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ELECTRICITY COSTS IN COLOMBIA

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Electric current is the movement of electrons in large quantities. Electrons are tiny particles that are in constant motion in all the material things we know. Voltage is the force that pushes these electrons in a desired direction. Electric energy is the movement of electrons with a certain force. This energy is used to operate devices that produce heat (stove, iron), light (bulbs) or movement (blender, vacuum cleaner and motors in general). This electrical energy is measured according to the work it does during a certain time. Its unit of measurement is

kilowatt-hours kWh. A kWh is the work that is done (movement of a quantity of electrons with a given force) for one hour.[1]

How does it work? To bring electric power to different places (residences, offices, schools, hospitals, hotels, parks, warehouses, among others) it is necessary to carry out a process that begins in the way it is produced, up to the way it is sold.

The electrical energy process is basically made up of four stages (generation, transmission, distribution and commercialization).

Generation: It is the production of electrical energy. It is done with machines that take advantage of the force of water, air, sunlight or the energy power of fuels, transforming them into electrical energy. The energy that is obtained directly from nature is called primary and that produced with fuels is called secondary.

Transmission: It is the transport of electrical energy from the generation plants to the large consumption centers (entrance to the regions, cities or delivery to large consumers), through cables that are supported by very high towers with special characteristics, which allow large quantities to be carried of product over long distances throughout the country.

Distribution: It is the transport of electrical energy from the point where the National Transmission System (NTS) delivers it to the point of entry to the facilities of the final consumer. It is done, like the NTS, with cables supported by structures but of smaller size and with different characteristics, to carry energy in smaller quantities across the sectors in the same region and distribute it in small quantities for the consumption of each user.

Commercialization: It is the activity of buying large amounts of energy from producers to sell to users or other companies in the sector, those related to meter reading, service billing, and in general, those involved with customer service (attention of queries, complaints, etc.)[2].

Tariff Structure of Electric Power in Colombia

The identification of the cost of the service and the price charged to the different users (rates) is called the tariff structure. The cost of the service is the

result of adding the costs of each of the stages (production, transmission, distribution, marketing and administration) (see figure 1).

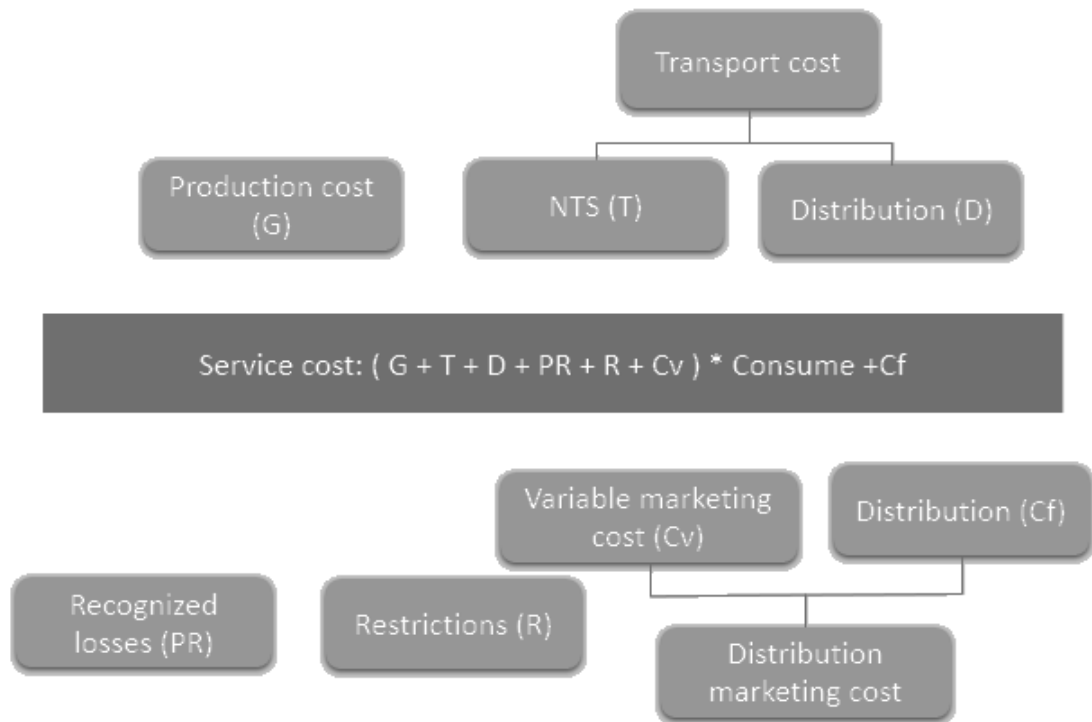


Figure 1. Cost service structure.

The Unitary Cost of Service Provision consists of a variable component according to the level of consumption, expressed in \$ / kWh, and a fixed component, expressed in \$ / invoice, as indicated below:

$$CU = CUf + CUv \quad \text{with} \quad CUv = G + T + D + Cv + PR + R$$

Where:

CUf = base marketing cost that remunerates the fixed costs of the marketing activity.

This cost is equal to zero (0) until the methodology for the remuneration of the marketing activity for the next tariff period is issued.

CUv = variable component of the unit cost of service provision.

G = corresponds to the cost of purchase of energy by the marketer and represents the cost of energy production, regardless of where it is generated.

T = with this value, energy transport is paid from the generation plants to the regional transmission networks.

D = value paid for transporting energy from the substations of the National Transmission System to the end user.

Cv = remunerates the margin to commercialize energy and includes the variable costs of the commercialization activity, associated with the attention of users such as billing, reading, attention, claims, etc.

PR = costs of energy losses, transportation and reduction thereof.

R = costs for restrictions and services associated with the generation [3].

Regardless of whether a user can be physically located in the vicinity of a reservoir or a generation plant, he faces the same costs as another of the same socioeconomic conditions, located anywhere in the same system, at the same level of tension and serviced by the same energy marketer.

Reviewing the concepts and calculation formulas the Unitary Cost of Service Provision (CU) is an efficient economic cost that results from adding the costs of the generation, transmission, distribution, marketing and other costs related to the operation and administration of the national interconnected system.

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