The distributional impact of reversing a long path of energy subsidies*

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Abstract

Reversing energy subsidies is often a complex policy challenge. One of the main concerns is its distributional impact, as these subsidies are typically justified as a means to protect the most vulnerable segments of the population. This paper examines this issue by analyzing the case of the Buenos Aires Metropolitan Area (AMBA) in Argentina, which, after decades of sizable residential energy subsidies, has begun a deliberate reduction in recent years. A key feature of this process is that it was implemented using targeting mechanisms that segment users primarily by self-reported income level. The subsidy reduction took place in a challenging macroeconomic context —characterized by currency devaluation and high inflation— which led to changes in income distribution beyond the effects of energy tariff updating. Using microdata and administrative information, we document that subsidies, which have historically been pro-rich and progressive, are now better targeted and, naturally, even more progressive. Both the user classification and the subsidy amount associated with these groupings contributed to a more progressive pattern. While the targeting mechanism has improved, the macroeconomic context has made the path toward better distributional outcomes non-linear. The lessons from Argentina may provide valuable insights for other countries facing similar policy challenges.

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1 Introduction

Energy subsidies are large and widespread (McCulloch *et al.*, 2021). By 2023, the International Energy Agency recorded nearly 40 countries subsidizing fossil fuels, with amounts ranging from 0.1% of GDP in South Africa to 24.1% in Venezuela (International Energy Agency, 2024a).[1] Although extensive literature highlights the harm caused by energy subsidies (e.g., they typically encourage greater fuel consumption, leading to higher levels of air pollution, which has been linked to premature deaths (Coady *et al.*, 2015)), their widespread use is usually justified on equity grounds. A key motivation for implementing energy subsidies is to protect vulnerable households from high energy prices (Inchauste & Victor, 2017). However, this justification is weak in light of the evidence. For example, Arze del Granado *et al.* (2012) estimated the welfare impact of energy subsidies for 20 countries in Africa, Asia, the Middle East, and Latin America. They found that fuel subsidies are an extremely costly way to help the poor, with the top income quintile typically capturing six times more in subsidies than the bottom.

This tension between the intended equity rationale and the flaws in targeting observed in practice calls for a deeper examination: *What are the distributional effects of removing energy subsidies?* This question is at the core of our paper. This country offers a particularly relevant setting for several reasons. First, since 2002, Argentina has heavily subsidized energy—primarily natural gas and electricity. As a share of gross domestic product (GDP), energy subsidies rose nearly tenfold in less than a decade, increasing from 0.4% in 2005 to 3.5% in 2014 (Giuliano *et al.*, 2020; Ministry of Energy, 2019).[2] Since 2015, Argentina has experienced alternating phases of subsidy reform. Between 2015 and 2019, subsidies were significantly reduced, reaching approximately 1.5% of GDP (Ministry of Energy, 2019). This trend reversed between 2019 and 2022, when subsidies expanded again to around 2% of GDP. Starting in 2023—and with greater intensity toward the end of the year—Argentina undertook a substantial reduction in energy subsidies, which declined to 1.0% of GDP by the end of 2024 (OPC, 2025).

Second, since 2016, Argentina has sought to improve the targeting of energy subsidies. Until 2015, subsidies were universal and uniform in unit terms (i.e., per kWh or m^3) for all users. In 2016, a Social Tariff (from now on ST) was introduced, allowing eligible households to

[1]Fossil fuels are heavily subsidized in Eurasia, notably Russia, Kazakhstan, Uzbekistan, Turkmenistan, and Azerbaijan. These subsidies total over 6% of the region's annual GDP (International Energy Agency, 2024b). Energy subsidies are also particularly prevalent in the Middle East, Africa (even in sub-Saharan Africa, the median country has energy subsidies exceeding 1% of GDP), and Latin America and the Caribbean (e.g., Argentina and Ecuador subsidize around 1.5% of GDP) (International Energy Agency, 2024a).

[2]Energy subsidies are defined as the difference between the price received by the supply, destined to cost coverage of energy production, and the price paid by the demand. This difference is covered by the government through the national budget (Giuliano *et al.*, 2020; Ministry of Energy, 2019).

pay substantially lower energy tariffs. Other users continued to receive a flat, general subsidy, albeit at a reduced level. In 2022, a new targeting scheme was implemented, based primarily on the creation of a national registry where users apply for the subsidy by self-reporting household information, including income. Under this system, users were grouped into three categories each paying different tariffs: high-income (Level N1), middle-income (Level N3), and low-income (Level N2). ST beneficiaries are included in N2. Although all groups continued to receive subsidies, the benefit declined with income level. The distributional impact of the ST has been analyzed in the literature, which finds that while it improves targeting, it is insufficient to fully correct the middle- and high-income bias of energy subsidies (Giuliano *et al.*, 2020; Hancevic *et al.*, 2016). To the best of our knowledge, the segmentation mechanism introduced in 2022 has not yet been evaluated. Finally, Argentina has faced a turbulent economic context in recent years, marked by high inflation, fiscal deficits, and currency devaluations.[3] These macroeconomic fluctuations have had distributive consequences beyond those directly linked to subsidy reforms, which are relevant for accurately answering our research question.

To answer our research question, this paper focuses specifically on subsidies allocated to residential electricity consumption. These subsidies increased from 0.6% of GDP in 2007 to a peak of 1.6% in 2014. By 2019, they had declined to 0.7%, rose again to 1.4% in 2022, and dropped back to 0.6% of GDP by 2024 (OPC, 2025).[4] Our analysis focuses on the Buenos Aires Metropolitan Area (AMBA[5]), which accounts for nearly half of total electricity subsidies (Bertín *et al.*, 2024a, 2025). In terms of temporal scope, we examine the period between August 2022 and December 2024, allowing us to capture key moments along the path of subsidy reduction. Our starting point —August 2022— is characterized by the coexistence of two subsidy schemes: a general flat-rate subsidy and the ST. As shown in Figure 1, a representative electricity bill for a household consuming 300 kWh per month and not eligible for the ST was nearly double that of an eligible household (i.e., ARS 1,473 vs. ARS 802). See also Figure A1 in the Appendix. The distributional implications of this baseline have been analyzed in recent studies (Giuliano *et al.*, 2020; Bertín *et al.*, 2024a, 2025).

We then examine a series of key moments along the path of subsidy reduction to assess

[3]Since 2014, the average annual inflation rate has been approximately 68.9%, reaching 211.4% in 2023. Fiscal deterioration began in 2009 and reached -4.7% of GDP in 2016. The COVID-19 crisis deepened the fiscal imbalance, with the deficit reaching -6.2% of GDP in 2020. During the post-COVID recovery, it remained around -2.0% of GDP and was 2.9% in 2023. In December 2023, the nominal exchange rate between the Argentine peso (ARS) and the US dollar (USD) went from 365 to 800.

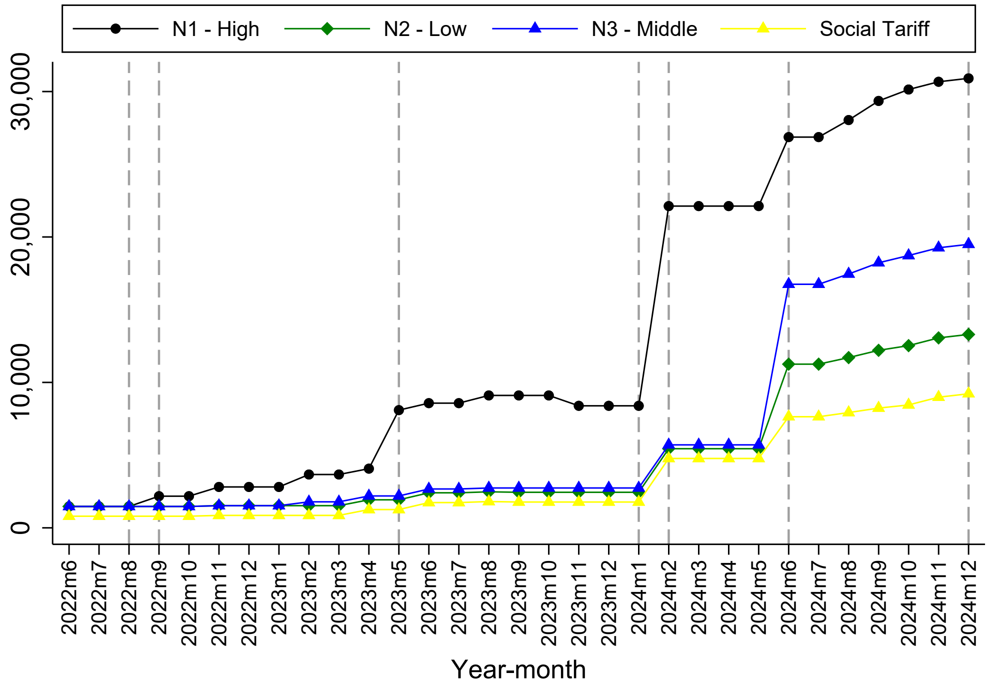
[4]Government transfers to the Wholesale Electricity Market (WEM), which cover the gap between generation costs and distributor prices, fell by 68.2% year-on-year in December 2024. Adjusted for inflation, this reduction amounted to 85.4% (ASAP, 2023).

[5]AMBA is a geographical region that includes the Autonomous City of Buenos Aires and surrounding areas, encompassing 40 municipalities in the Province of Buenos Aires. It covers 13,285 km² and, according to the 2022 census, has approximately 14 million inhabitants —representing 37% of Argentina's total population.

the distributional effects of subsidy removal: *(i) September 2022:* the implementation of the targeting scheme known as segmentation. Users classified as high income according to their self-reported information started paying more than those classified as middle or low income. Representative monthly electricity bills were ARS 2,180 for those classified as high-income users and ARS 1,473 for middle- and low-income users. Notably, these latter two groups paid the same tariff. However, middle-income users paid that price only for a subsidized consumption block (400 kWh/month) —beyond which they paid the full price, like high-income households. Meanwhile, the ST continued to coexist with the segmentation scheme. ST beneficiaries were included in the low-income group but paid an even lower tariff (ARS 802), compared to other non-eligible users (see Figure 1); *(ii) May 2023:* a substantial tariff increase —around 100% in nominal terms— was applied to those classified as high-income users. As a result, the gap between income groups widened: representative bills reached ARS 8,095 for high-income users versus ARS 1,930 for low-income users (see Figure A1 in the Appendix); *(iii) January 2024:* although the pricing structure remained unchanged, the Argentine economy experienced a sharp currency devaluation and a surge in inflation. The exchange rate jumped from 365 ARS/USD to 800 ARS/USD in a single day in December 2023, and monthly inflation rose to 25.5%. These macroeconomic shocks generated significant distributive effects beyond those directly linked to energy tariff policy; *(iv) February 2024:* another sizable tariff increase was introduced, with higher-income users experiencing relatively larger adjustments. Representative nominal tariffs increased by 164%, 108%, and 122% for high-, middle-, and low-income users, respectively; *(v) June 2024:* a further round of tariff adjustments took place, this time affecting middle- and low-income users more intensively. Nominal increases for representative bills were 21%, 193%, and 107% for high-, middle-, and low-income users, respectively. Additionally, consumption block subsidized (350 kWh per month) were extended to low-income users and for middle-incomes it reduced to 250 kWh/month ; *(vi) December 2024:* the most recent point in our analysis, bringing us closer to the current policy configuration and the cumulative distributional effects of these successive reforms.

For the empirical analysis, we rely on multiple data sources. First, we estimate the total cost of electricity using sectoral administrative data. This cost includes the generation and transmission stages in the Wholesale Electricity Market (WEM), as well as the distribution component managed by electricity distributors —i.e., companies responsible for delivering electricity to final users. Second, we determine the price paid by residential users based on the tariff charts published by electricity distributors. Using this information, we define the subsidy as the difference between the price paid by users and the total cost of electricity provision. Third, we carry out a distributional analysis using the standard benefit-incidence approach (van de Walle, 1998; Demery, 2000; Bourguignon & Pereira da Silva, 2003; Giuliano *et al.*, 2020; Bertín *et al.*, 2024a, 2025), drawing on microdata from Argentine household surveys. These datasets provide information on income distribution, household electricity consumption, and allow us

Figure 1: Electricity bill. By user segment. Representative household with a monthly consumption of 300 kWh. Evolution 2022-2024. In nominal ARS pesos. AMBA



Source: Author's elaboration based on Edenor and Edesur. *Note*: The vertical dotted lines denote tariff adjustments along the subsidy reversal path.

to identify user groups eligible for different targeting mechanisms (i.e., the ST and the segmentation scheme). For each key moment identified in the reform timeline, the distributional analysis assesses both the absolute incidence (i.e., targeting) and the relative incidence (i.e., progressivity) of electricity subsidies. In addition, we compute concentration curves and standard distributional indicators such as the concentration index and the Kakwani coefficient. As a novelty, we also include a measure of the absolute income gap —capturing the differences in household income before and after accounting for subsidies— to assess how subsidies affect income disparities in absolute terms. This approach enables a comprehensive evaluation of the distributional effects of energy subsidies and the efficiency of targeting mechanisms over time.

Our analysis reveals that electricity subsidies in Argentina —historically progressive in relative terms but pro-rich in absolute terms— became more proportional following the introduction of income-based user classification in 2022. While the early stages of the reform brought limited changes to the distributional pattern, the first major tariff adjustment in May 2023 marked a turning point: for the first time since the introduction of subsidies, lower-income households received a larger share of total subsidy transfers than higher-income groups. This improvement in targeting was driven primarily by two factors. First, the number of user categories increased: whereas the pre-segmentation system included only two groups —the beneficiaries of the ST and a general group receiving a uniform subsidy— post-segmentation, four distinct groups were defined (high (N1)-, middle (N3)-, and low (N2)-income users, plus ST beneficiaries). Second, the effectiveness of targeting depends not only on the number of segments but also on the differences in the intensity of subsidies received by each group. For instance, during part of the reform period, middle- and low-income users received nearly identical levels of subsidies, limiting the progressivity of the policy. Targeting improved substantially once middle-income users began receiving lower subsidies than low-income users. The same logic applies to the relative differences in subsidy intensity across all other user segments. The trend towards better distributional outcomes deepened throughout 2024, as further tariff adjustments enhanced the progressivity of subsidy allocation. By the end of the period, both focalization and progressivity indicators confirm that subsidies became more effectively concentrated among lower-income households. However, the broader macroeconomic context —particularly high inflation and currency devaluation— introduced short-term reversals in this trend, temporarily offsetting some of the gains achieved through improved targeting.

This paper contributes to a broader understanding of the distributional effects of energy subsidy reforms, with a particular focus on the role of targeting mechanisms in improving users identification. It highlights how both the number of user segments and the intensity with which each group is subsidized are key drivers of distributional outcomes. These insights are relevant beyond the Argentine case, offering evidence to inform the design of equitable and fiscally sustainable energy reforms in other developing country contexts. More specifically, the paper provides the first evaluation of Argentina's 2022–2024 income-based user segmentation mechanism —a major but understudied reform in the country's energy policy. By combining administrative data with micro-level household information, it offers a granular view of subsidy incidence over time, capturing both targeting efficiency and progressivity. In addition, we complement standard benefit-incidence analysis with an absolute income-difference approach to assess the impact of subsidies on absolute income inequality. Finally, by situating our findings within the broader macroeconomic turbulence that characterized this period, the paper sheds light on how subsidy reforms interact with challenging macroeconomic conditions in developing countries.

The remainder of this paper is organized as follows: Section 2 contextualizes the case of Argentina. Section 3 connects this study to relevant strands in the literature and highlights its contribution. Section 4 presents the methodology and data, while Section 5 reports the main results. Concluding remarks are presented in Section 6.

2 Background of electricity subsidies in Argentina

As remarked by Giuliano *et al.* (2020), following the deep economic crisis of 2001/02, the Argentine government began to intervene heavily in the energy sector. In the case of electricity, this intervention took the form of noncompliance with regulatory frameworks that mandated tariff reviews every five years and the passthrough of rising costs.[6] This resulted in a prolonged tariff freeze, which weakened investment incentives in the sector (Barril & Navajas, 2015), leading to declining production and reserves of hydrocarbons and a surge in electricity demand. From 2003 onwards, the wholesale price of electricity increasingly diverged from its economic cost, resulting in a sharp increase in fiscal subsidies managed by CAMMESA.[7] Additionally, transmission and distribution costs were frozen as part of the regulatory suspension.[8] Up to 2015, most subsidies reached both residential and non-residential consumers directly through lower electricity tariffs. The erosion of tariffs was substantial: by 2015, the average household electricity bill covered only about 15% of the generation cost (Ministry of Energy, 2019).

By the end of 2015, electricity subsidies accounted for approximately 1.5% of GDP, placing significant pressure on the national budget, which was already facing a fiscal deficit of around 5% of GDP. In response, the government launched a gradual subsidy reduction

[6]See Law 24.065.

[7]CAMMESA is a non-profit company. Eighty percent of its control lies with private agents of the WEM, while the remaining 20% belongs to the Ministry of Energy. It oversees electricity supply management and sells electricity to industries and distributors at below-cost prices.

[8]This portion of the subsidy is often referred to as a "cross-subsidy," as it represents a transfer from private providers to consumers without direct fiscal impact (Giuliano *et al.*, 2020).

plan aimed at alleviating fiscal stress and restoring market conditions in the electricity sector. As part of this effort, the ST was introduced to shield low-income households from the full impact of tariff adjustments.[9] The ST also played a role in fostering public acceptance of the reform plan.[10] Eligibility was based on the income and socioeconomic condition of the primary account holder.[11] The ST provided a full subsidy for the first 150 kWh and a 50% subsidy for the next 150 kWh consumed monthly, significantly lowering electricity bills for eligible households. However, even households not eligible for the ST continued to receive a general flat-rate subsidy on their electricity consumption.[12] Between 2016 and 2019, the reduction of subsidies led to steep increases in electricity tariffs, which outpaced general inflation. Over this period, electricity tariffs rose by 377%, compared to a 171% increase in the consumer price index (Giuliano *et al.*, 2020). By 2019, household electricity bills covered about 63% of generation costs (Ministry of Energy, 2019).

Towards the end of 2019, Argentina was facing a severe macroeconomic crisis, triggered by a sudden stop in capital inflows in May 2018. With the change in administration, the government enacted the "Law of Social Solidarity and Productive Reactivation," which reintroduced a freeze on electricity tariffs. This marked the beginning of a new phase of tariff erosion and rising subsidies. By 2021, electricity subsidies had once again reached 1.5% of GDP (OPC, 2025), and household electricity bills covered only about 35% of generation costs.

In response to the increasing fiscal burden of subsidies, Argentina introduced a segmentation mechanism in 2022 —primarily based on self-reported household income— to gradually reduce subsidies.[13] This reform path is the focus of our paper. The segmentation system classifies residential users into three tiers based on socioeconomic criteria: high-income (Level N1), middle-income (Level N3), and low-income (Level N2), with ST beneficiaries included in N2. As illustrated in Figure 1, households in Level N1 experienced the steepest reductions in subsidies, while those in Level N2 continued receiving significant support to protect vulnerable groups. The segmentation mechanism relies primarily on self-reported income data. Eligibility criteria also include property ownership, vehicle registration, and other socioeconomic indicators. See Table A1 in the Appendix for additional details. This reform enabled a gradual realignment of electricity tariffs with actual generation costs: household electricity bills covered approximately 39% of generation costs in 2022, 45% in 2023, and 63% in 2024.

[9] The ST was established by Resolution No. 7/2016 and further specified in Resolutions 6/2016, 28/2016, and 122/2018 from the Ministry of Energy. Its structure has remained largely unchanged since implementation.

[10] On the political economy of such compensatory mechanisms, see de Mooij *et al.* (2012); Klenert *et al.* (2018); Hammerle *et al.* (2021); McCulloch *et al.* (2021).

[11] Eligible beneficiaries included those connected to social programs, retirees and wage earners earning less than two minimum wages, individuals with specific health conditions, and others. Exclusion criteria included ownership of vehicles or multiple real estate properties.

[12] See Giuliano *et al.* (2020) for details on this dual subsidy structure—targeted and universal.

[13] See Decree 332/22 and Decree 465/24.

3 Related literature and contribution

Our paper contributes to the literature on the distributional effects of fiscal policy, with a specific focus on how energy subsidies —particularly those on electricity— affect income distribution. It is closely related to a growing body of work analyzing the welfare impacts of energy policy reforms, such as subsidy removals and tariff adjustments.

Rosas-Flores *et al.* (2017) simulate the partial and total removal of energy subsidies in Mexico and, similar to our findings, conclude that electricity subsidies are progressive. Other studies document the regressive impact of energy tariff reforms, particularly in contexts with limited or no compensation mechanisms. For example, Krauss (2016) and Ersado (2012) examine the distributional effects of a major natural gas tariff increase in Armenia, finding that a 40% hike disproportionately affected poorer households. Similar patterns are observed by Zhang (2011), Baclajanschi *et al.* (2006), Mitra & Atoyan (2012), and Siddig *et al.* (2014) for Turkey, Moldova, Ukraine, and Nigeria, respectively, where subsidy removals and energy price hikes led to adverse welfare impacts for low-income households. The case of Iran's 2010 subsidy reform also offers relevant parallels. It involved the elimination of energy subsidies combined with universal cash transfers. Moshiri (2015) finds that the compensation mechanism initially fostered public support, though subsequent macroeconomic instability —characterized by budget deficits, inflation, and currency devaluation— raised concerns about the reform's sustainability (Breton & Mirzapour, 2016). Argentina's own attempt to reduce subsidies, initiated in 2016, shares several of these features. Likewise, Dartanto (2013) shows that subsidy removal in Indonesia could increase poverty unless offset by higher social spending, while Gelan (2018) demonstrates that in Kuwait, compensatory cash transfers can help mitigate the negative effects of subsidy cuts. For the Latin American context more broadly, Schaffitzel *et al.* (2020) provide a multidimensional assessment of Ecuador's subsidy reform and emphasize that such reforms can be progressive when paired with well-designed compensation schemes.

The paper is also closely related to the extensive literature on energy subsidies in Argentina. In particular, existing studies analyze data only up to mid-2022 —prior to the implementation of the income-based user segmentation policy. As such, the substantial process of subsidy reduction that began in 2023 remains unexplored. Early contributions by Lustig & Pessino (2013), Puig & Salinardi (2015), and Lakner *et al.* (2016) documented that Argentina's energy subsidies were poorly targeted: they disproportionately benefited higher-income households in absolute terms, while remaining progressive in relative terms—favoring lower-income groups when evaluated as a share of income. This middle-to-high-income bias was later interpreted as a manifestation of Argentina's "energy populism" by Hancevic *et al.* (2016). Subsequently, Giuliano *et al.* (2020) analyzed the 2016 subsidy reform and the introduction of the ST, aimed at protecting vulnerable users. Using benefit-incidence analysis, the study found that, although aggregate subsidies declined, they remained pro-rich.

More recently, Bertín *et al.* (2024a) and Bertín *et al.* (2025) extended this line of research by incorporating regional disparities[14] and the role of public financing mechanisms.[15] These studies, covering data up to 2022, show that while subsidies remained both progressive and pro-rich, the extent of this pattern varied across regions due to differences in electricity costs and pricing structures set by distributors. Moreover, they highlight the importance of financing: Bertín *et al.* (2025), building on Musgrave (1964), shows that (i) if subsidies are financed via general consumption taxes, their progressivity is significantly reduced, and (ii) if financed through cuts in public education spending, the overall policy becomes regressive.

While our paper focuses on the AMBA region and does not examine the fiscal incidence of subsidy financing, it contributes to this literature by incorporating the role of the 2022 income-based user segmentation policy and analyzing a new phase of substantial subsidy reduction. To the best of our knowledge, this is the first study to show that electricity subsidies in Argentina —though still progressive and lower in aggregate terms— have substantially improved in their targeting. In this sense, the paper also contributes to understanding how both the number of user segments and the differential intensity of subsidies across them play a crucial role in shaping distributional outcomes.

4 Methodology and data

The methodology for estimating electricity subsidies and their distributional incidence involves two main steps. First, we estimate electricity costs and tariffs using administrative data from the electricity sector. Second, we assess the distributional incidence of subsidies by estimating household-level electricity consumption. This step relies on microdata from household surveys, which we combine with the previously mentioned tariff and cost data. The following paragraphs describe each of these steps in more detail.

Electricity Costs and Tariffs. Residential electricity tariffs are composed of three main components, each financed by different actors: (i) the cost of acquiring energy and power in the WEM, including associated transmission costs; (ii) the Value Added of Distribution (VAD), which reflects the marginal cost of delivering electricity to final users; and (iii) national and municipal taxes, such as the value-added tax (VAT) and other local levies.[16] To mea-

[14] Hancevic *et al.* (2016) and Giuliano *et al.* (2020) focus only on the AMBA region. Other studies, such as Lustig & Pessino (2013); Puig & Salinardi (2015); Lakner *et al.* (2016); Navajas (2016), analyze subsidies at the national level without addressing regional heterogeneity.

[15] Bertín *et al.* (2024b) is a condensed, letter-format version of Bertín *et al.* (2024a).

[16] The VAD also covers costs related to network development and investment, operation and maintenance,

sure generation and transmission costs, we rely on the "Total Monomic Cost" published by CAMMESA.[17] We estimate the VAD as the difference between the total tariff charged to final users and the Total Monomic Cost. Tariff information is obtained from the pricing charts published by the two main distribution companies operating in AMBA: EDENOR and EDESUR (see Appendix A2 for further details). Notably, these charts report prices before taxes. Electricity costs —expressed in ARS/kWh— for each key period analyzed in this paper are presented in Table 1.

The electricity price actually paid by final users (i.e., the households in our sample) is determined by these tariff charts. They include both fixed and variable components for cost recovery and apply increasing rates based on consumption tiers, with higher charges for users with higher levels of electricity use (see Appendix A2). The charts also differentiate prices by user segmentation level. The average electricity price —in ARS/kWh— by user group and key period is also presented in Table 1.

The subsidy per kilowatt-hour (kWh) is calculated as the difference between the total cost of electricity and the tariff paid by users. Naturally, this amount varies across user segments. Table 1 presents these values alongside tariff coverage rates. Several stylized facts emerge from this comparison. In 2022, users receiving the ST covered approximately 16% of electricity costs—a share that increased to 24% over time. In August 2022, users without ST coverage paid for roughly 29% of electricity costs.

The introduction of the segmentation mechanism brought about a significant degree of differentiation, which—as this paper demonstrates—plays a key role in enhancing the effectiveness of subsidy targeting. Initially, high-income users covered about 45% of costs, while middle- and low-income users covered approximately 30%. By May 2023, high-income users were covering nearly 85% of electricity costs. A sharp decline in this coverage occurred in January 2024, driven by the substantial currency devaluation in December 2023 and its impact on electricity generation costs. However, this deviation was subsequently corrected through successive tariff increases and the introduction of consumption quotas for subsidized users. As of the end of 2024, high-income users again cover close to 85% of costs. Importantly, a clearer differentiation has also emerged between middle- and low-income segments. As of December 2024, they cover 52% and 36% of electricity costs, respectively—compared to nearly identical coverage rates of 19% and 20% prior to June 2024. This growing gap reflects a key shift in policy design, contributing to the improved targeting outcomes documented in this paper.

Household Electricity Consumption. Once the parameters for tariffs and costs have been established, we proceed to estimate household-level electricity consumption. Follow-

customer service, depreciation, and a "fair and reasonable" return on invested capital. In the AMBA region, the VAD is regulated by the National Electricity Regulatory Office (ENRE).

[17] See annual reports available at this link.

ing Bertín *et al.* (2024a, 2025), we rely on the most recent Household Income and Expenditure Survey (ENGHo) for the years 2017–2018 (hereinafter ENGHo 2017/18). As is standard practice in the literature (Navajas, 2008; Giuliano *et al.*, 2020; Bertín *et al.*, 2024a, 2025), we do not directly use the quantity values reported in the survey, as these tend to be under-reported relative to administrative data.[18] Instead, we derive quantities based on reported household expenditures after deducting applicable taxes.[19] To complete the calculation, we use the relevant tariff charts published by the distribution companies.

The presence of the ST introduces an additional methodological challenge, as the ENGHo 2017/18 does not include a variable explicitly identifying ST beneficiaries. Moreover, for a given reported expenditure, two different consumption levels may apply—depending on whether a household receives the ST or not.[20] To address these limitations, we construct a binary variable that identifies potential ST beneficiaries based on the official eligibility criteria.[21] We then estimate electricity consumption for each household by combining reported spending, the applicable tariff chart, and each household's classification as either a potential ST beneficiary or not.

Once the ENGHo 2017/18 data are processed, two important considerations arise. First, the survey provides the most recent and detailed data available on household electricity consumption patterns. Second, however, the income distribution captured by ENGHo 2017/18 does not reflect current socioeconomic conditions in Argentina—an important limitation given the implementation of income-based tariff segmentation in recent years. To address this, we turn to the Permanent Household Survey (EPH), a nationally representative survey published quarterly and primarily designed to monitor household income and employment conditions. However, the EPH lacks information on household-level consumption. To overcome this, we impute electricity consumption from ENGHo 2017/18 to the most recent waves of the EPH, specifically those spanning from the third quarter of 2022 to the fourth quarter of 2024. Imputation is based on variables common to both surveys. We use the DMATCH module in Stata to perform the matching.[22] Once electricity consumption is imputed, we scale the estimates

[18]This under-reporting is often attributed to measurement error: individuals are generally more aware of how much they paid than of how many units they consumed. In ENGHo 2017/18, 67% of quantity observations are equal to or less than one unit.

[19]Overall taxation on electricity—including national (VAT) and subnational taxes (turnover and municipal taxes)—amounts to approximately 29%. In ENGHo 2017/18, electricity spending is recorded under the variable "amount" when the "item" variable equals "A0451101." Spending is generally reported on a monthly basis, except in AMBA, where it is bimonthly, provided that the amount reported is strictly equal to 1.

[20]This issue does not arise in Giuliano *et al.* (2020), as they use the 2012–2013 ENGHo, which predates the introduction of the ST.

[21]For current criteria, see for example: Edenor and Edesur.

[22]The DMATCH module in Stata allows matching of similar households across surveys based on variables contained in both datasets. In this study, households are matched based on per capita family income.

using administrative data on total residential electricity consumption.[23]

Naturally, the usual concerns associated with imputations based on observable characteristics apply to this methodological choice. Nonetheless, obtaining a recent and accurate measure of household income—aligned with the income distribution prevailing during the subsidy rollback period analyzed in this paper —is essential for approximating user segmentation. Once electricity consumption is imputed, we identify each user type within the EPH: those eligible for the ST and those falling into one of the three income-based segments (Levels N1, N2, and N3).[24]

Distributional analysis. We rely on the standard benefit-incidence analysis framework (van de Walle, 1998; Demery, 2000; Bourguignon & Pereira da Silva, 2003; Giuliano *et al.*, 2020; Bertín *et al.*, 2024a, 2025). This methodology involves three core steps: (i) ranking individuals or households according to a welfare indicator—in our case, per capita household income;[25] (ii) adopting identification assumptions to estimate the population segments benefiting from subsidies (i.e., electricity consumers segmented by income level and ST beneficiaries); and (iii) measuring the distribution of subsidies based on the beneficiary classifications obtained in step (ii). Using this framework, we compute conventional indicators of distributional incidence, including the concentration index, the Kakwani index, and the Reynolds-Smolensky index, along with subsidy concentration curves. In addition, to provide a novel measurement, we estimate absolute income differences before and after accounting for subsidies, in order to assess their impact on the overall distribution of household income.

Given the methodology employed in this paper, it is important to highlight several stylized facts. First, Figure A2 in the Appendix presents the estimated number and distribution of ST beneficiaries by income decile. Notably, the distributions derived from the ENGHo 2017/18 and the imputed data from the EPH are highly similar, lending support to the robustness of the imputation procedure. Consistent with Giuliano *et al.* (2020), our estimates confirm that the ST is relatively pro-poor, with significantly higher coverage among the lowest-income households. However, some exclusion errors are observed in the lower deciles, alongside notable inclusion errors in the middle- and upper-income deciles. Second, Figure A3 in the Appendix

[23]These data are obtained from the Association of Electric Power Distributors of the Argentine Republic (ADEERA). The average monthly consumption per household (in kWh) is calculated as total residential consumption divided by the number of residential users.

[24]Before performing the imputation, we replicate in the EPH the binary variable used in ENGHo 2017/18 to identify potential ST beneficiaries, ensuring that eligibility is considered in the matching process. By contrast, segmentation status is assigned after consumption is imputed. It is worth noting that while the ST was in effect at the time of the ENGHo 2017/18, the segmentation scheme was not yet implemented.

[25]We construct deciles based on individuals ranked by per capita family income (pcfi). We use the income values directly reported in the surveys, without applying corrections for underreporting, due to the limitations and potential distortions introduced by correction methods in Argentina. For a discussion, see Gasparini *et al.* (2012).

displays the distribution of electricity consumption by income decile, based on both ENGHo 2017/18 data and EPH-imputed values. Figures A4 to A8 presents further comparation of the distribution of kWh among socioeconomic variables (head of household education level, type of dwelling, type of housing tenure and type of gas and water supplying). A high degree of similarity is evident between the two, further validating the imputation method. As expected, electricity consumption is more concentrated among higher-income households—an outcome consistent with income-based ordering and aligned with findings in Bertín *et al.* (2024a, 2025). Finally, Figure A9 in the Appendix illustrates the segmentation of users. Panel (a) shows that the distribution of users by segment, as identified from the microdata, closely matches that reported in administrative records. Panel (b) presents the distribution of segments across income deciles. As expected, the proportion of households in the high-income (low-income) segment increases (decreases) with income. The middle-income segment, by contrast, appears relatively evenly distributed across the income distribution.

Table 1: Key variables for the distributional analysis of electricity subsidies in residential consumption. Evolution 2022-2024. AMBA.

	Aug-22	Sep-22	May-23	Jan-24	Feb-24	Jun-24	Dec-24
Electricity Cost (ARS/kWh)							
Generation and transmission cost	14.08	12.46	21.40	50.33	51.88	84.91	65.76
Distribution Cost	2.71	3.81	10.23	13.77	44.98	49.06	58.50
Total Cost	16.79	16.27	31.63	64.10	96.86	133.97	124.26
Electricity Tariff (ARS/kWh)							
ST	2.67	2.67	4.20	5.92	15.91	25.47	30.74
No ST	4.91						
N1 - High Income		7.27	26.99	27.97	73.75	89.57	103.04
N2 - Low Income		4.91	6.44	8.16	18.15	37.52	44.33
N3 - Medium Income		4.91	7.31	9.15	19.02	55.83	64.99
Electricity Subsidy (ARS/kWh)							
ST	14.11	13.60	27.43	58.18	80.95	108.49	93.51
No ST	11.88						
N1 - High Income		9.01	4.65	36.13	23.11	44.40	21.22
N2 - Low Income		11.36	25.20	55.95	78.71	96.44	79.92
N3 - Medium Income		11.36	24.32	54.96	77.84	78.13	59.27
Tariff Coverage (%)							
ST	0.16	0.16	0.13	0.09	0.16	0.19	0.25
No ST	0.29						
N1 - High Income		0.45	0.85	0.44	0.76	0.67	0.83
N2 - Low Income		0.30	0.20	0.13	0.19	0.28	0.36
N3 - Medium Income		0.30	0.23	0.14	0.20	0.42	0.52
Exchange Rate (ARS/USD)	135.30	143.63	231.21	818.31	834.88	903.82	1,022.50
Inflation (Index July 24 = 100)	13.79	14.64	24.42	64.48	73.02	96.15	116.48

Source: Own elaboration based on specific information of the energy sector. *Notes*: Generation and transmission costs are sourced from CAMMESA, while distribution costs and tariffs come from EDENOR and EDESUR. The figures presented represent the average of both companies. The exchange rate and inflation index are obtained from INDEC.

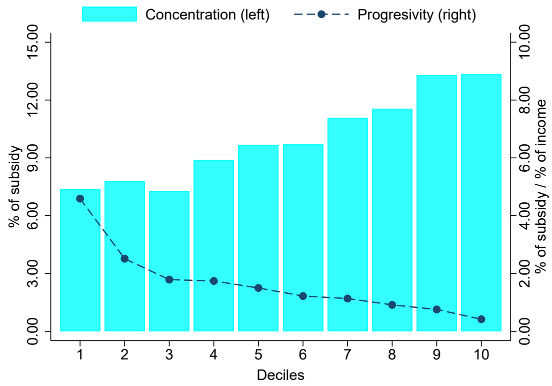
5 Results

Figure 2 presents the distributional incidence of electricity subsidies across income deciles. Panels (a) through (g) correspond to each key moment in the subsidy reform timeline. In each panel, the bars represent the absolute incidence—that is, the share of the total subsidy received by each decile. The dashed line shows the relative incidence, defined as the share of the subsidy received by each decile relative to its share of total income. Panel (a) illustrates a well-known baseline: the lowest-income decile receives approximately 7.3% of the total subsidy, while the highest-income decile captures around 13.3%. This distribution indicates that subsidies are pro-rich in absolute terms. However, because lower-income deciles receive a larger share of the subsidy relative to their share of income, the subsidy is also progressive in relative terms. This finding is consistent with the broad empirical literature showing that energy subsidies in Argentina, while disproportionately benefiting higher-income groups in absolute terms, have generally been progressive—delivering larger transfers relative to income for poorer households (Hancevic *et al.*, 2016; Giuliano *et al.*, 2020; Bertín *et al.*, 2024a, 2025).

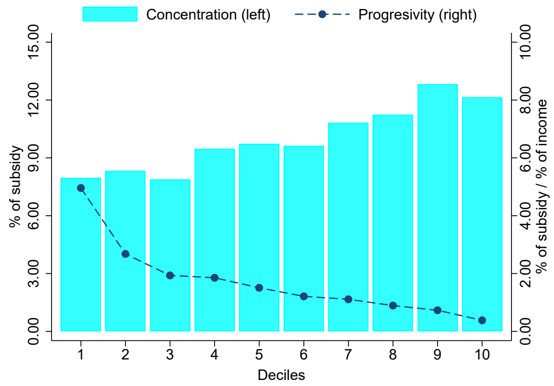
The key findings of this study emerge from Panel (b) onward. At the onset of the segmentation policy, the distributional impact and targeting remained largely unchanged: the lowest-income decile received approximately 8.0% of total subsidies, while the highest-income decile received 12.2%. However, the first major tariff increase in May 2023 marked a turning point in the distributional dynamics. For the first time since the introduction of subsidies in 2002, the pattern ceased to be pro-rich: the lowest-income decile received approximately 10.3% of total subsidies, compared to 7.6% for the highest-income decile (Panel (c)). By January 2024, however, a reversal in targeting can be observed: the share received by the lowest-income decile declined to 9.4%, while the highest-income decile's share rose to 10.3% (Panel (d)). As we will discuss below, this shift represents a key moment in the distributive trajectory, closely tied to macroeconomic developments during that period. In February 2024, a new round of significant tariff increases —more sharply applied to high-income users— once again redirected the distribution of subsidies toward lower-income households. The lowest-income decile received approximately 11.9% of total subsidies, while the highest-income decile's share dropped to 4.9% (Panel (e)). In June 2024, however, a relatively larger adjustment in tariffs for middle- and low-income users slightly altered the pattern: the lowest-income decile received 10.9% of subsidies, while the highest-income decile received 9.2% (Panel (f)). Finally, by December 2024, subsidy distribution appeared clearly pro-poor, with the lowest-income decile capturing 12.2% of total subsidies and the highest-income decile only 5.8% (Panel (g)).

Figure 2: Distributional incidence of electricity subsidies in Argentina. By deciles of per capita income. Evolution 2022-2024. AMBA. In absolute and relative terms

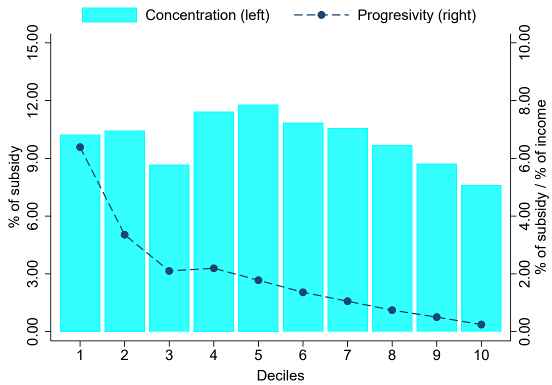
(a) August 2022



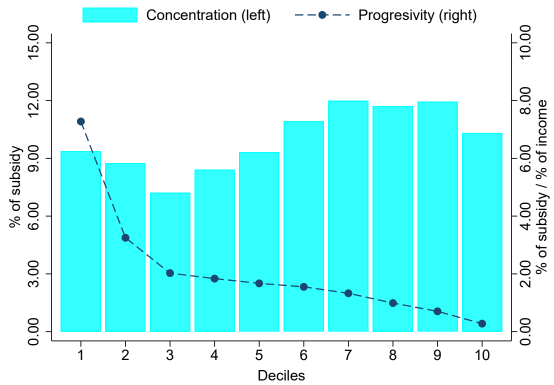
(b) September 2022



(c) May 2023



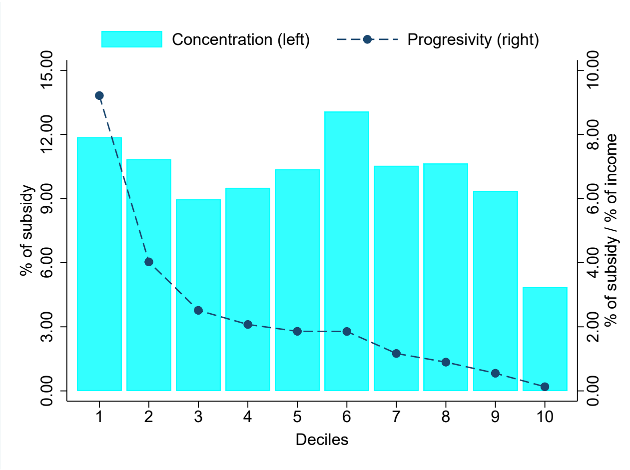
(d) January 2024



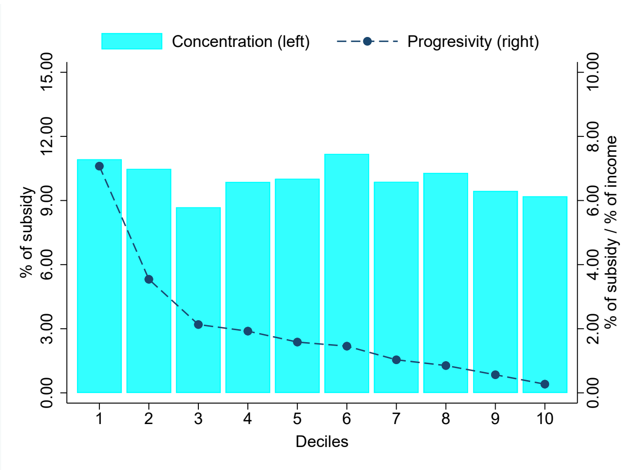
Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor.

Figure 2 (Cont.): Distributional incidence of electricity subsidies in Argentina. By deciles of per capita income. Evolution 2022-2024. AMBA. In absolute and relative terms

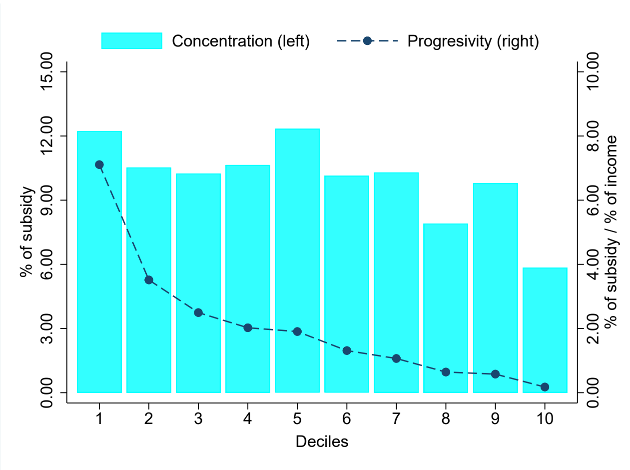
(e) February 2024



(f) June 2024



(g) December 2024



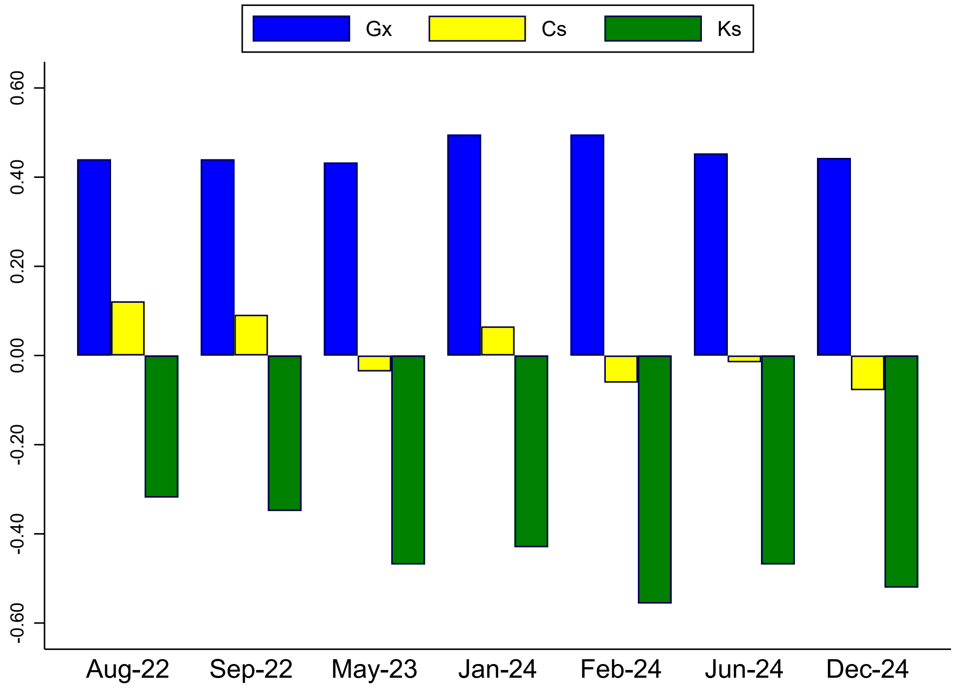
Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor.

Figure 3 reports standard indicators of distributive incidence. For brevity, we focus the discussion on a subset of key metrics, while Table A2 in the Appendix provides complementary indicators for a more comprehensive analysis. Of particular interest is the subsidy concentration index (C_s), which measures the extent to which subsidy benefits are concentrated among lower-income deciles (Gasparini *et al.*, 2012). A negative value indicates a pro-poor distribution of subsidies. Consistent with previous findings, the concentration coefficient for electricity subsidies is positive in August and September 2022, indicating a pro-rich pattern at the onset of the reform. From that point onward —and with the exception of January 2024— the index turns negative, suggesting that the distribution of subsidies became pro-poor, with varying degrees of intensity over time.

January 2024 marks a key turning point in the subsidy reduction process. As noted in the Introduction, Argentina experienced a sharp currency devaluation and a spike in inflation in December 2023. These macroeconomic shocks are reflected in Table 1. Although electricity tariffs remained unchanged during this period, the cost of electricity generation increased significantly due to the devaluation. As a result, tariff coverage fell sharply. Notably, high-income users once again covered a share of electricity costs comparable to levels observed prior to May 2023. This episode highlights how broader macroeconomic conditions can temporarily offset the gains in subsidy targeting, illustrating the complex interaction between pricing reforms and external shocks in shaping the distributional dynamics of energy subsidies

A second key indicator used to assess the distributive impact of subsidies is the Kakwani coefficient (K_s), which measures the progressivity of a transfer. It is defined as the difference between the concentration coefficient of the subsidy (C_s) and the Gini coefficient of pre-subsidy income (G_x) (Gasparini *et al.*, 2012). Negative (positive) values of K_s indicate that the subsidy is progressive (regressive), meaning it contributes to a more equitable income distribution. The more pro-poor the subsidy (i.e., the more negative the concentration coefficient, C_s), the more progressive it will be. Similarly, for a given subsidy structure, progressivity increases with the degree of initial income inequality (G_x). In all periods analyzed, the Kakwani coefficient is negative, reinforcing a well-established finding: electricity subsidies in Argentina are progressive (Giuliano *et al.*, 2020). Once again, the role of macroeconomic context deserves attention. The sharp currency devaluation and inflation at the start of 2024 exacerbated income inequality, as reflected in a spike in the Gini coefficient. This increase in pre-subsidy inequality, combined with a more targeted subsidy structure, resulted in February 2024 being the moment of peak progressivity in the entire reform period.

Figure 3: Indicators on the distributional incidence of electricity subsidies in Argentina. Evolution 2022-2024. AMBA.



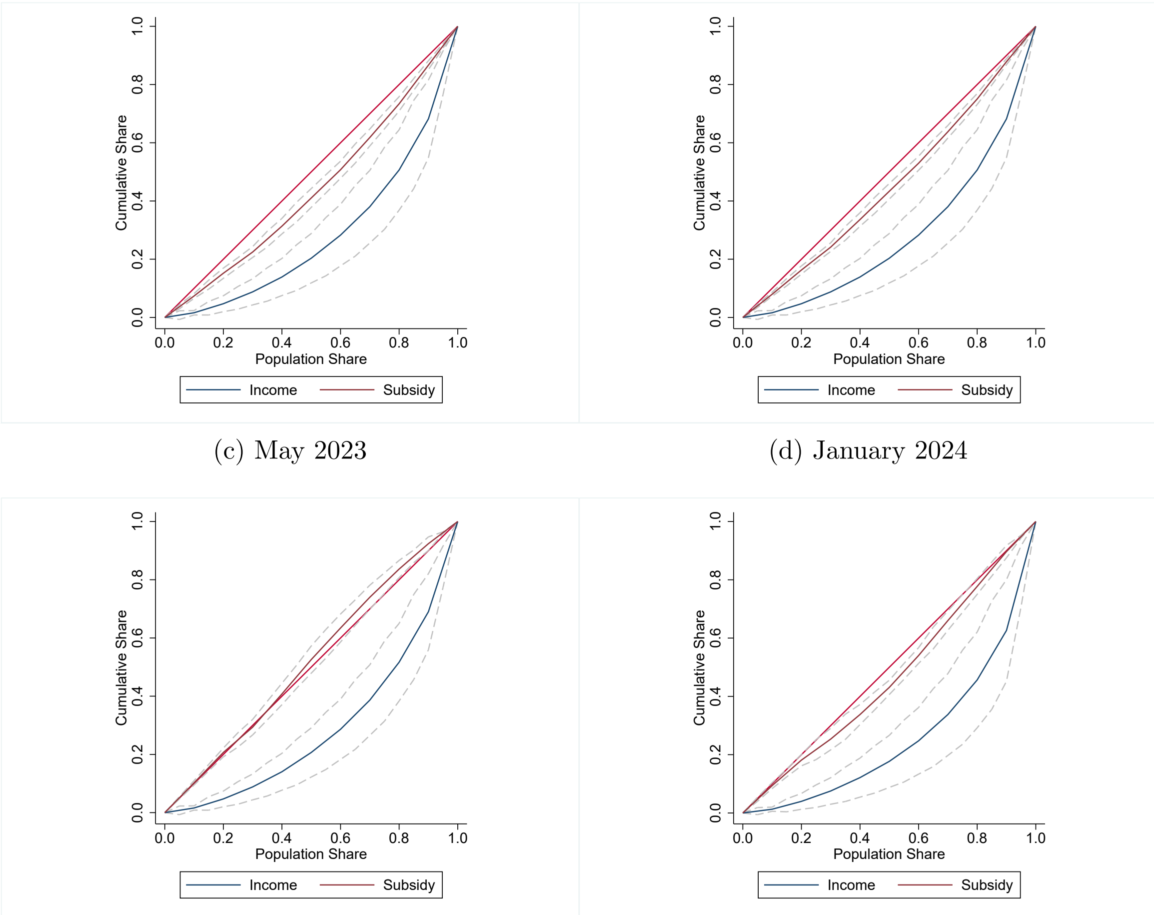
Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor.

To continue the analysis, Figure 4 illustrates the distributional effects of subsidies using their concentration curve, compared against the Lorenz curve of income (i.e., the income distribution). In all periods, the concentration curve lies above the Lorenz curve, confirming the progressivity of the subsidy: lower-income households receive a greater share of subsidies relative to their share of income. However, when compared to the line of perfect equality (the 45° line), the analysis reveals important differences in terms of targeting. Attention should also be given to the confidence intervals (shown as dotted lines). In August and September 2022 (Panels (a) and (b), respectively), the concentration curve lies significantly below the line of equality, indicating that subsidies were pro-rich at that time—a difference that is statistically significant at conventional confidence levels. This pattern shifts beginning in May 2023. From that point onward, in most cases, the concentration curve is no longer statistically distinguishable from the line of equality. This suggests that subsidies moved from being pro-rich to being proportional —that is, distributed in line with the income distribution— at standard levels of statistical confidence.

Figure 4: Distributional incidence of electricity subsidies in Argentina. By deciles of per capita income. Evolution 2022-2024. AMBA. Concentration and Lorenz curves

(a) August 2022 (b) September 2022

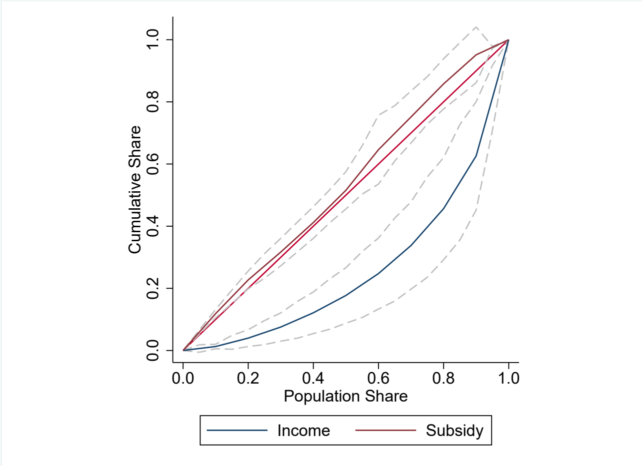
(c) May 2023 (d) January 2024



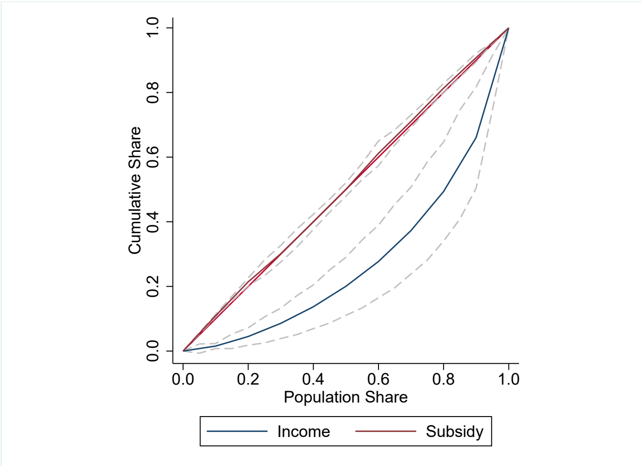
Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Dotted lines denote 90% confidence intervals.

Figure 4 (Cont.): Distributional incidence of electricity subsidies in Argentina. By deciles of per capita income. Evolution 2022-2024. AMBA. Concentration and Lorenz curves

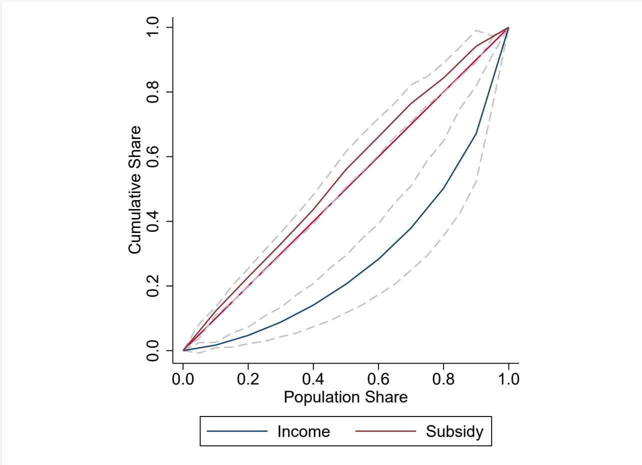
(e) February 2024



(f) June 2024



(g) December 2024



Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Dotted lines denote 90% confidence intervals.

Finally, it is worth highlighting an important characteristic of the previous analysis —such as the indicators shown in Figure 3— namely, that individual incomes are weighted in a way that gives greater importance to lower-income individuals. In this sense, these measures reflect the idea that "a peso is not a peso", since its distributive value depends on who receives it. A complementary and equally relevant question is whether, as a result of the subsidy, the absolute differences in ex post income—i.e., income after the subsidy—decrease or increase, and by how much (Decressin, 2002; Melitz & Zumer, 2002; Cont & Porto, 2014; Feld *et al.*, 2021). In this case, "a peso is a peso" because all individuals are weighted equally, regardless of income level.

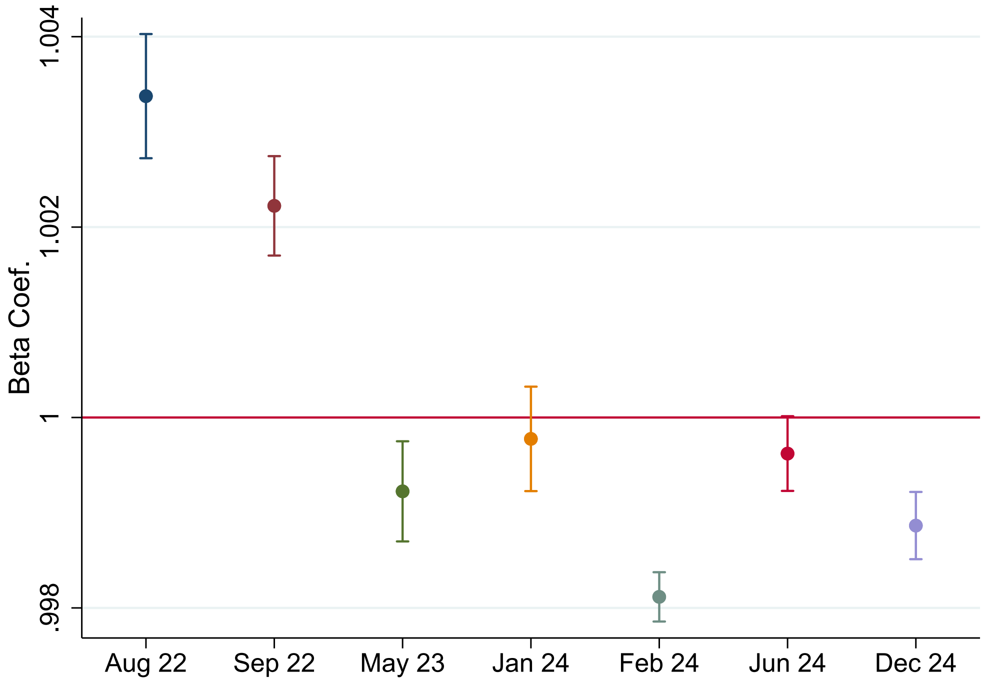
To address this, we define $x_{i,t}$ as the pre-subsidy income of individual i in period t, and $y_{i,t}$ as post-subsidy income. The difference $y_{i,t} - x_{i,t}$ represents the net change in income due to the subsidy. We then estimate the following regression: $y_{i,t} = \alpha + \beta x_{i,t} + \mu_{i,t}$. If $\beta < 1$, the subsidy reduces income disparities (i.e., compresses the income distribution); if $\beta > 1$, it increases them. The coefficient β can be interpreted as the proportion of pre-subsidy income differences that remain after the subsidy. For instance, a value of $\beta = 0.8$ indicates that income inequality has been reduced by 20%.

This approach offers complementary insight because it depends on how the subsidy is structured. For example, a uniform (flat) subsidy —one that gives the same amount to all individuals— would leave both the Gini coefficient and absolute income differences unchanged. This was largely the case in Argentina prior to 2015. If the unitary subsidy declines monotonically with income, both the Gini and absolute differences improve. However, if subsidy allocation also accounts for other characteristics (e.g., housing conditions, employment status, or asset ownership), monotonicity may be broken, as is possible under the ST and the segmentation policy implemented in Argentina.

Figure 5 presents the estimated values of β for each key moment in the analysis, with 90% confidence intervals. At the beginning of the period (August 2022), the coefficient was slightly above one ($\beta = 1.0037$), suggesting that subsidies, due to poor targeting, exacerbated the absolute income gap despite the improvement in the Gini. From that point forward, the gradual refinement of targeting—primarily through the implementation of user segmentation—led to a steady decline in β. By December 2024, the β coefficient had fallen below one and was statistically distinguishable from unity, indicating that subsidies began to reduce the absolute income gap at the same time the Gini improves.

Putting all the pieces together, Figures 2 and 5, and Table A2, relate subsidy progressivity, the Gini coefficient, and the absolute income gap as follows. In all observations, the subsidy is progressive, and the Gini coefficient improves. However, the absolute income gap differs. For example, in August 2022 and September 2022, the unitary subsidy increases with income, widening the gap. The opposite occurs in the remaining observations, which is most clearly seen in May 2023, February 2024, and December 2024.

Figure 5: Beta coefficients for testing differences in income pre and post electricity subsidies. AMBA



Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor.

6 Discussion and concluding remarks

This paper has examined the distributional consequences of reversing a long-standing path of energy subsidies in Argentina, with a particular focus on the 2022–2024 period marked by the introduction of a user segmentation mechanism. We find that this reform, combined with successive tariff increases, has improved the progressivity of subsidies and shifted their incidence toward lower-income groups. For the first time since subsidies were introduced, high-income households no longer receive a disproportionately large share of subsidies.

Our analysis also highlights that these intended improvements in targeting were driven by two key design features: the increased number of user categories —moving from a dual system (ST vs. non-ST) to a more granular segmentation— and the differential intensity of subsidies allocated to each group. The combination of more segments and greater variation in subsidy levels across them played a crucial role in achieving better distributive outcomes.

Nonetheless, the analysis suggests that there remains substantial room to enhance focalization. Inclusion and exclusion errors persist: a non-negligible share of benefits still reaches middle- and high-income households, while some eligible low-income households may be left out. The reliance on self-reported income and the administrative challenges of verifying eligibility contribute to these shortcomings. Moreover, the complexity of the segmentation criteria —which include not only income but also assets, housing conditions, and employment status— makes perfect targeting difficult in practice.

Our results underscore the critical role of policy design —particularly the use of income-based segmentation— in ensuring that subsidy reductions do not disproportionately harm vulnerable households. In contrast to earlier universal schemes that were poorly targeted, the segmentation policy introduced a level of focalization that had previously been lacking. This supports findings from the international literature emphasizing the importance of well-designed targeting and compensation mechanisms in making subsidy reforms politically and socially viable. At the same time, our findings reveal that macroeconomic volatility —especially episodes of high inflation and currency devaluation— can temporarily offset gains in targeting and exacerbate inequality. The reversal observed in January 2024, despite no changes in policy design, illustrates the extent to which macroeconomic shocks can undermine the equity effects of reform. This suggests that the sustainability and effectiveness of targeted subsidies depend not only on administrative capacity but also on broader macroeconomic stability.

These insights carry broader implications. Countries facing similar fiscal constraints and considering subsidy reform may draw on Argentina's recent experience to design reforms that balance fiscal responsibility with equity. Key lessons include the importance of robust data systems to support means-testing, the added value of increasing the number of user groups and adjusting subsidy intensity accordingly, the benefits of phased tariff adjustments to mitigate political resistance, and the need to monitor distributional outcomes continuously over time. Moreover, if Argentina continues along the path of subsidy reduction while preserving support for those who need it most, targeting could improve even further. In that case, the distribution of subsidies may evolve from being merely proportional to being statistically pro-poor.

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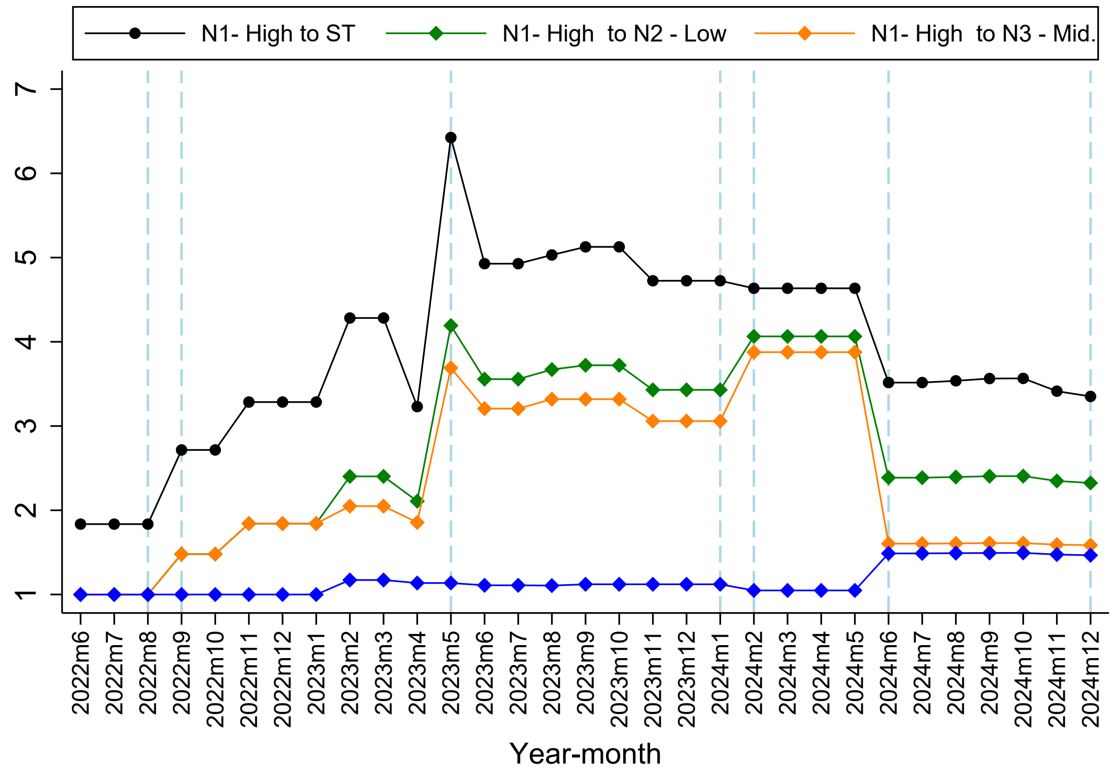
Appendix

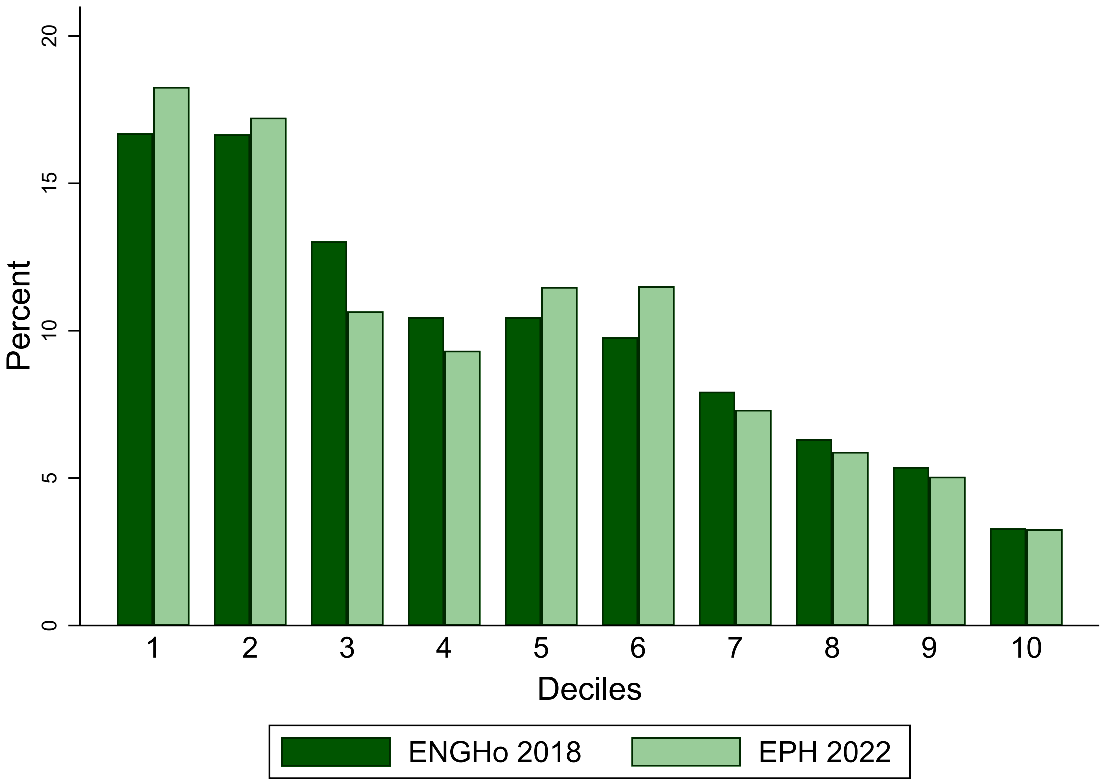
A1 Additional Figures and Tables

Figure A1: Relative electricity bill. By user group. Representative household with a consumption of 300 kWh. Evolution 2022-2024. AMBA



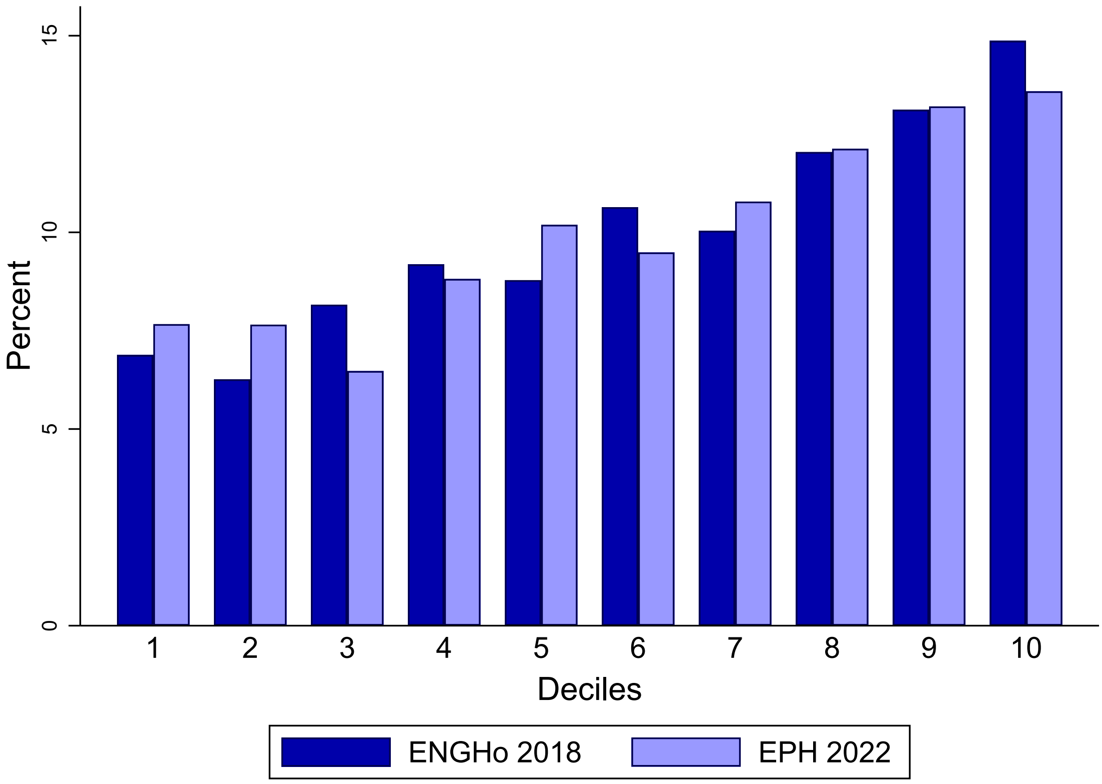
Source: Author's elaboration based on Edenor and Edesur. *Note*: The vertical dotted lines denote tariff adjustments along the subsidy reversal path.

Figure A2: Distribution of ST Beneficiaries. By deciles of per capita income. In ENGHo 2017/18 and EPH 2022. AMBA region



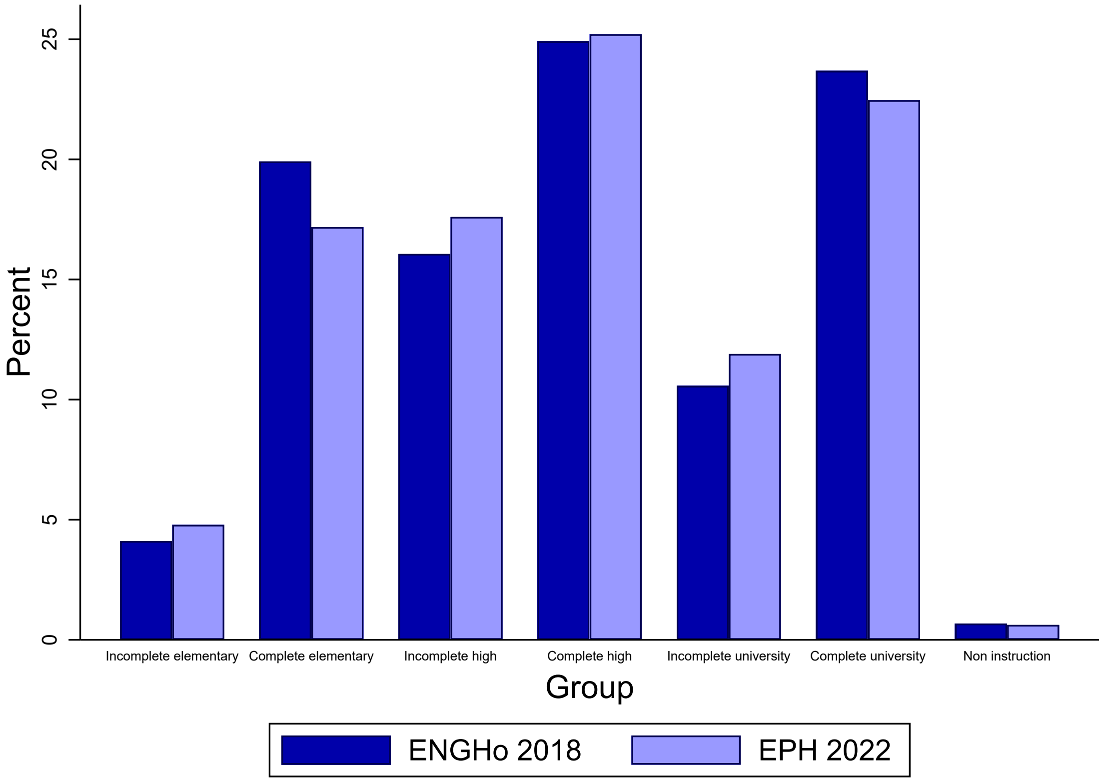
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A3: Distribution of consumption. By deciles of per capita income. In ENGHo 2017/18 and EPH 2022. AMBA region



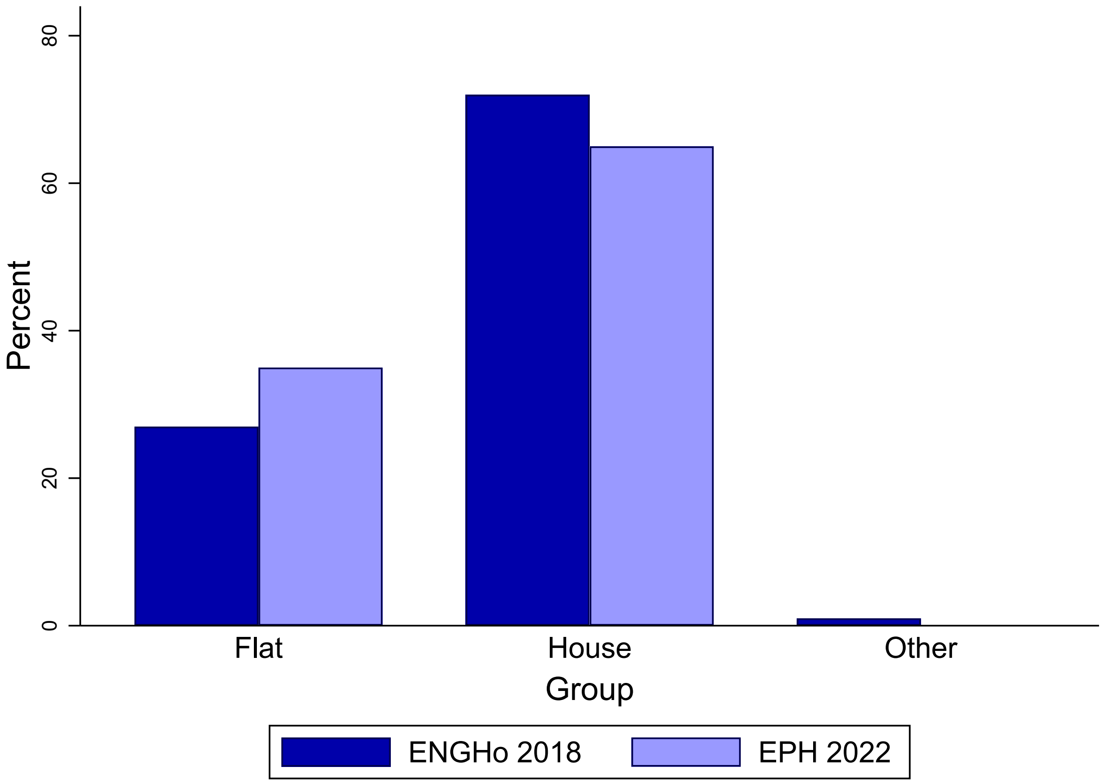
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A4: Distribution of consumption. By head of household's education level. In ENGHo 2017/18 and EPH 2022. AMBA region



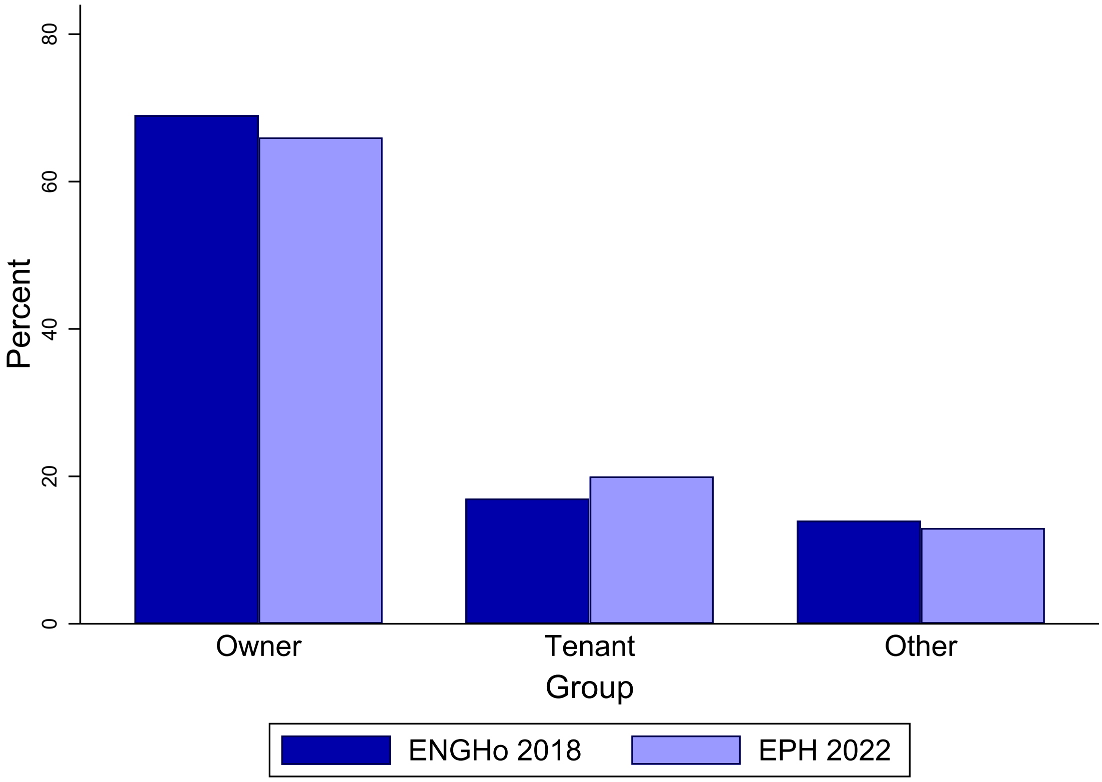
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A5: Distribution of consumption. By type of dwelling. In ENGHo 2017/18 and EPH 2022. AMBA region



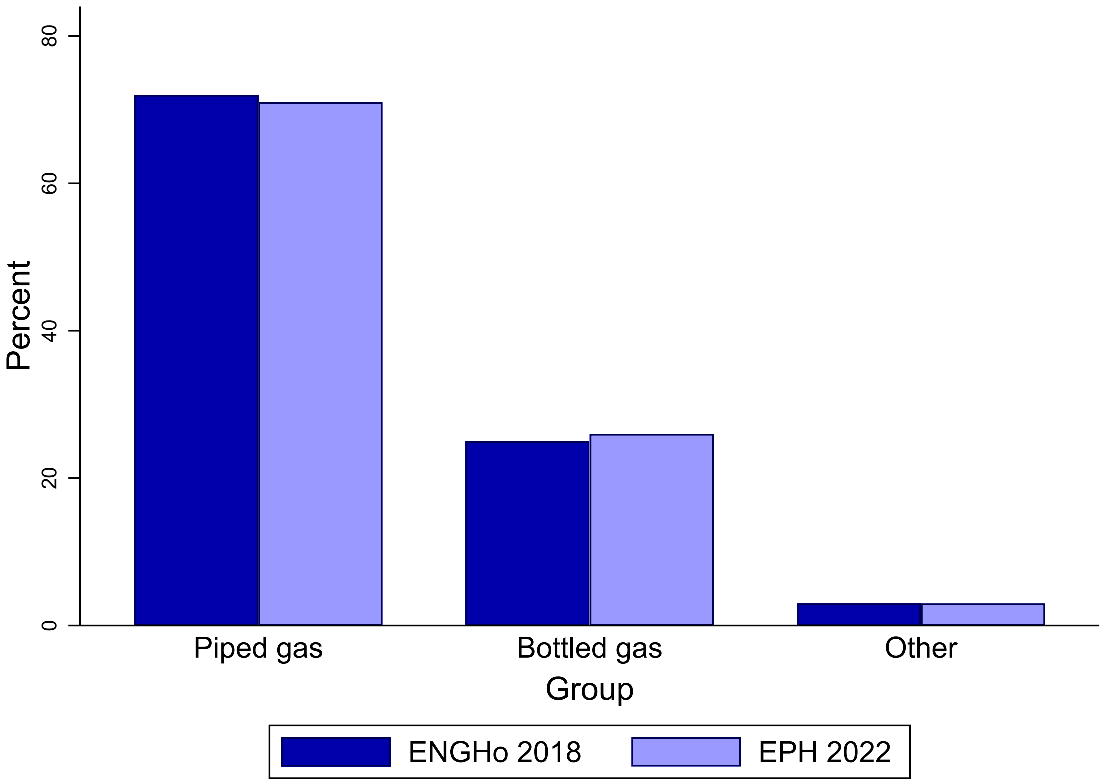
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A6: Distribution of consumption. By type of housing tenure. In ENGHo 2017/18 and EPH 2022. AMBA region



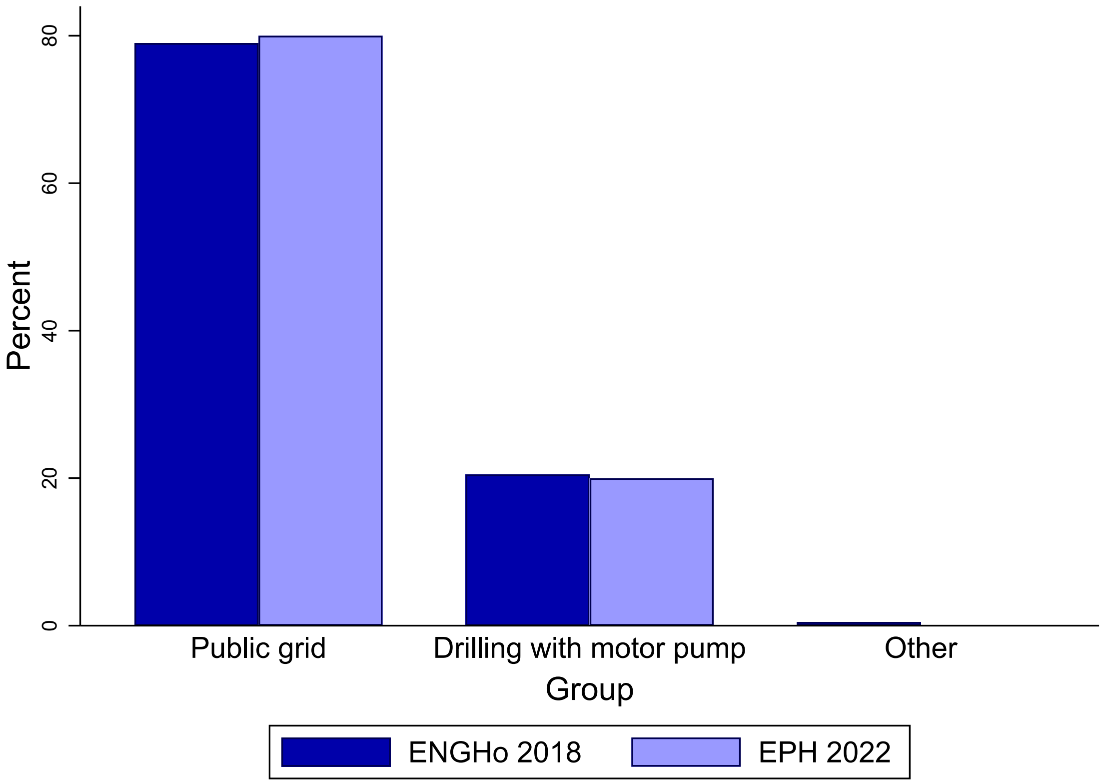
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A7: Distribution of consumption. By type of gas supplying. In ENGHo 2017/18 and EPH 2022. AMBA region



Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

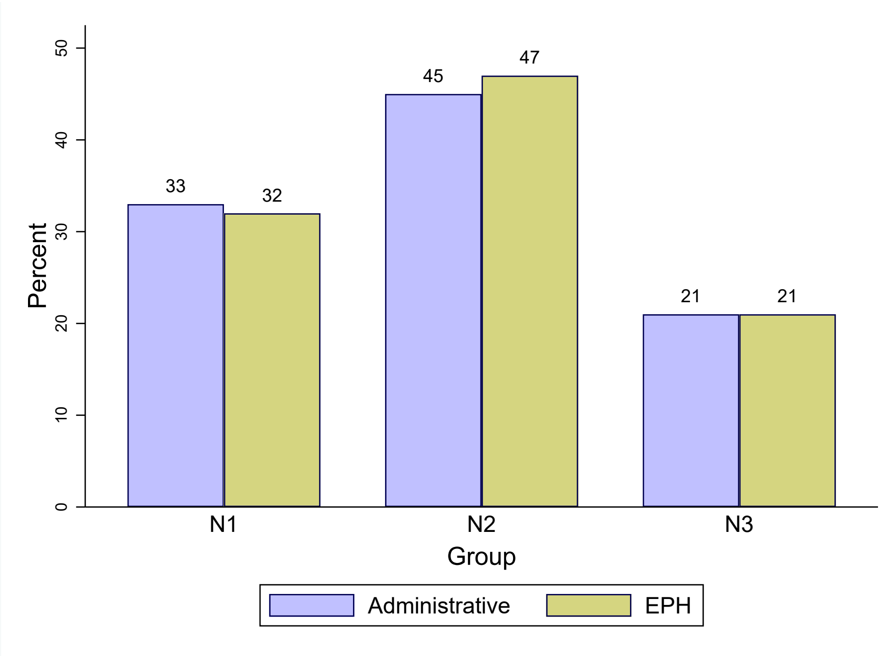
Figure A8: Distribution of consumption. By type of water supplying. In ENGHo 2017/18 and EPH 2022. AMBA region



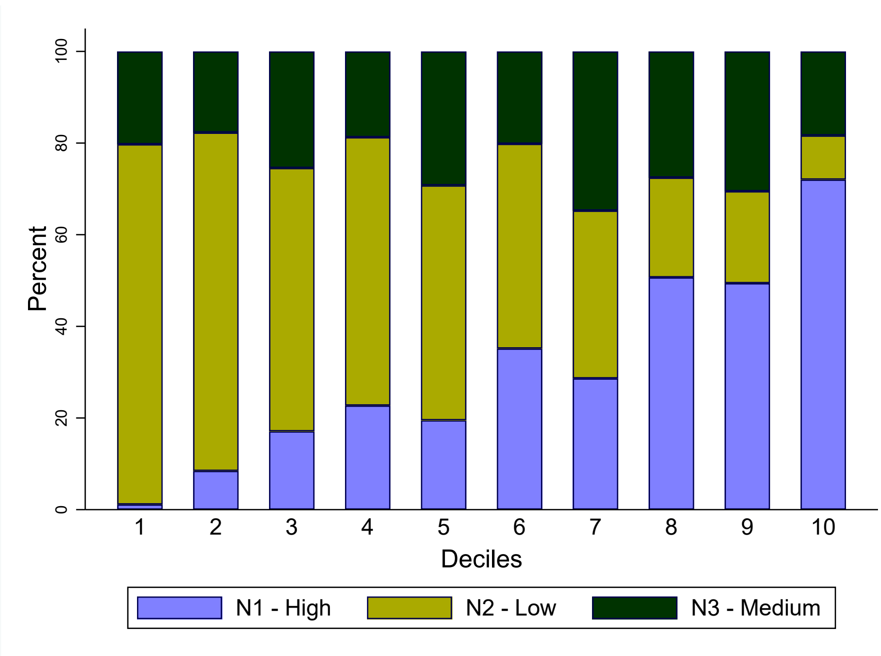
Source:Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor. Distribution based on EPH 2022 remains very similar while using the corresponding waves for 2023 and 2024

Figure A9: Distribution of electricity users. By deciles of per capita income and segment. AMBA region

(a) Comparative with administrative data



(b) Distribution by deciles in EPH



Source:Own elaboration based on EPH, and Undersecretary for Parliamentary Affairs (2023). *Notes*: All values are weighted using the population expansion factor. The segmentation classifies users into three groups based on socioeconomic criteria: high-income (Level N1), middle-income (Level N3), and low-income (Level N2).

Table A1: Users segmentation. Eligibility criteria, by group

Group	**Eligibility Criteria**
N1 High	Households that declare meeting one or more of the following conditions, considering all cohabitants: 1) Total monthly household income equivalent to or greater than 3.5 basic baskets for a type 2 household according to INDEC. 2) Owning 3 or more vehicles less than 5 years old. 3) Owning 3 or more properties. 4) Owning a luxury boat, aircraft, or being the holder of corporate assets that demonstrate full economic capacity.
N2 Low	Households that, considering all members of the household together, meet one or more of the following conditions: 1) Net income less than 1 basic basket for a type 2 household according to INDEC. Exception: For households with a cohabitant holding a Unique Disability Certificate (CUD), total monthly income for this segment must be less than 1.5 basic baskets for a type 2 household according to INDEC. 2) Owning up to 1 property. 3) Not owning a vehicle less than 3 years old. Exception: households with a cohabitant holding a Unique Disability Certificate (CUD) may own up to 1 vehicle less than 3 years old to be part of the lower income segment.
N3 Middle	Households that are not within the higher income segment and meet one or more of the following conditions: 1) Total monthly household income between 1 and 3.5 basic baskets for a type 2 household according to INDEC. Exception: for households with a cohabitant holding a Unique Disability Certificate (CUD), total monthly income for this segment may vary between 1.5 and 3.5 basic baskets for a type 2 household according to INDEC. 2) Owning up to 2 properties. 3) Owning up to 1 vehicle less than 3 years old. Exception: households with a cohabitant holding a Unique Disability Certificate (CUD) may own up to 1 vehicle less than 3 years old to be part of the middle income segment.

Source: Decree 322/2022.

Table A2: Additional Indicators on the distributional incidence of electricity subsidies in Argentina. Evolution 2022-2024. AMBA.

	Aug-22	Sep-22	May-23	Jan-24	Feb-24	Jun-24	Dec-24
Pre-subsidy Gini	0.4403	0.4403	0.4330	0.4954	0.4954	0.4534	0.4429
Post-subsidy Gini	0.4348	0.4350	0.4260	0.4889	0.4872	0.4460	0.4395
Average subsidy rate	-0.0180	-0.0159	-0.0158	-0.0157	-0.0153	-0.0165	-0.0068
Reynolds-Smolensky net redis. effect	0.0055	0.0054	0.0071	0.0065	0.0082	0.0075	0.0035
Kakwani progressivity index	-0.3187	-0.3488	-0.4688	-0.4302	-0.5564	-0.4687	-0.5208
Vertical equity	0.0056	0.0055	0.0073	0.0066	0.0084	0.0076	0.0035
Reranking	0.0001	0.0001	0.0002	0.0001	0.0002	0.0002	0.0001
Suits progressivity index	-0.3330	-0.3601	-0.4768	-0.4494	-0.5628	-0.4678	-0.5217
Musgrave-Thin redistributive effect	1.0099	1.0096	1.0125	1.0129	1.0162	1.0136	1.0062
Atkinson-Plotnick horiz. inequity	0.0002	0.0001	0.0003	0.0001	0.0002	0.0002	0.0001
Subsidy concentration index	0.1216	0.0915	-0.0358	0.0652	-0.0610	-0.0152	-0.0779

Source: Own elaboration based on ENGHo, EPH, and specific information of the energy sector. *Notes*: All values are weighted using the population expansion factor.

A2 Tariff charts for residential electricity consumption

Figure A10: Tariff Charts. AMBA. EDENOR and EDESUR. August 2022

Edenor

Consumption (kWh)	Charges	Aug-22
0 - 150	fixed price	62.24
	per unit price	4.42
151-325	fixed price	122.82
	per unit price	4.501
326-400	fixed price	199.95
	per unit price	4.588
401-450	fixed price	227.61
	per unit price	4.736
451-500	fixed price	330.34
	per unit price	4.851
501-600	fixed price	622.72
	per unit price	4.898
601-700	fixed price	1604.3
	per unit price	5.139
701-1400	fixed price	2072.41
	per unit price	5.226
más de 1400	fixed price	2685.19
	per unit price	5.319

Edesur

Consumption (kWh)	Charges	Aug-22
0 - 150	fixed price	61.44
	per unit price	4.476
151-325	fixed price	118.74
	per unit price	4.492
326-400	fixed price	192.29
	per unit price	4.575
401-450	fixed price	218.51
	per unit price	4.2
451-500	fixed price	318.11
	per unit price	4.836
501-600	fixed price	597.55
	per unit price	4.8779
601-700	fixed price	1583.22
	per unit price	5.572
701-1400	fixed price	2044.33
	per unit price	5.563
más de 1400	fixed price	277782.56
	per unit price	5.758

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. September 2022

Edenor

		Sep-22		
Consumption (kWh)	Charges	N1	N2	N3*
0 - 150	fixed price	62.24	62.24	62.24
	per unit price	6.826	4.42	4.42
151-325	fixed price	122.82	122.82	122.82
	per unit price	6.856	4.501	4.501
326-400	fixed price	199.95	199.95	199.95
	per unit price	6.943	4.588	4.588
401-450	fixed price	227.61	227.61	227.61
	per unit price	7.09	4.736	4.736 - 7.09
451-500	fixed price	330.34	330.34	330.34
	per unit price	7.206	4.851	4.851 - 7.206
501-600	fixed price	622.72	622.72	622.72
	per unit price	7.252	4.898	4.898 - 7.252
601-700	fixed price	1604.3	1604.3	1604.3
	per unit price	7.493	5.139	5.139 - 7.493
701-1400	fixed price	2072.41	2072.41	2072.41
	per unit price	7.581	5.226	5.226 - 7.581
más de 1400	fixed price	2685.19	2685.19	2685.19
	per unit price	7.6773	5.319	5.319 - 7.6773

* Up to a consumption of 400 kWh, the N2 tariff table applies. For the excess of 400 kWh, the N1 table applies.

Edesur

		Sep-22		
Consumption (kWh)		N1	N2	N3*
0 - 150	fixed price	61.44	61.44	61.44
	per unit price	6.831	4.476	4.476
151-325	fixed price	118.74	118.74	118.74
	per unit price	6.847	4.492	4.492
326-400	fixed price	192.29	192.29	192.29
	per unit price	6.93	4.575	4.575
401-450	fixed price	218.51	218.51	218.51
	per unit price	7.075	4.2	4.2 - 7.075
451-500	fixed price	318.11	318.11	318.11
	per unit price	7.192	4.836	4.836 - 7.192
501-600	fixed price	597.55	597.55	597.55
	per unit price	7.234	4.8779	4.8779 - 7.234
601-700	fixed price	1583.22	1583.22	1583.22
	per unit price	7.927	5.572	5.572 - 7.927
701-1400	fixed price	2044.33	2044.33	2044.33
	per unit price	7.918	5.563	5.563 - 7.918
más de 1400	fixed price	277782.56	277782.56	277782.56
	per unit price	8.113	5.758	5.758 - 8.113

* Up to a consumption of 400 kWh, the N2 tariff table applies. For the excess of 400 kWh, the N1 table applies.

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. May 2023

Edenor

		May-23		
Consumption (kWh)	Charges	N1	N2	N3*
0 - 150	fixed price	129.35	129.35	129.35
	per unit price	26.174	5.524	6.401
151-325	fixed price	255.23	255.23	255.23
	per unit price	26.135	5.585	6.462
326-400	fixed price	415.51	415.51	415.51
	per unit price	26.316	5.766	6.643
401-450	fixed price	473	473	473
	per unit price	26.623	6.073	6,95 - 26,623
451-500	fixed price	686.47	686.47	686.47
	per unit price	26.862	6.312	7,189 - 26,862
501-600	fixed price	1294.08	1294.08	1294.08
	per unit price	26.959	6.409	7,286 - 26,959
601-700	fixed price	3333.89	3333.89	3333.89
	per unit price	27.46	6.91	7,787 - 27,46
701-1400	fixed price	4306.67	4306.67	4306.67
	per unit price	27.642	77.092	7,97 - 27,642
más de 1400	fixed price	5580.1	5580.1	5580.1
	per unit price	27.834	7.284	8,162 - 27,834

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Edesur

		May-23		
Consumption (kWh)		N1	N2	N3*
0 - 150	fixed price	127.67	127.67	127.67
	per unit price	26.091	5.538	6.415
151-325	fixed price	246.75	246.75	246.75
	per unit price	26.125	5.572	6.449
326-400	fixed price	399.6	399.6	399.6
	per unit price	26.297	5.744	6.621
401-450	fixed price	454.09	454.09	454.09
	per unit price	26.598	6.045	6,921 - 26,598
451-500	fixed price	661.06	661.06	661.06
	per unit price	26.84	6.287	7,164 - 26,84
501-600	fixed price	1241.77	1241.77	1241.77
	per unit price	26.929	6.376	7,252 - 26,929
601-700	fixed price	3290.08	3290.08	3290.08
	per unit price	28.368	7.815	8,692 - 28,368
701-1400	fixed price	4248.32	4248.32	4248.32
	per unit price	28.351	7.798	8,674 - 28,351
más de 1400	fixed price	5782.43	5782.43	5782.43
	per unit price	28.755	8.203	9,079 - 28,755

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. January 2024

Edenor

Consumption (kWh)	Charges	Jan-24 N1	Jan-24 N2	Jan-24 N3*
0 - 150	fixed price	224.62	224.62	224.62
	per unit price	26.391	6.686	7.563
151-325	fixed price	443.24	443.24	443.24
	per unit price	26.497	6.792	7.669
326-400	fixed price	721.59	721.59	721.59
	per unit price	26.811	7.106	7.983
401-450	fixed price	821.43	821.43	821.43
	per unit price	27.345	7.639	8,516 - 27,345
451-500	fixed price	1192.15	1192.15	1192.15
	per unit price	27.76	8.054	8,932 - 27,76
501-600	fixed price	2247.33	2247.33	2247.33
	per unit price	27.928	8.223	9,1 - 27,928
601-700	fixed price	5789.2	5789.2	5789.2
	per unit price	28.798	9.092	9,97 - 28,798
701-1400	fixed price	7479.07	7479.07	7479.07
	per unit price	29.115	9.409	10,286 - 29,115
más de 1400	fixed price	9690.53	9690.53	9690.53
	per unit price	29.448	9.743	10,62 - 29,448

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Edesur

Consumption (kWh)	Charges	Jan-24 N1	Jan-24 N2	Jan-24 N3*
0 - 150	fixed price	221.2	221.2	221.2
	per unit price	26.422	6.714	7.59
151-325	fixed price	428.51	428.51	428.51
	per unit price	26.482	6.773	7.65
326-400	fixed price	693.96	693.96	693.96
	per unit price	26.781	7.072	9.949
401-450	fixed price	788.59	788.59	788.59
	per unit price	27.303	7.594	8,471 - 27,303
451-500	fixed price	1148.01	1148.01	1148.01
	per unit price	27.724	8.015	8,892 - 27,724
501-600	fixed price	2156.5	2156.5	2156.5
	per unit price	27.878	8.169	9,045 - 27,878
601-700	fixed price	513.64	513.64	513.64
	per unit price	30.377	10.668	11,545 - 30,377
701-1400	fixed price	7377.73	7377.73	7377.73
	per unit price	30.347	10.638	11,515 - 30,347
más de 1400	fixed price	10041.91	10041.91	10041.91
	per unit price	31.05	11.341	12,217 - 31,05

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. February 2024

Edenor

Consumption (kWh)	Charges	Feb-24 N1	Feb-24 N2	Feb-24 N3*
0 - 150	fixed price	791.27	791.27	791.27
	per unit price	67.826	12.219	13.096
151-400	fixed price	1687.65	1687.65	1687.65
	per unit price	68.128	12.521	13.399
401-600	fixed price	5818.97	5818.97	5818.97
	per unit price	73.3	18.122	19 - 73,3
más de 600	fixed price	30054.11	30054.11	30054.11
	per unit price	80.824	25.217	26,095 - 80,824

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Edesur

Consumption (kWh)	Charges	Feb-24 N1	Feb-24 N2	Feb-24 N3*
0 - 150	fixed price	783.43	783.43	783.43
	per unit price	67.883	12.355	13.232
151-400	fixed price	1644.45	1644.45	1644.45
	per unit price	68.151	12.623	13.499
401-600	fixed price	5651.94	5651.94	5651.94
	per unit price	73.831	18.303	19,18 - 73,831
más de 600	fixed price	30391.24	30391.24	30391.24
	per unit price	87.116	31.588	32,465 - 87,116

*Up to a consumption of 400 kWh, a lower variable charge applies. For the excess of 400 kWh, the N1 charge applies.

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. June 2024

Edenor

Consumption (kWh)	Charges	Jun-24 N1	Jun-24 N2*	Jun-24 N3**
0 - 150	fixed price	791.27	791.27	791.27
	per unit price	83.639	31.594	43.158
151-400	fixed price	1687.65	1687.65	1687.65
	per unit price	83.942	31,897 - 83,942	43,461 - 83,942
401-500	fixed price	5818.97	5818.97	5818.97
	per unit price	89.543	37,498 - 89,543	49,062 - 89,543
501-600	fixed price	9309.04	9309.04	9309.04
	per unit price	91.366	39,321 - 91,366	50,885 - 91,366
601-700	fixed price	24526.03	24526.03	24526.03
	per unit price	95.4	43,355 - 102,77	54,919 - 95,4
más de 700	fixed price	28923.74	28923.74	28923.74
	per unit price	97.554	45,509 - 97,554	57,073 - 97,554

* Up to a consumption of 350 kWh, a lower variable charge applies. For the excess of 350 kWh, the N1 charge applies.
** Up to a consumption of 250 kWh, a lower variable charge applies. For the excess of 250 kWh, the N1 charge applies.

Edesur

Consumption (kWh)	Charges	Jun-24 N1	Jun-24 N2*	Jun-24 N3**
0 - 150	fixed price	783.43	783.43	783.43
	per unit price	83.693	31.711	43.261
151-400	fixed price	1644.45	1644.45	1644.45
	per unit price	83.691	31,979 - 83,691	43,529 - 83,691
401-500	fixed price	5651.94	5651.94	5651.94
	per unit price	89.641	37,659 - 89,641	49,209 - 89,641
501-600	fixed price	9216.86	9216.86	9216.86
	per unit price	91.561	39,579 - 91,561	51,129 - 91,561
601-700	fixed price	24910.6	24910.6	24910.6
	per unit price	102.774	50,792 - 102,774	62,34 - 102,774
más de 700	fixed price	28592.58	28592.58	28592.58
	per unit price	103.681	51,699 - 103,681	63,249 - 103,681

* Up to a consumption of 350 kWh, a lower variable charge applies. For the excess of 350 kWh, the N1 charge applies.
** Up to a consumption of 250 kWh, a lower variable charge applies. For the excess of 250 kWh, the N1 charge applies.

Source: Author's elaboration based on Edenor and Edesur.

Figure A10: (Cont.) Tariff Charts. AMBA. EDENOR and EDESUR. December 2024

Edenor

Consumption (kWh)	Charges	Dec-24 N1	Dec-24 N2*	Dec-24 N3**
0 - 150	fixed price	959.54	959.54	959.54
	per unit price	95.84	31.142	50.186
151-400	fixed price	2046.55	2046.55	2046.55
	per unit price	96.214	37,51 - 96,214	50,553 - 96,214
401-500	fixed price	7056.45	7056.45	7056.45
	per unit price	103.006	44,302 - 103,006	57,345 - 103,006
501-600	fixed price	11288.73	11288.73	11288.73
	per unit price	105.217	46,512 - 105,217	59,556 - 105,217
601-700	fixed price	29741.8	29741.8	29741.8
	per unit price	110.108	51,504 - 110,108	64,448 - 110,108
más de 700	fixed price	35074.74	35074.74	35074.74
	per unit price	112.721	112,721 - 112,721	112,721 - 112,721

* Up to a consumption of 350 kWh, a lower variable charge applies. For the excess of 350 kWh, the N1 charge applies.
** Up to a consumption of 250 kWh, a lower variable charge applies. For the excess of 250 kWh, the N1 charge applies.

Edesur

Consumption (kWh)	Charges	Dec-24 N1	Dec-24 N2*	Dec-24 N3**
0 - 150	fixed price	950.04	950.04	950.04
	per unit price	95.92	37.286	50.314
151-400	fixed price	1994.16	1994.16	1994.16
	per unit price	96.244	37,611 - 96,244	50,639 - 96,244
401-500	fixed price	6853.9	6853.9	6853.9
	per unit price	103.133	44,499 - 103,133	57,527 - 103,133
501-600	fixed price	11176.95	11176.95	11176.95
	per unit price	105.461	46,828 - 105,461	59,856 - 105,461
601-700	fixed price	30208.16	30208.16	30208.16
	per unit price	119.058	60,425 - 119,058	73,45 - 119,058
más de 700	fixed price	34673.16	34673.16	34673.16
	per unit price	120.158	61,524 - 120,158	74,552 - 120,158

* Up to a consumption of 350 kWh, a lower variable charge applies. For the excess of 350 kWh, the N1 charge applies.
** Up to a consumption of 250 kWh, a lower variable charge applies. For the excess of 250 kWh, the N1 charge applies.

Source: Author's elaboration based on Edenor and Edesur.