

# Characteristics of the Romanian energy market

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**Abstract.** This paper highlights the main characteristics of the energy market in Romania. Starting from the mode of organization and operation of the electricity market, there are revealed prices and tariffs for electricity for different categories of customers and their evolution in time. There are pointed also ways of setting electricity prices and tariffs, taking into account the expenditures actually recorded by economic operators.

## 1. Introduction

Economic development being strongly related to electricity, proper functioning of national electric energy systems is vital for national economies. Given that many national economies have implemented the market model, the concerns have been expanded to the proper operation of electricity market. The peculiarities of this kind of market, its complexity and strategic position in economy requires special attention from authorities.

In this context, there are highlighted in this paper some characteristics of Romanian energy market and its evolution in last years.

## 2. Literature review

As well as the problems of the electricity market are complex and this type of market has many peculiarities and difference from the other types of market, the scientific literature is not too vast comparative with other markets.

Mookherjee & al. [1] proposed a dynamic electric power model, a day ahead model used by generation firms for planning and bidding purposes. Baldick [2] presents uses of market equilibrium models, like physical model, economic and commercial model. Many studies have been realized in this field [3-6]. Francoa & al. [7] present a system dynamics model that supports analysis of long-term effects of the various policy instruments, focusing on environmental quality, security of supply and economic sustainability.

Glachant and Ruester [8] highlight the steps made to create an EU internal electricity market. Prabavathi & Gnanadass [9] (analyses the state of the art research of bidding strategies in restructured electric power market. Hogan [10] presents problems of virtual transactions and electricity market design.

## 3. Evolution of Romanian Electricity Market

Even if Romania had not been yet an EU member in 1996, when liberalization of electricity markets was launched by Directive 96/92/EC, since that year she started the creation of a functioning electricity market.



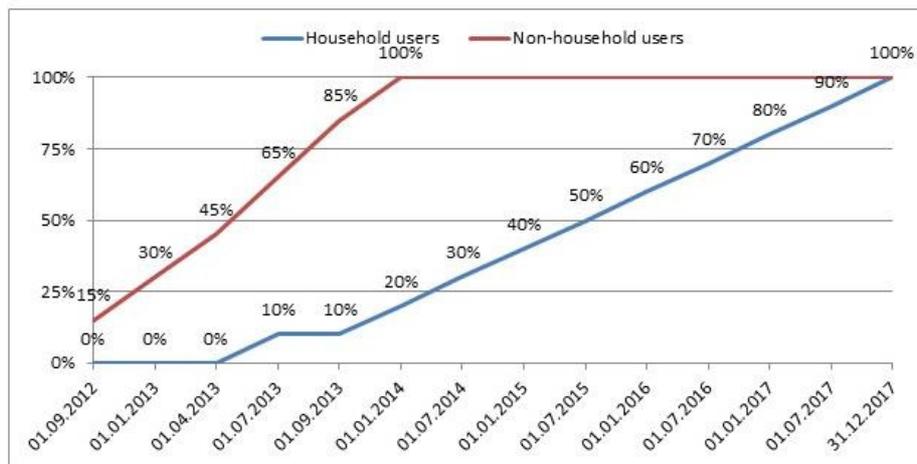
The process started with the restructuring the energy sector and creation the institutional framework for regulating the electricity sector and the model adopted was that of a decentralized markets. But, the opening the energy market started four years later, and in 2005 the openness reached 83.5%, at which time all non-household customers became eligible. For non-household consumers the complete liberalization was produced at the end of 2014.

Full opening occurred after the moment of Romania's integration into the European Union, respectively 2007 [11]. Even though, household consumers have not been able to exercise their eligibility right of the providers. There were a relatively small number of suppliers, who operated each of them on certain distinct geographic areas where, practically, in this way, they exercised their monopoly. No other provider in the country disputed the offer for residential customers on that geographic area.

It was only much later, starting with 2015, when the household consumers have been really able to exercise the right to change their energy supplier, through penetration of new suppliers interested in catching also a part of the market segment of household customers.

From legal point of view in 2007 the degree of market opening was 100%, being achieved the full liberalization. But from a practical perspective, customers could not benefit from the liberalization process. However for households it was even more advantageous to remain on the captive market, with regulated tariffs, due to the state that provide energy for a lower price than the free market.

In 2013 only 10 % from the electricity delivered to household users was at free market price, the difference being billed at regulated price. The market liberalization process is due to close at the end of 2017 (Figure 1), when the consumers will directly negotiate prices with the electricity suppliers.

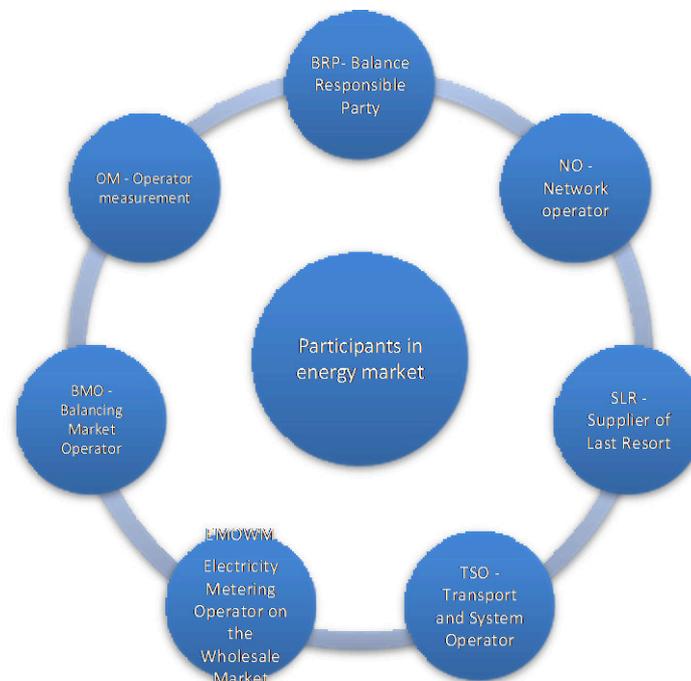


**Figure 1.** Liberalization calendar of electricity prices [ANRE, www.anre.ro]

The Romanian body that sets the official rules of electricity market and monitors that is ANRE. In 2009 [12] it was considered an autonomous administrative authority, under parliamentary control, fully financed from its own resources, independent decision-making, organizational and functional. Subsequently, it passed under direct coordination of the Vice Prime Minister, thus becoming fully funded from the state budget and the collected revenue flows entirely into the state budget. In 2012 it became again an autonomous authority.

On the regulated market, ANRE may impose public service obligations on producers, transmission and system operator, distribution system operators and suppliers of last resort for certain categories of customers. It also has the role of continuous monitoring of the effect of the regulated market on competitive electricity market, being able take steps to avoid possible distortion.

The main participants in the electricity market are the producers, suppliers, electricity market operator, transport and system operator OTS, distribution operator, electricity trader, and final customers. Besides them there are, also, other different categories of operators (Figure 2).



**Figure 2.** Participants on energy market

OPCOM, as operator of the electricity market, deals with organization and management of centralized markets, in the short, medium and long term, with the exception of the balancing market for wholesale trading electricity.

Distribution operators hold an electric power distribution and they are responsible for operating, maintaining and developing the distribution system in a given area and the interconnections with other systems, as well as for ensuring the long term ability of the network to meet reasonable demand of electricity distribution. Distribution service provided to customers consists of the transmission, in terms of efficiency and safety of electricity between two or more points of distribution network, in compliance with performance standards.

Electric transport network is state property. Transmission and distribution of electricity are fully regulated natural monopolies. Transelectrica, as the transport and system operator, has a transmission electric network and it is responsible for operating, ensuring the maintenance and development of the transmission network in a certain area, its interconnection with other power systems, and for ensuring the long term ability of transport network to cover reasonable requests for electricity transmission. To maintain the level of the reliability into service of the power system, as well as the quality of electricity it performs system services. Also, it provides electricity transmission services between different parts of the transportation network.

There can be metering operators the transmission and system operator, producers and distribution operators.

The supplier of last resort is that provider which is designated by the competent authority to provide universal service for the supply of electricity to end customers who have not secured supply of electricity from any other source. The suppliers of last resort shall be appointed by ANRE from the existing providers on the energy market through competitive mechanisms, based on a regulation which establishes the rules and criteria for their selection for each category of end-customers who they serve.

In the market there can be find horizontally integrated operators performing at least one of the functions of electricity generation for sale, transportation, distribution or supply of electricity, and another activity that is not from the field of electricity.

Economic operators vertically integrated can be traders or groups of traders in the field of electricity who are entitled, directly or indirectly, to exercise control and which perform at least one of the functions of transmission or distribution and at least one of the production or supply of electricity.

In the energy sector there can be identified the market of electricity production and sale, transport and system technological services market, distribution market and electricity supply market.

On the first market of these, there is a quasi-monopoly due to the fact that is dominated by the companies owned by the state, which represents 85-90% of the market. The market has two market segments: futures trading and hourly trading on spot market.

The market of system technological services has for distinctive segments: secondary adjustment, fast tertiary adjustment, slow tertiary adjustment and balancing market to increase or decrease power.

Regarding the distribution market, the energy distributors take over the energy from the transport operator and distribute it to consumers.

On the market of electricity supply market two market segments are distinguished: wholesale trading and supply to the final customers.

Electricity market is composed by regulated market and competitive market and the energy transactions are wholesale and retail [13]. Therefore, electric energy market has two components:

- Wholesale electricity market, attended by producers, the transmission and system operators, distribution operators, electricity market operator and wholesale customers;
- Retail market, in which the transactions are carried between suppliers or producers and consumers.

The growth of competitive market share has been achieved gradually, by ensuring the access on that market for as many as possible participants, producers, suppliers and end customers.

On the wholesale electricity market there are traded electricity and related services and there are as participant electricity generators, the transmission and system operator, distribution operators, the electricity market operator and wholesale customers.

Since 2005, on the wholesale electricity market, there have been introduced new trading platforms:

- Day Ahead Market (PZU) is organized and managed by the operator of the electricity market for buying and selling electricity in the next delivery day following the trading day;
- Centralized Market for Bilateral Contracts where are taking place, through public auction, trading of contracts with physical delivery of electricity based on specific rules approved by the competent authority. Energy producers sell the energy produced on the Centralized Market for Bilateral Contracts PCCB without they could sell them directly;
- Centralized Green Certificates Market;
- Balancing Market, dedicated to offset deviations from the programmed values of the production and consumption of electricity. It is organized and operated by the transmission and system operator, which deals electricity with electricity producers who operates dispatchable production facilities and with the end customers to provide real-time balance between production and consumption.

The functionality of the first three markets is ensured by the wholesale electricity market operator - SC Opcom S.A., while balancing market is managed by Transelectrica, the transmission and system operator. It has the responsibility for the operation, maintenance and development of the transportation network.

The role of Opcom is also that of the settlement operator for centralized markets. Opcom introduced in 2007 also the centralized market for bilateral contracts with continuous negotiation, respectively forward contracts.

There are, also, other centralized markets in the electricity sector:

- intra daily electricity market PI, organized and managed by the operator of the electricity market, which contributes to improve balancing the portfolio of participants, for a day of

delivery, through transactions in sessions held after the completion of transactions in the day-ahead market and before a certain time of delivery start;

- the market for allocation capacities for international interconnection, organized and managed by the transmission system based on specific rules, in order to achieve transactions of the import / export and transit of electricity.
- centralized market for bilateral contracts with continue negotiation PCCB - NC;
- bilateral contracts market for green certificates PCBCV;
- centralized market with double continue negotiation of electricity bilateral contracts PC-OTC;
- electricity market for big final customers PMC.

In the centralized electricity market transactions with electricity occur between various economic operators, brokered by the electricity market operator or transmission and system operator, based on specific rules, approved by the competent authority.

The market participants are required to assume financial responsibility for payment the imbalances they generate on the electricity market, except the imbalances stipulated by legislation [13].

On the electricity retail market the electric energy is purchased by the end customers from suppliers or producers. Suppliers sell electric energy to final customers by bilateral contracts, at negotiated prices or established by standard offers.

For household and non-domestic customers with a number of employees below 50 and a turnover less than EUR 10 million, electricity supply is guaranteed through universal service.

In order to ensure the safety level in operating of the national energy system SEN, as well as the quality of transmitted electric energy at normal parameters, the transport and system operator can ask to producers and dispatchable final customers to ensure the technological system service.

On the competitive market, commercial electricity transactions are carried out transparently, public, centralized and non-discriminatory, as wholesale or retail transactions. On this market, the transport and system operator can acquire technological system services. It is forbidden the cross-subsidy between regulated activities and between the regulated and the unregulated of an economic agent.

Starting to 2015, it is used the trading mechanism by signing bilateral electricity contracts through extended auction PCCB-LE. Participation on the PZU and PCCB-LE markets is voluntary, being allowed for companies that hold participation conventions with OPCOM.

On PZU market transactions are made for trading intervals of delivery day based on the quantity-price offers of participants. After the validation of the offers by the computer system, OPCOM provides physical notifications regarding the transactions to the transmission and system operator OTS and to the parties responsible with balancing.

In 2016. the "Clean Energy for All" package was made public, package which includes action guidelines of the Government represented by the Ministry of Energy. Regarding the energy market, the main objectives are:

- removal of some of the factors distorting the market, such as price ceilings;
- better remuneration of the participation of electricity consumers at the balancing market;
- facilitate the participation in the electricity market in the role of prosumers (producers and consumers);
- guarantee of the right to participate in the balancing market, individual or by the centralized platform;
- use of mechanisms by which the capacity markets can work efficiently;
- guarantee of the free access at the comparison instruments of the suppliers offers which comply with the minimal quality standards.

#### **4. Characteristics of the consumers on the electricity market**

Initially, the consumers were differentiated in eligible and captive consumers, but after the full opening of the electricity market, this distinction no longer exists. There is, however, a subcategory of consumers, those of the beneficiaries of universal service.

Suppliers, also, were divided in competitive suppliers for eligible consumers and suppliers for captive consumers. After full market opening, the electricity suppliers are suppliers in competition regime and providers of last resort.

Starting from 2014, the final clients fall into the following categories [14]:

- household customers;
- small non-household customers, i.e. non-household customers for which power by the technical connection approval is less than or equal to 100 kW ;
- large non-household customers, i.e. non-household customers for which power by the technical connection approval exceeds 100 kW.

In Romania, the liberalization of the energy market allows all consumers to benefit from their eligibility right of the provider, based on information related to the price, duration, methods of payment and other contractual conditions. Residential customers who have not exercised their eligibility can opt for any of the regulated electricity tariffs corresponding to the category to which they belong, with the exception of regulated tariff social type CS.

For vulnerable consumers, social protection is insured by maintaining social tariff or other measures of social protection and growing energy efficiency. If household customers have an average income per family member less than or equal to the minimum wage they may require CS tariff to the consume place from their own home [15]. Suppliers are required to keep records of vulnerable consumers in their own area of supply.

On the retail market there can be identified different types of electricity tariffs (Figure 3).

CTP	•Monomial regulated tariff on power installments
CS	•Social regulated tariff
CR	•Monomial regulated tariff with reservation
CI	•Monomial regulated tariff with induced consumption
CR1	•Monomial differentially regulated tariff with reservation
CR2	•Monomial differentially regulated tariff by reservation with two time zones
CPC	•Competitive market component tariff
Differentiated CPC	•Differentiated competitive market component tariff

**Figure 3.** Types of tariffs on electricity market

In the case of the application of the monomial regulated tariff on power installments CTP, the inclusion of residential customers in power installments is based on the maximum contracted power.

In the electricity sector there are used prices resulted from the competitive mechanisms of the electricity market, regulated tariffs for transport, system and distribution of the electric energy, for acquisition of technological system services and for electricity supply to some categories of customers (Table 1), regulated tariffs for connection to the grid, regulated tariffs practiced by the electricity market operator and regulated prices used by producers or suppliers of electric energy for certain categories of consumers [13].

**Table 1.** Pricing methods

Types of tariffs	Pricing methods	
1. Tariffs for post-consumption payment	Social regulated tariffs in three installments CS	In first installment - 2 kWh/day for each day of billing period
		In second installment - 1 kWh/day for each day of billing period
		In third installment - the difference between actual consumption and induced consumption in previous installments (lei/kWh)
		Monomial tariff CR
		Regulated monomial tariff with reservation CR
2. Regulated monomial tariff with induced consumption CI	Low voltage (0 - 1 kV inclusive)	Price / reservation (lei/day)
		Price / energy (lei/kWh)
		Medium voltage (1 - 110 kV exclusive)
		Price / energy (lei/kWh)
3. CTP Monomial regulated tariff on power installments - low voltage (0 - 1 kV inclusive), based on the maximum contracted power tranche	Up to 3 kW inclusive	Price / reservation (lei/day)
		Price / energy (lei/kWh)
		3 - 6 kW
		Price / reservation (lei/day)
4. Tariffs for meters with prepayment	More than 6 kW	Price / energy (lei/kWh)
		Price / reservation (lei/day)
		Monomial tariff CP
		CP2 monomial tariff differentiated on two time zones
4. Tariffs for meters with prepayment	CP3 monomial tariff differentiated on three time zones	Price / reservation (lei/day)
		Price / energy in day zone (lei/kWh)
		Price / energy in night day (lei/kWh)
		Price / reservation (lei/day)
4. Tariffs for meters with prepayment	CP3 monomial tariff differentiated on three time zones	Price / energy in peak area (lei/kWh)
		Price / energy in normal area (lei/kWh)
		Price / energy in low load area (lei/kWh)
		Price / energy in low load area (lei/kWh)

In the Romanian electric energy sector there is an area of natural monopoly, specific to transport and distribution for which regulated tariffs for the use of networks shall be based on the ceiling type methodologies. The transport tariff has two components: the price for introducing electricity in the network and the price for energy recovery from the network. Pricing mechanism of the electricity transmission is differentiated on geographical areas, with negative effects on the competition.

On the market of system technological services most of the transactions are realized in a regulated regime.

The support of the electricity production from renewable sources is realized through mandatory quotas for suppliers, proportional to traded energy and the possibility of trading green certificates on the competitive market for green certificates. For example, mandatory quotas in 2017 for financial support through the mechanism of green certificates of the renewable energy is 8.3%.

The promotion system of electricity from renewable energy resources had begun in 2004. In 2006 it was introduced the right of energy suppliers to recover the costs of buying green certificates from the

captive consumers, through regulated tariffs and from eligible consumers, increasing the selling electricity price, measure that was canceled in 2011.

## 5. Conclusions

The process of liberalization of Romanian electricity market have passed through several stages in the last 20 years. The competitive electricity market coexist with the regulated market. In the last few years it has been carried out a process concerning the deregulation of energy prices for household users and non-domestic users. The process had six stages and was completed for companies in 2014, this kind of consumers buying now electric energy only from competitive market.

For household consumers the process includes ten stages and will be finished at the end of 2017. This process has already encounter important effects on the electricity prices.

In these conditions, prices depend mainly on relation between supply and demand, but could be influenced also by some taxes and tariffs practiced on the markets of electricity production and sale, as well as on the markets of electricity transmission or distribution.

Therefore, the regulation authority has to take into consideration a better supervision of registered costs of distribution and transmission companies and a periodic revision and update of the methodologies for distribution and transport tariffs.

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