences between countries[6]. When expressed in PPS, energy prices are thus shown in relation to the cost of other goods and services. The lowest adjusted household electricity prices are found in Oslo, Budapest, Valletta, and Stockholm while the highest are currently in Prague, Nicosia, Berlin and Vilnius. Most of the CEE countries usually end up with electricity prices which are relatively low compared to the general level of prices in the country and below the European average (Figure 5). However, this is not the case in April; Bucharest, Prague, Riga, Tallinn, Vilnius and Warsaw are the capital cities among the CEE countries in which the price of electricity is above the European average.

Figure 6: Residential electricity price breakdown[7]

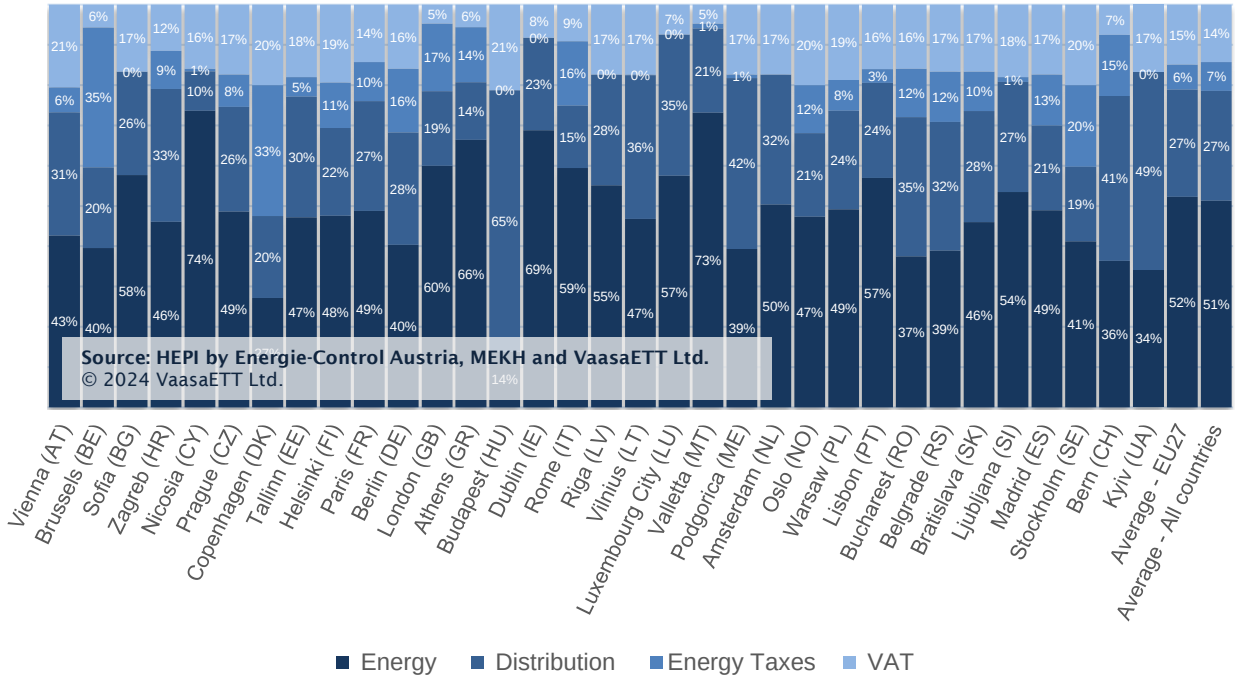


Figure 6 shows the breakdown of the electricity price in the 33 analysed capitals, into energy, distribution, energy taxes[8] and VAT. Our survey shows that on average, energy (the contestable

[6] Eurostat: Purchasing power parities - Overview

[7] Please note that proportions appearing in the graph are rounded, and due to this may not add up to 100%. Additionally, for Amsterdam (NL), the typical household considered in HEPI research receives a tax refund on their energy tax. When considering this, the end-consumer's bill breakdown is as follows: Energy component 70%, distribution 45%, energy taxes -32%, and VAT 17%. For Luxembourg City (LU), the typical household considered in HEPI research receives a tax refund on their energy tax. When considering this, the end-consumer's bill breakdown is as follows: Energy component 90%, distribution 55%, energy taxes -52%, and VAT 7%.

[8] Energy taxes component is the sum of all the taxes, fees and levies.

component of the price) represents 52% of the end-user price of electricity bill, distribution 27%, energy taxes 6% and VAT 15% for the EU capitals.

If we focus on the cost of energy as a commodity, in Budapest it currently represents just 14% of the end-user electricity price, which is the lowest among all surveyed cities. On the contrary, Nicosia has the greatest energy percentage, reaching 74% of the end-user price in April 2024.

Additionally, starting from January 2020, a typical consumer in Amsterdam pays zero energy tax due to the increased amount of tax credit, which exceeds the indicated energy tax amount. On the contrary, they receive a refund on the exceeding tax credit amount. The aim of this refund is to encourage consumers towards electrification and switching away from gas heating and appliances.

In the same manner, in Luxemburg City[9], the typical customer is paying negative energy taxes as a result of the compensation mechanism that is currently in force, intended to offset the increase in the energy component and stabilise prices to 2022 levels.

Before the energy crisis fixed (price and term) and variable prices were relatively similar. A fixed price was often cheaper since it afforded the supplier lower loyalty and procurement risk. Though customers essentially gambled a little on the direction of the market, it was not a particularly significant choice for most customers. In the more mature markets at least, active customers nevertheless tended to choose fixed prices. Since the crisis, the situation has mostly reversed. Fixed prices, where available (in some markets they have been unavailable since early or mid-crisis), were higher than variable prices, in some cases by a very large margin. However, this trend seems to be reversing again. In April 2024, the number of fixed offered contracts appears to be increased while their average price is only slightly higher than the average variable price only by 0.92 c€/kWh. This is also observed in the majority of the EUR15 markets when studied individually, with fixed contracts being on average cheaper than variable ones in only 6 out of the EUR15 individual markets.

Figure 7 and Figure 8 show the situation as of April 2024 for a selection of markets, the EUR-15 markets. Across all the markets shown, the average price for fixed prices was 28.43 c€/kwh. For variable prices it was 27.51 c€/kWh. Naturally, for those markets where fixed prices are both available and very different from variable prices, the average of the two is less representative than in other markets.

[9] ILR: "Règlement ILR/E22/58 du 28 décembre 2022 fixant la contribution au mécanisme de compensation de la catégorie A pour l'année 2023 - Secteur Électricité.", 28.12.2022

Figure 7: All-in electricity end-user price including VAT (c€/kWh) for EUR-15, average fixed vs variable contracts.

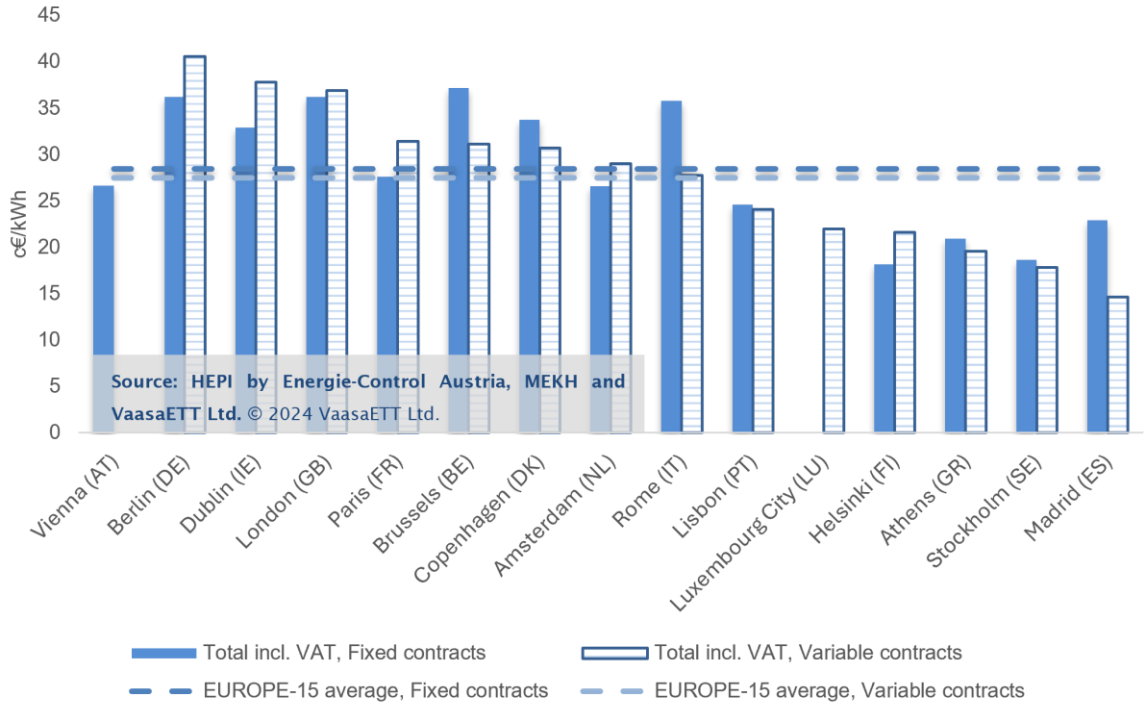
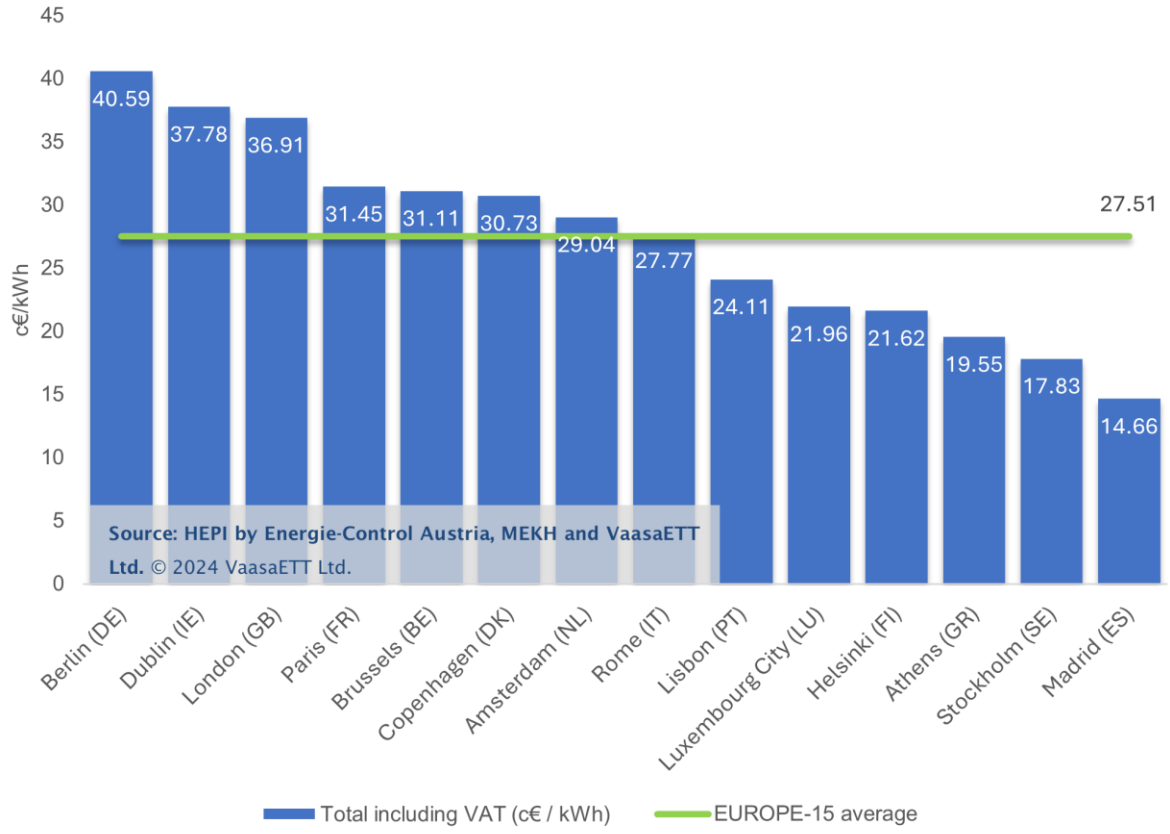
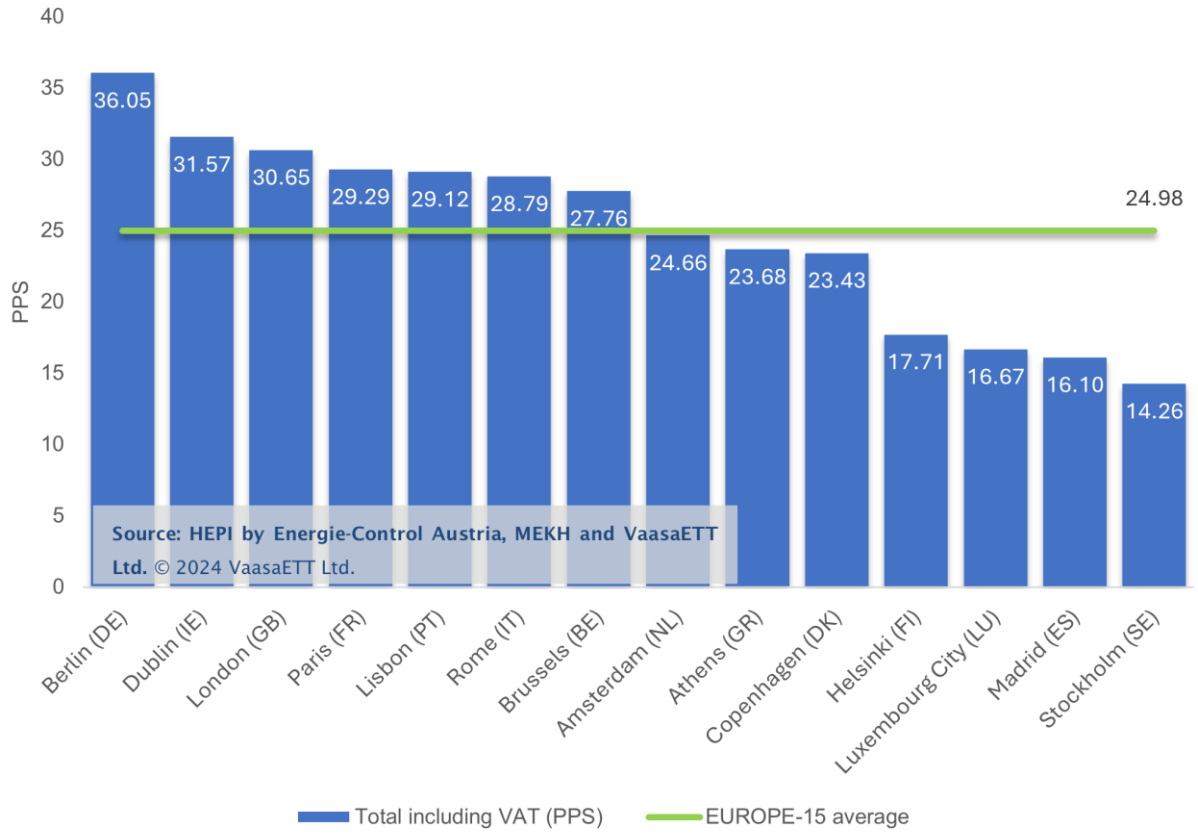


Figure 8: All-in electricity end-user price including VAT (c€/kWh) for EUR-15, variable contracts only



If we adjust the variable prices for purchasing parity (Figure 9), we arguably gain a clearer picture of the relative significance of the most popular prices in April 2024.

Figure 9: All-in electricity end-user price including VAT (PPS) for EUR-15, variable contracts only



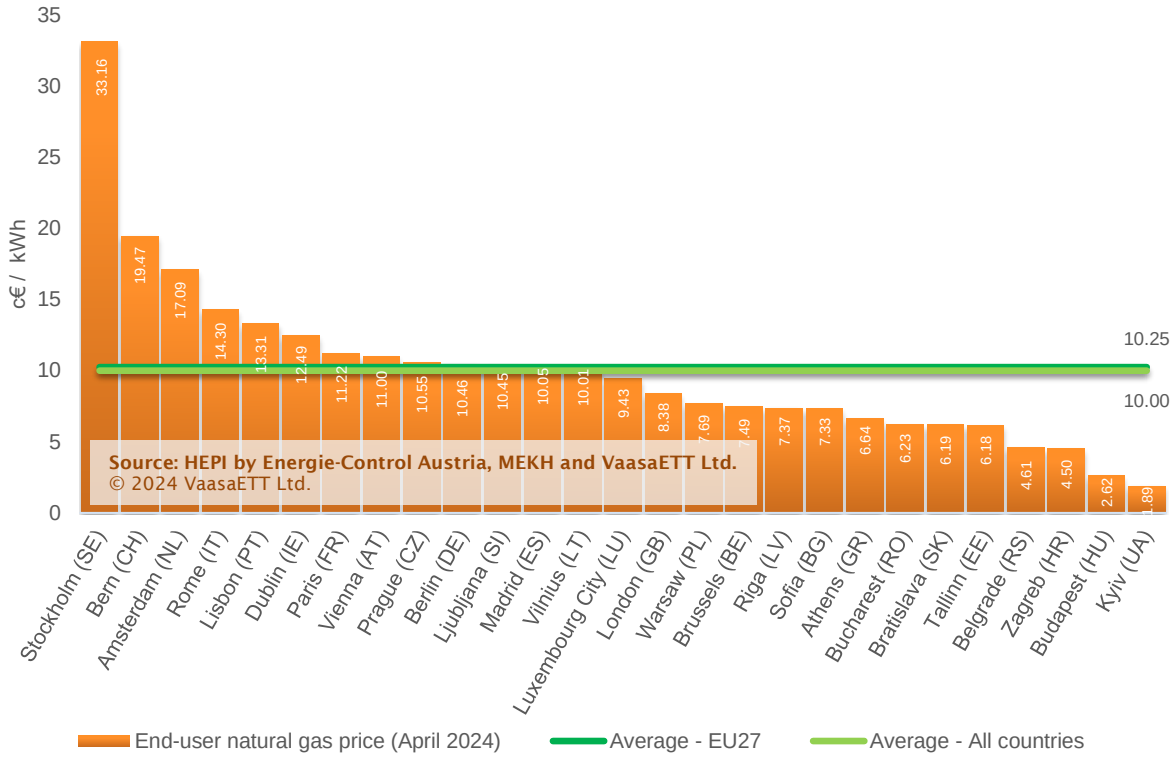
Residential Gas Prices

Figure 10 shows the price of natural gas paid typically by residential customers in 28 European capital cities as of April 1st, 2024[10]. The highest price is paid by inhabitants of Stockholm who pay over 3 times the European average end-user price, followed by Bern, which is the second most expensive capital city. This can be explained by the nature of the Swedish gas market; the small size

[10] Please note that Copenhagen, Helsinki, Nicosia, Oslo, Podgorica and Valletta have been left out of this analysis on gas prices as there is virtually no residential gas market in these cities.

of only 77,000 household gas customers in the whole of Sweden of which 50,000 in the isolated gas network in Stockholm.[11] Amsterdam is currently the third most expensive capital city.

Figure 10: Residential gas prices including taxes



The price in Stockholm is almost 13 times as high as in Budapest, which is the cheapest city for gas in EU, and over 17 times as high if we include Kyiv. Household natural gas is usually cheaper in the CEE countries; Ljubljana and Prague are the only capital cities among the CEE countries in which the price of natural gas is above the European average.

The most significant changes that took place in the natural gas market this month were as follows [12]:

- A 17% price increase in Berlin, due to increases in the energy and VAT component, following the end of a subsidy scheme;
- A 5% price increase in Madrid, due to increases in the energy and the VAT components;
- A 2% price increase in Athens, due increases in the energy and distribution components;
- An 11% price decrease in Vienna, due to decreases in the energy and energy taxes components;

[11] The Swedish electricity and natural gas market 2022 Ei (Ei R2023:13)

[12] The change in each capital city is calculated using the prices in their local currency to exclude the impact of exchange rate fluctuations.

- An 8% price decrease in London, due to a decrease in the energy component;
- A 7% price decrease in Lisbon, due to a decrease in the energy component;
- A 7% price decrease in Riga, due to decreases in the energy, energy taxes and distribution components;
- A 4% price decrease in Amsterdam, Luxembourg City, Paris and Tallinn, due to decreases in their energy components;
- A 3% price decrease in Rome, due to decreases in the energy and distribution components;
- A 3% price decrease in Zagreb, due to a decrease in the energy component.

In April, the average natural gas end-user price marked a 2% decrease across Europe. Only 4 out of the 27 capital cities under review showed a price increase this month, while 12 of them noted decreases of different magnitude. The TTF benchmark index[13] fluctuated below the 30€/MWh mark for the most parts of April, showing only partial influence from the tensions in the middle East. The general stability in European gas markets continues, following the mild winter across Europe, while the high renewable output leads to high capacity of gas storage facilities, which drives end-user price down.

A 17% increase in natural gas end-user prices was observed in Berlin, as VAT[14] returned to 19% from April 1st. The VAT rate on the supply of gas was temporarily reduced by the government to 7%, from October 2022, as part of a relief package aiming to help consumers with soaring energy prices.

Similarly, the return of the typical VAT (21%) for natural gas led to a 5% increase in the end-user price in Madrid, despite the downward trend of the energy component price. The newly announced regulated TUR[15] price marked a sharp reduction this month, a decrease that is expected to be transferred to the free market, now that the heating season came to an end.

On the other hand, Vienna experienced the largest price decrease (11%) as Wien Energy, the largest supplier, announced reductions[16] for both electricity and gas, impelling other suppliers to adjust their prices accordingly.

In London, the price cap on natural gas marked a decrease to 6p per kWh (previously at 7.42p per kWh), resulting in an 8% drop in end-user prices. Ofgem, the national energy regulator announced

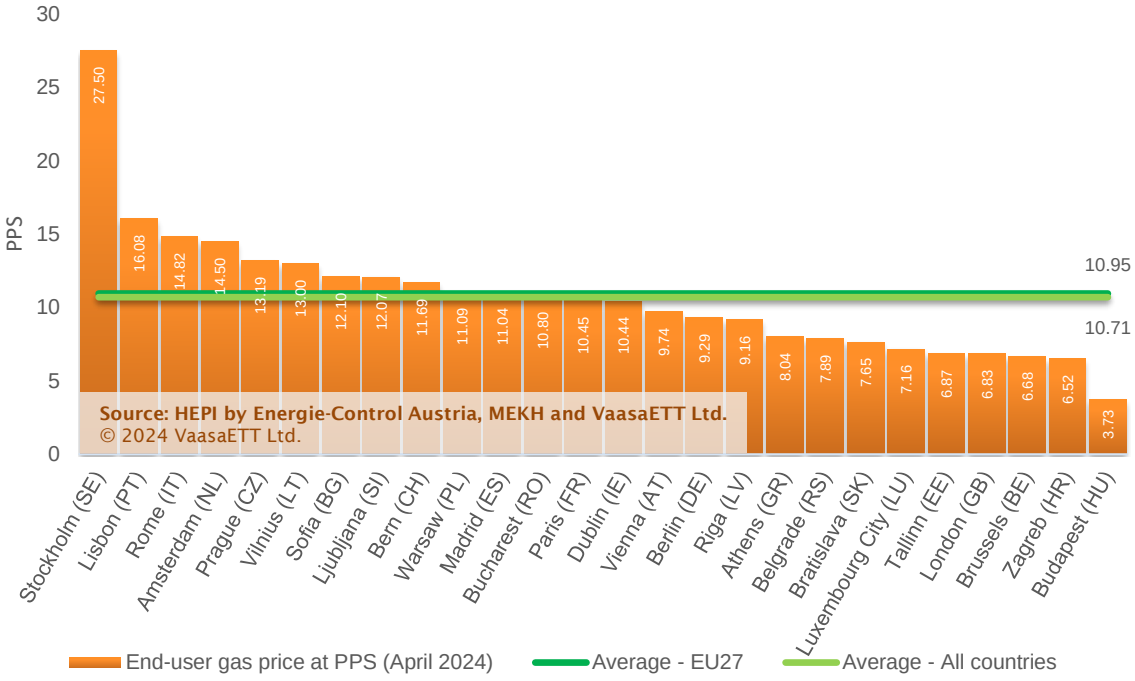
[13] ICE: "Dutch TTF Natural Gas Futures"
[14] Tagesschau: "Mehrwertsteuer auf Gas wieder bei 19 Prozent", 01.04.2024
[15] OCU: "Contratar la TUR, lo mejor para pagar menos gas", 01.04.2024
[16] OTS: "Wien Energie: Preise für Strom und Gas sinken weiter", 20.03.2024

that the existing price cap system could be modified to become more dynamic to consider changes in demand and renewable generation[17].

Lastly, a 7% decrease in Lisbon can be attributed to Galp, one of the largest gas suppliers in the country, which reduced natural gas prices to "reflect the decline in energy prices in international markets during the first quarter of 2024", as the company reports[18].

In the same vein as for electricity, gas prices at PPS have a very different outcome from the actual prices. This month, Budapest, Zagreb and Brussels were the cheapest cities when adjusted to PPS (Figure 11).

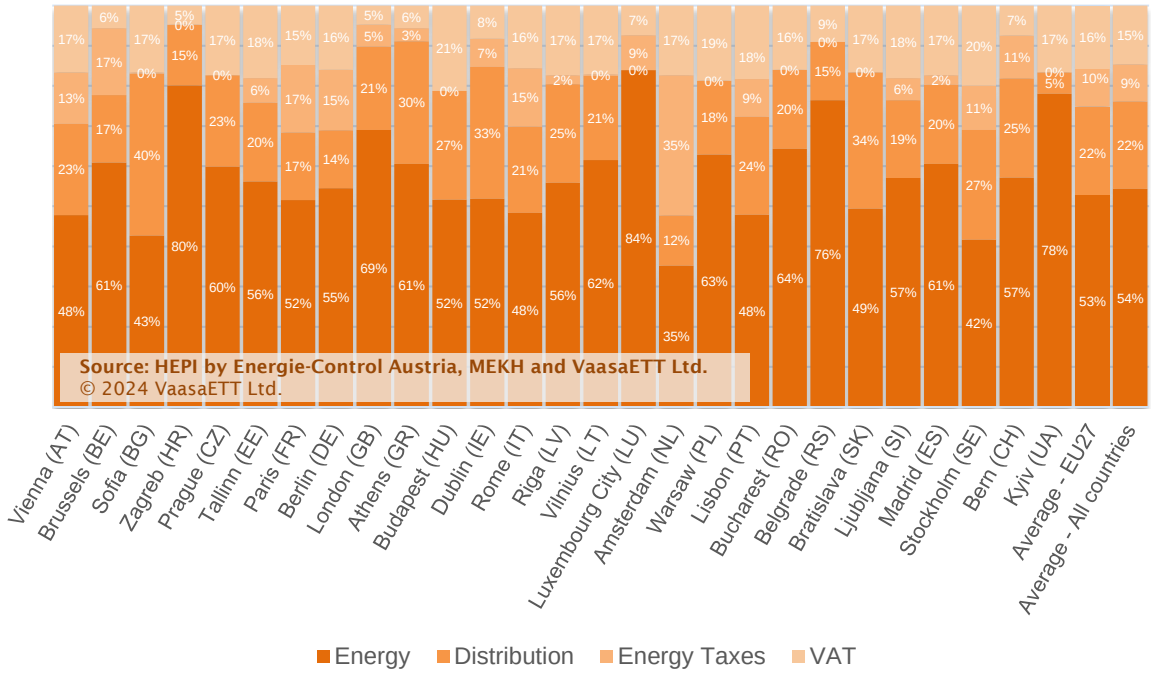
Figure 11: Residential gas prices including taxes at PPS



Our survey shows that on average, energy (the contestable component of the price) represents 53% of the end-user price of natural gas, distribution 22%, energy taxes 10% and VAT 16% for the European capitals. In the Netherlands, energy taxes are used for nudging the consumers' behaviour and energy use. Even more so starting from January 2020, the energy tax for residential natural gas user is typically around 35%. The aim is to encourage the use of electric heating and appliances instead of gas.

[17] BBC: "What is the Ofgem energy price cap and how much are bills going down?", 03.04.2024
[18] Eco Sapo: "Galp desce preço da luz em média 28% e do gás natural em 19% em abril. EDP não mexe", 26.03.2024

Figure 12: Residential gas price breakdown



Overall, results show that market forces represent about 53% of the end-user price both for electricity and gas, whereas national fiscal and regulatory elements are responsible for the remaining 47% through distribution tariffs, energy taxes and VAT. The current energy crisis led to significant increase of the average energy component in EU capitals while now the prices appear to be decreased when compared to the two previous years. The energy share of end-user price of electricity used to be 61% in April 2022 and in April 2023 also and is currently standing at 52%. Likewise, in the natural gas market, the energy component percentage of the end-user price used to be 63% back in April 2022 before reaching 60% in April 2023 and 53% this month. In places where the energy component is lower, so is the incentive for customers to look for more competitive offers[19].

[19] Latest utility customer switching data can be accessed in the most recent version of Capgemini's World Energy Markets Observatory, created with partnership with VaasaETT, De Pardieu Brocas Maffei and Enerdata. VaasaETT contributes with data on the retail markets sections.

HEPI Data Attributes

All prices and other statistics relate to:

- The prices being offered to customers actively searching for an offer at the time of data collection
- The first day of the month
- Residential customers with a typical consumption for the national capital city
- Standing fees are added to the price per kWh so that the entire end-user cost is taken into account.
- In case of spot-based tariffs the previous month's average price is considered in the calculations to smooth day-to-day extreme changes

HEPI prices do not relate to:

- The prices paid by customers on fixed price contracts agreed prior to the time of data collection
- The price paid by customers on tariff contracts set at a level no longer available at the time of data collection
- Sign in and other temporary bonuses and other forms of non-monetary benefits are not taken into account since they can distort the overall tariff offered, especially in cases where they are offered on a "one-off" basis
- Contracts with extra services (e.g. insurance, maintenance, etc.) and prepaid contracts are also omitted from the analysis.

Note on retrospective price adjustments:

In cases of retrospective adjustments to previous months' price (i.e. application of support measures or review of regulated price where applicable) changes are integrated retrospectively in the prices of the month(s) for which the adjustments apply. This might create a difference between the HEPI price and the actual bill amount for a given month.

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Energie-Control Austria

Energie-Control Austria was set up by the legislator on the basis of the new Energy Liberalisation Act and commenced operation on 1 March 2001. Energie-Control is headed by Mr. Wolfgang Urbantschitsch and Mr. Andreas Eigenbauer as managing directors and is entrusted with monitoring, supporting and, where necessary, regulating the implementation of the liberalisation of the Austrian electricity and natural gas markets.

More at: www.e-control.at

The Hungarian Energy and Public Utility Regulatory Authority

The main responsibilities of the Hungarian Energy and Public Utility Regulatory Authority are consumer protection, providing regulated access to networks and systems, carrying out regulatory competencies in order to maintain security of supply and fostering competition. The scope of the infrastructures, which have to be overseen by the Hungarian Energy and Public Utility Regulatory Authority, has been extended in 2011 with the complete regulation of district heating and in 2012 with the water public utilities. As market progresses are becoming more widespread, we put emphasis on our market monitoring task and we pay specific attention to regional market integration both in electricity and natural gas. **More at:** www.mekh.hu

VaasaETT

VaasaETT is a research and advisory consultancy dedicated to customer related issues in the energy industry. VaasaETT advises its clients based on empirical evidence brought about from extensive research in the area of customer behaviour and competitive market behaviour (including smart energy offerings, demand response, energy efficiency, smart home, smart grid). VaasaETT's unique collaborative approach enables it to draw on an extensive network of several thousand energy practitioners around the world who can contribute to its research activities or take part in industry events it organises allowing VaasaETT to integrate global knowledge and global best practice into its areas of expertise. VaasaETT's truly global focus is reflected by research and strategic support having been provided to a diverse array of organisations on 5 continents including for instance 28 of the Fortune Global 500 companies, the European Commission, Government and public research bodies in Europe, Japan, the UAE, the Middle East and Australia. **More at:** www.vaasaett.com