

Box 1

Electricity Rates: Recent Developments and Indexation

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According to the World Bank, the increase in energy prices over the past two years has been the steepest since the 1973 oil crisis, and the rise in international food and fertilizer prices has been the sharpest since 2008. This has occurred against a backdrop of a global energy crisis mainly resulting from Russia’s invasion of Ukraine to a degree that the widespread rise in energy prices has been even more pronounced than the recent surge in world food prices (Graph R1.1). Global energy prices are estimated to have risen by nearly 50% in 2022, before dropping in 2023 and 2024.¹

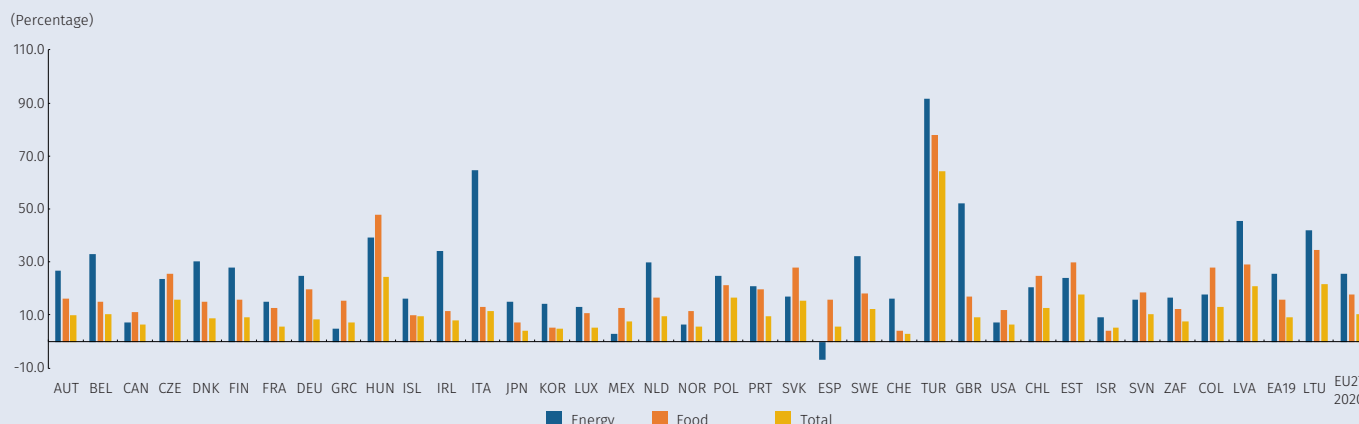
In Colombia, the price of electricity has also increased significantly. In the months before the pandemic and until April 2021, this indicator did not show a defined tendency and kept oscillating at a figure close to the inflation target. However, from May 2021, it began an upward climb as of its annual rate adjustment, reaching its recent peak in October of last year (28.53%), a figure not seen since November 2000 (28.40%). In the last two months of 2022, owing to the adjustment of the regulatory rate structure announced by the Government, the CPI for energy curbed its growth, closing 2022 at 22.4 % (Graph R1.2).

The energy market is highly complex, as is the fixing of rates in each of the stages required to bring the service to the end user. The purpose of this Box is to describe some of these determinants that partly explain the recent price dynamics, to identify the stages where price indexation plays a key role, and to summarize the measures implemented by the sector’s authorities at the end of 2022.

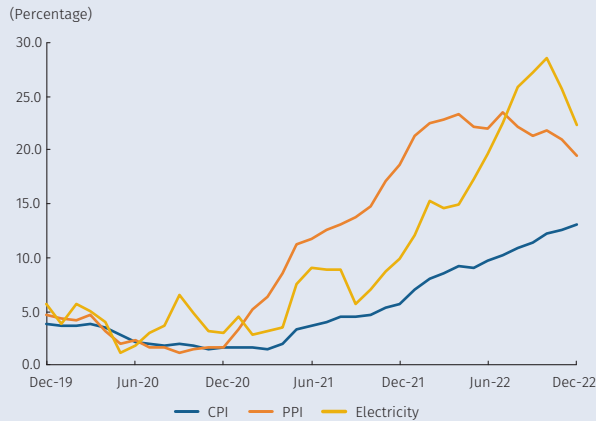
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1 See: <https://www.worldbank.org/en/news/press-release/2022/04/26/food-and-energy-price-shocks-from-ukraine-war>

Graph B1.1
 Headline inflation, food, and energy as of December 2022
 (annual change)



Graph B1.2
Electricity price vs. PPI and CPI
(annual variation)



1. General developments in the electricity market and rate regulation

In 1994, the Colombian Congress passed Laws 142 and 143 that defined the regulatory framework for structuring and developing the electric power market among the agents involved in the four primary sector activities: generation, transmission, distribution, and commercialization. Subsequently, through Energy and Gas Regulatory Commission (CREG) Resolution 131 of 1998, electric energy service users were classified as regulated or unregulated. The regulated market, comprising the majority of consumers, consists of industrial, commercial, and residential users whose energy demands total less than 55 MWh/month. In 2007, the CREG approved the general rate formula (Resolution 119), whereby the electricity retailers (includes utilities) determine the costs and prices for the provision of services to regulated users in the National Interconnected System (SIN). The unregulated market is a free market comprised of industry and non-industry users whose energy demand exceeds or equals 55 MWh/month. Unlike the regulated market, in the non-regulated market, the price of energy is freely agreed upon through negotiations between the consumer and the supplier.

Regulated market rates are determined based on the unit cost of service (UC):

$$UC (\$/kWh) = G + T + D + C + L + R$$

Where UC is the unit cost of providing the service (\$/kWh); G is the generation cost, namely the cost of producing the energy (contracts indexed to the PPI and CPI, and energy purchases on the exchange); T is the cost of transporting the energy to the power plants (updated with the PPI); D is the cost of distributing it to the end user (updated with the IPP and the ADD);² C is the commercialization cost of buying and selling energy (updated monthly with the CPI);³ L is the energy losses for providing the service;⁴ and R is the costs that restrict the energy transmission capacity.⁵

In addition, in the case of households, a specific value is added or subtracted from the unit cost of the service according to the socioeconomic strata of said household. Users in strata 1, 2, and 3 receive a subsidy over their subsistence consumption⁶ of 60%, 50%, and 15%, respectively. Strata 4 pays the unit cost of the service, while users in strata 5 and 6, together with commercial and

- 2 The electricity service distribution areas (ADD for its Spanish acronym) structure unified the fees for the use of the local and regional networks, which led to variability in user rates. For those that paid higher fees than the uniform ADD their fees decreased; while those who had lower fees than those established for the ADD saw rate hikes.
- 3 Is the sales margin resulting from the cost of buying from the generators and selling the energy, which includes billing, meter readings, and customer service costs, among others.
- 4 Losses in this context includes both technical and non-technical losses. The former are those generated through the provision of the service due to losses in the transmission of energy to the end user. Non-technical losses are energy losses resulting from illegal connections to the transmission lines, defaults, etc.
- 5 Restrictions correspond to costs generated by technical conditions of the network (obsolescence), which limit the capacity to transport energy, increasing the unit cost of providing the service.
- 6 Subsistence consumption was defined by the Mining and Energy Planning Unit's Resolution UPME 0355/2004 as up to 130 kWh/month for users located at an altitude above 1,000 meters above sea level and up to 173 kWh/month for users located below 1,000 meters above sea level.

industrial users, pay a 20 % surcharge on their electricity costs to cover the subsidies granted to users in the lower-income strata.

2. Recent developments in electricity service rates

By December 2022, the electricity generated in Colombia was mostly hydroelectric (76.9 %), and to a lesser extent thermal (14.2 %) while other sources represented 8.9 %. In this month, the daily useful volume of water in reservoirs averaged 79.04%.⁷ This value tends to fluctuate in periods with less rainfall, for example during the El Niño phenomenon, a meteorological event that reduces the level of reservoirs and hydraulic generation and is offset with greater thermal generation that has higher production cost and thus increases energy rates. The current La Niña event has been favoring hydroelectric power generation and limiting the increase of energy prices, as present-day rates would be higher if we were experiencing a period of low rainfall or an El Niño phenomenon.

Despite the favorable condition of the reservoirs, most contracts for the sale of electricity from generators to retailers are indexed to the PPI of internal supply, which underwent an annual adjustment as of December 2022 of 19.4%. As described above, the generation rate factor is not the only one indexed to the PPI, as transportation and distribution are also updated monthly with this indicator. Consequently, these pricing factors have been contributing significantly to the marked annual change of the CPI for electricity in recent months. Similarly, the commercialization component, which is tied to the CPI, has been reflecting in its behavior the high consumer inflation, which in December stood at 13.1%.

In addition to the indexation of most of the components that determine the unit cost of the electric energy service, in 2020, in response to the economic crisis resulting from the Covid-related pandemic, the sector authorities established a rate option (CREG Resolution 012) that deferred the programmed rate increases until the end of the public health emergency, which officially ended in June 2022. Accordingly, as of the following month, the adjustments that were not applied during the pandemic began to be included in the energy service charges.⁸ According to information from the Public Services Superintendence, Bogotá would be caught up regarding this deferment, while Medellín and, in general, the cities of the Atlantic Coast show delays in its implementation.⁹

In addition to the above, international prices of fossil fuels (gas, coal, and oil) began to rise sharply in mid-2020 and, although they curbed their growth in the second half of 2022, currently stand at historically high levels. This drives up the cost of thermal energy generation, which, as previously mentioned, represents more than 10% of total electricity generation in the country. Additionally, investments to expand coverage and improve networks in some cities, as well as to transform the energy matrix to clean energy (wind and solar), are compensated within the unit cost of service and consequently drive up electricity rates.

It should be noted that the cities of the Atlantic Coast have the highest electricity unit cost in the entire country. In general, the annual change at yearend 2022 in electricity services for these cities was double the national average. This growth trend observed for the Caribbean region is related to additional regional factors including the instability of the electricity grid, which increases the unit cost. Also, according to estimates by the Colombian Association of Electric Energy Distributors (Asocodis), technical losses (due to network obsolescence), and non-technical losses (due to illegal connections and payment defaults) are higher than those of the rest of the country.¹⁰ Additionally, the increase in electricity rates has been higher in the north of the country, partly due to the implementation of CREG Resolution 010 of 2020, which established a special transitional rate regime in which the percentage of losses recognized in the rates that

⁷ *Monthly Executive Report on the Colombian Electricity Market*, Derivex, December 2022.

⁸ With information to August, it was estimated that close to COP 3.5 trillion remained outstanding. See CREG Resolution 701-019 of 13 September 2002.

⁹ See: https://www.superservicios.gov.co/sites/default/files/inline-files/informacion_tarifaria_de_energia_principales_comercializadores_integrados_al_operador_de_red_diciembre_2020_0_%20%281%29.xlsx

¹⁰ See: <https://www.larepublica.co/empresas/air-e-y-afinia-son-las-empresas-con-el-mayor-indice-de-perdida-de-energia-por-hurto-3297960>

can be assumed by the users in the Caribbean region is 28.1%,¹¹ and 12.5% for the rest of the country.¹²

3. Recent Adjustments in Rate Regulation and Their Effects During Recent Months

In mid-September 2022, the Ministry of Mines and Energy announced a national agreement to lower electricity prices, called the *Pacto por la Justicia Tarifaria* (Pact for Fair Rates). This strategy includes a series of regulations, among which the following stand out: lower service prices for electricity consumers, the renegotiation of bilateral contracts between retailers and generators at lower prices, the oversight of these agreements, and the continuation of dialogues with all the stakeholders in the chain to protect consumers.

Within the portfolio of regulations that this national agreement contains to decrease electricity prices is CREG Resolution 101-029 of September 16, 2022, which aims to temporarily allow changes (between October and December 2022) to the terms of the contracts entered into by retailers in the energy market, the fees for use of the networks and the payment terms stipulated for these contracts. The purpose of the above was to provide greater financial flexibility to the commercialization companies (retailers) without compromising the provision of services. Previously, the retailers had a maximum payment period of thirty calendar days, while the new payment period for deferred amounts would be eighteen months as of January 2023. The retailers will be able to defer up to 20% of their financial obligations for transactions in the wholesale energy market and fees for the use of the national transmission network.

Furthermore, CREG Resolution 101-028 of September 16, 2022 (which will be effective for five months) seeks to optimize the operations of thermoelectric plants according to their number of units and power. These changes are expected to help reduce costs for the restrictions component of the UC rate formula.

Within the new regulations defined by Resolution 101-027 of September 16, 2022, the CREG established that the monthly variation the retailer may apply on the rate will be capped at the CPI of the prior month and the minimum may be equal to or less than 0%. Before this regulation, this component had a floor of 0.6% of the monthly variation (equal to a 7.2% annual adjustment). This allows for the possibility that rate increases may be smaller and may even result in a decrease in rates. Additionally, this same resolution modified the indexers that updated transmission and distribution charges as of 2021. This change also seeks to reduce the base on which these rate components are calculated, so that they are computed on a lower value. Consequently, as of January 2021, these rate components will no longer be indexed to the PPI and will be recalculated between December 2020 and September 2022 with the lower of the CPI, the PPI, or an index proposed by the sector's agents. Finally, CREG Resolution 101-031 of September 30, 2022, which amended Resolution 101-027, stipulates that as of January 2023, the retailers integrated with the network operators (distributors) that have accepted the agreement may increase their rates between December 2022 and September 2023 up to a +0.3 percentage-point monthly variation of the CPI. Those who did not accept the agreement will be able to increase rates only according to the monthly variation of the CPI.

As a result of the Colombian authorities' decisions to reduce electricity rates, the CPI for this service fell over the last two months of 2022. In November, information collected by the National Administrative Department of Statistics, DANE, shows that electricity rates nationally would have fallen by 1.14%, while in December they would have contracted by an additional 0.85%.

11 Is the average percentage of losses recognized in the rates authorized for the two companies providing service on the Atlantic Coast, Air-e and Afinia (29% and 27.2%, respectively).

12 Amylkar Acosta, September 18, 2022, "¿Qué hacemos con la hiperinflación de las tarifas de energía?", Digital magazine *Razón Pública*. Accessed at: <https://razonpublica.com/hacemos-la-hiperinflacion-las-tarifas-energia/>