



# Quality of Electricity Supply

## National Report of Montenegro

by

Energy Regulatory Agency

### National Legal Framework

#### The Energy law

(Official Gazette of the Republic of Montenegro, No.39/2003) defines the basic principles for the implementation of energy policy and strategy, the framework of the Energy Sector, the competencies of the Government in the Energy Sector and the duties and responsibilities of the Energy Regulatory body with respect to the implementation of this Law.

This Law regulates the following Energy Sector activities:

- 1) Generation, Transmission, Distribution and Supply of electricity in the market and/or as a Public Service;
- 2) organization and functioning of the electricity market;
- 3) production and the market of coal for the needs of electricity generation;
- 4) Transportation, Distribution, storage, wholesale and retail trade and supply of Petroleum Products and Gas.

The objectives of this Law are to ensure a safe, secure, reliable quantity and quality supply of Energy at fair prices, taking into account:

- 1) efficient and economic use of natural resources that meets the needs of the country;
- 2) environmental protection;
- 3) the efficient use of energy;
- 4) promotion of market competition;
- 5) Tariff Customer protection;
- 6) the need for Energy Undertakings to realize a reasonable profit in the market;
- 7) the need for Energy Undertakings to promote private sector participation;
- 8) the enforcement of legally binding obligations;
- 9) integration of the Energy Sector activities of Montenegro with those of the rest of Europe.



## Energy Regulatory Agency

Energy Regulatory Agency of Montenegro is an independent and non-profit organization that carries out its public authorizations in accordance with the Energy Law (Official Gazette of the Republic of Montenegro, No.39/2003).

In accordance with Article 12 of the Energy Law, the Energy Regulatory Agency has the following powers, functions and responsibilities:

- 1) to make and issue all rules and regulations required to:
  - carry out its obligations under this Law; and
  - to carry out and enforce the energy policies;
  - revision and approval of market rules; technical codes, terms and conditions for connection and access to networks;
- 2) to issue Licenses to conduct activities and to interconnect Energy Sector facilities, networks and equipment for the Generation, Transmission, Distribution, Supply and sale of Energy;
- 3) to issue Authorizations for the construction of new or the modification of existing energy facilities;
- 4) to set Tariffs and prices pursuant to the terms of this Law and Secondary Legislation;
- 5) to issue orders to Energy Undertakings pursuant to this Law and Secondary Legislation;
- 6) to modify, suspend, revoke, monitor, control and enforce compliance with Licenses issued pursuant to this Law and Secondary Legislation issued pursuant thereto.
- 7) to establish, or amend rules and regulations:
  - that define the Energy market structure;
  - for market operation;
  - for the unbundling of Energy Undertakings;
  - for the rights and obligations of all Energy Undertakings;
- 8) to establish rules and regulations related to:
  - public hearings and findings conducted by the Agency in accordance with the terms of this Law and Secondary Legislation;
  - monitoring of Energy Undertakings;
  - safety of Energy facilities, personnel and the public, generally, and
  - compliance of Energy Undertakings with environmental regulations;
- 9) to ensure Tariff Customer protection that provides for:
  - fair and non-discriminatory treatment of Tariff Customers by Energy Undertakings;
  - the delivery of high quality service by Energy Undertakings;
  - the establishment of mechanisms that will encourage public participation in the development of rules and policies that affect Tariff Customers;
- 10) to promote competitive conduct in the Energy Sector, including:
  - fair and non-discriminatory transit of Energy; and
  - additional sources of Energy for Generation, improvement of the possibilities for the Transmission, Distribution and Supply;
- 11) to establish regulations related to:
  - requirements pursuant to which all books, accounts, papers and records shall be kept by Energy Undertakings;



- in accordance with applicable laws, Secondary Legislation, treaties and other internationally recognized norms, to resolve disputes and/or hear complaints among or involving:
- Tariff Customers and Energy Undertakings; or
- Energy Undertakings;

The Agency has the right, at any time, to examine, inquire into, and determine, the extent, condition and value of the whole or any portion of the property and assets, of any Energy undertaking that is providing services at prices that are regulated by the Agency pursuant to Article 18. In determining the value of such property and assets, the Agency shall ensure that the valuation methods used, and the determination of base annual and accrued depreciation, complies with generally accepted international valuation and accounting standards.

The Agency shall be entitled to conduct its own inspections of Energy Undertakings, pursuant to this Law and Secondary Legislation established pursuant thereto.

### **Elektroprivreda Crne Gore A.D. – Nikšić**

Elektroprivreda Crne Gore A.D. – Nikšić (the Electric Power Company of Montenegro, Joint Stock Company (J.S.C.), Niksic) is the only company in Montenegro carrying out activities of electricity generation, distribution and supply and it owns the electricity generating capacities with the total installed capacity of 867 MW, whereof 657 MW (76%) in hydropower plants and 210 MW (24%) in thermal power plant “Pljevlja”. is the national electric power industry carrying out activities in the area of electricity generation, distribution and supply.

Pursuant to its Statute, EPCG Joint Stock Company Niksic is organized as a Company whose core activity is electricity generation, distribution and supply.

EPCG carries out business activities regulated by the Energy law, licenses for the energy sector and the Articles of Association, as follows:

- electricity generation,
- electricity distribution,
- electricity supply,
- purchase and sale of electricity,
- distribution network operator.

These activities are carried out as internal and international transactions on the basis of adequate licenses, i.e. on the basis of approval of the Energy Regulatory Agency.

Business activities of EPCG are activities of public interest and they are carried out in a manner that ensures regular and high quality meeting of demand of Montenegrin customers, profitability of business operation and maintenance of good business relations with all the partners.

According to Article 19 of the Energy Law, EPCG is a holder of the following three licenses:

- license for generation of electricity
- license for distribution of electricity
- license for supply of electricity



Organizational structure of the Company consists of the following functional and organizational units:

- FU Generation,
- FU Distribution,
- FU Supply,
- OU Head Office of the Company and
- OU Elektrogradnja.

### Functional Unit Generation

Elektroprivreda Crne Gore owns 867 MW installed capacity in hydropower plants and in one coal fired thermal power plant. Overview of generating capacities in Montenegro is given in the Table below.

Table 1: Generating capacity

|                         |        |
|-------------------------|--------|
| HPP Perućica            | 307 MW |
| HPP Piva                | 342 MW |
| TPP Pljevlja            | 210 MW |
| Small hydropower plants | 8 MW   |

### Functional Unit Distribution

Functional Unit Distribution provides possibilities for regular supply of distribution customers. Its main task is to ensure good quality of electricity in order to have all electrical devices and machines operating normally - light bulbs, household appliances, computers, as well as specific customers in certain segments of industry.

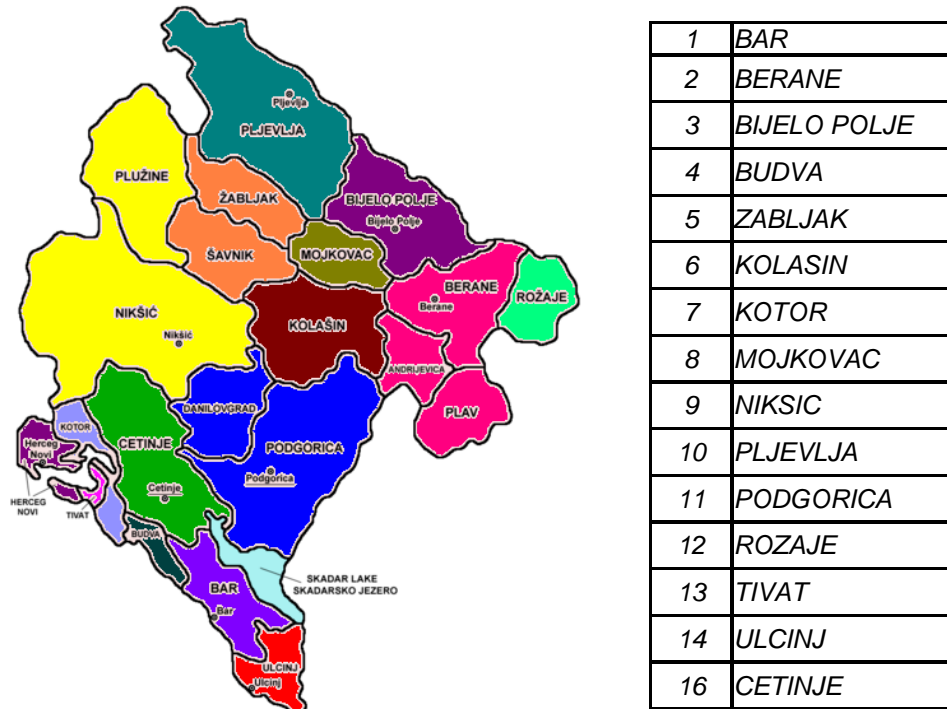


Figure 1: Organizational and territorial segmentation of the FU Distribution of EPCG

There are 16 distribution centres, organized on a territorial principle as well as Distribution Head Office operating within FU Distribution. Due to volume of work and wide area it covers FU Distribution is a part of EPCG.

Distribution network is a part of the electric power system, which serves to transport electricity from the transmission network or from power plants connected to the distribution network to customers connected to the distribution network and it comprises power lines of the total length of 18,556 km, with the voltage structure given in Table 2.

Because of simplicity and functional separation of the distribution network elements, the primary and secondary MV distribution network were defined. Typical primary distribution voltages are 35 kV and 30 kV and sometimes 50 kV, and typical secondary distribution voltages are 10 kV and 20 kV and sometimes also 6 kV. Out of the above mentioned voltages, in the distribution network of Montenegro there are only 35 kV and 10 kV. Secondary medium voltage distribution network is a connection with the low voltage network and it comprises MV/LV transformer stations and MV power lines from bays in HV/MV transformer stations and primary distribution MV/MV transformer stations. Hence, secondary distribution network comprises MV power lines, almost exclusively in radial operation, quite often without possibility for two-side supply and mostly without relay protection component that could perform selective disconnection of parts of the network. Secondary medium voltage distribution network, as a connection to the low voltage network, is necessary part of any distribution network

*Table 2: General information about Distribution System*

| <b>Length of distribution lines</b>         | <b>(km)</b> |
|---|-------------|
| 35 kV Overhead lines                        | 1.012,639   |
| 35 kV Cable lines                           | 48,480      |
| 10 kV Overhead lines                        | 3.570,112   |
| 10 kV Cable lines                           | 935,970     |
| 0.4 kV Overhead lines                       | 12.962,363  |
| 0.4 kV Cable lines                          | 1.670,981   |
| <b>Characteristics of the network</b>       | <b>(ps)</b> |
| Number of TS 35/10 kV                       | 85          |
| Installed capacity of TS 35/10 kV           | 685.3 MVA   |
| Number of 35/6 kV TS                        | 3           |
| Number of 35/0,4 kV TS                      | 21          |
| Installed capacity of 35/04 and 35/06 kV TS | 29.20 MVA   |
| Number of 10/0,4 kV TS                      | 1.781       |
| Number of 10/0,4 kV pole mounted            | 1.981       |



### **Functional Unit Supply**

Supply is the youngest functional unit of EPCG and it establishes contact with customers primarily at its counters.

It consists of collection points placed in 16 towns of Montenegro. At those places a customer may pay a bill or file a complaint because of amount on his bill, be given an explanation related to structure of the bill. Customers could also sign a protocol on settlement of their debt, at those places as well.

FU Supply performs settlement of accounts and collection of debt for electricity delivered to customers belonging to category of households, as well as settlement of accounts for electricity used by industrial and commercial customers.

Functional Unit Supply is established as a separate functional unit within EPCG and is responsible for supply customers with electricity. This is a public service obligation.

According to the Rules for supply of electricity, Public Supplier is an energy undertaking supplying of electricity the following categories of customers:

- tariff (non-eligible) customers and
- eligible customers connected to the distribution System which decided to be supplied with the Public Supplier.

Tariff customers are customers that do not have the right to choose a supplier, or are tariff customers by 01.01.2015. These are customers belonging customer category "households".

As of 1st of January 2009 the Montenegrin electricity market is opened for all customers excluding households, meaning all customers except households are eligible to purchase electricity at the market.

Up to now the Energy Regulatory Agency of Montenegro issued 8 licenses for performing energy activities in the electricity sector, out of which one license is for trade (EFT) at the opened market.

## **Quality of electricity supply**

The quality of electricity services in the Republic of Montenegro is covered by the following documents:

- Temporary Distribution Code(Official Gazzette of the Republic of Montenegro No.13/2005
- Rules for supply of electricity(Official Gazzette of the Republic of Montenegro No.54/2009)
- License for supply of electricity

The distribution network in Montenegro is owned by the National Electric Power Company (EPCG), Niksic. EPCG AD Niksic, supplies with electricity 351.722 consumers out of which 351.719 are households.



Table 3: Number of customers in Distribution units on 31.12.2009.

| Voltage level                 | Number of customers |
|-------------------------------|---------------------|
| 35 kV                         | 23                  |
| 10 kV                         | 374                 |
| 0,4 I degree                  | 1232                |
| 0,4 II degree                 | 26406               |
| Households (two tariffs)      | 239967              |
| Households (one tariff)       | 82014               |
| Public lighting (two tariffs) | 727                 |
| Public lighting (one tariff)  | 976                 |
| <b>Total</b>                  | <b>351719</b>       |

Total consumption of electricity in 2009 is 140,326.948. The consumption of electricity by customer categories in 2009 is presented as follows:

Table 4: Consumption of consumers connected to the distribution network

| Customers connected to the distribution network | Consumption in 2009 (kWh) |
|---|---------------------------|
| 35 kV   | 5.362.998                 |
| 10 kV   | 18.987.869                |
| 0,4 kv I degree                                 | 11.085.730                |
| 0,4 kvII degree                                 | 22.484.931                |
| Households (two tariffs)                        | 105.864.720               |
| Households (one tariff)                         | 9.257.958                 |
| Public lighting (two tariffs)                   | 1.643.797                 |
| Public lighting (one tariff)                    | 2.964.045                 |

## Continuity of supply

The continuity of supply is related to the availability of electricity. There are various indicators measuring the continuity of supply.

According to the license for distribution system operator and interim distribution code Distribution System Operator is obliged to keep records on the number and duration of planned and unplanned interruptions for each voltage level and inform Energy regulatory Agency on monthly level.

The most frequent used indices for continuity of supply in DSO are SAIFI and SAIDI. According to data received from Distribution Dispatch Centre, in the following tables are showed the following information regarding the interruptions at 35 kV network.

Table 5: Influence of Transmission network on interruptions in 35 kV network

|              | <b>Nb</b>  | <b>D (hour)</b> | <b>MWh</b>      |
|--------------|------------|-----------------|-----------------|
| Up to 30 min | 85         | 152.4           | 1.908,15        |
| Over 30 min  | 38         | 142.1           | 1.733,10        |
| <b>Total</b> | <b>123</b> | <b>294.5</b>    | <b>3641,247</b> |

With total of 123 interruptions with duration of 294.5 h, the transmission network caused interruptions in supply in the amount of 3.641,2 MWh.



Interruption over 30 min. amounted to 38 with duration of 142.1 h and with energy unsupplied of 1.733 MWh.

The following data on continuity of supply are given for the 35 kV network.

*Table 6: Interruptions up to 30 min. (planned and unplanned)*

|              | <b>Nb</b>   | <b>D (hour)</b> | <b>MWh</b>    |
|--------------|-------------|-----------------|---------------|
| Transformer  | 277         | 634,9           | 467,782       |
| Lines        | 1.879       | 4392,2          | 3.507,37      |
| <b>Total</b> | <b>2156</b> | <b>5027,1</b>   | <b>3975,1</b> |

At the 35 kV network it is registered the total of 2.156 interruptions (planned and unplanned) with the duration of 5.027.1 h and energy unsupplied of 3.975 MWh

*Table 7: Interruptions over 30 min. (planned and unplanned)*

|              | <b>Nb</b>  | <b>D (hour)</b> | <b>MWh</b>    |
|--------------|------------|-----------------|---------------|
| Transformer  | 96         | 605,0           | 386,716       |
| lines        | 857        | 4237,4          | 3.037,07      |
| <b>total</b> | <b>953</b> | <b>4842,3</b>   | <b>3423,8</b> |

The registered number of interruptions (planned and unplanned) over 30 min is 953 with the duration of 4.842 h and unsupplied energy of 3423.8 MWh

*Table 8: Unplanned interruptions*

|              | <b>Nb</b>   | <b>D (hour)</b> | <b>MWh</b>    |
|--------------|-------------|-----------------|---------------|
| Transformer  | 241         | 599,8           | 408,672       |
| lines        | 1.879       | 4392,2          | 3.507,37      |
| <b>total</b> | <b>2120</b> | <b>4992,0</b>   | <b>3916,0</b> |

Total unplanned interruptions are 2120 with 4.992 h of duration and with 3.916 MWh unsupplied energy

*Table 9: Unplanned interruptions over 30 min.*

|              | <b>Nb</b>  | <b>D (hour)</b> | <b>MWh</b>    |
|--------------|------------|-----------------|---------------|
| Transformer  | 79         | 574,7           | 338,496       |
| lines        | 624        | 3443,8          | 2.206,12      |
| <b>total</b> | <b>703</b> | <b>4018,6</b>   | <b>2544,6</b> |

Unplanned interruptions over 30 min were 703 with the duration of 4.018, 6 h and supply ceased of 2.544,6 MWh

*Table 10: Total interruption index.*

|              | <b>Nb</b>   | <b>D (hour)</b> | <b>MWh</b>      |
|--------------|-------------|-----------------|-----------------|
| Transformer  | 241         | 599,8           | 467,782         |
| lines        | 1879        | 4392,2          | 3507,367        |
| <b>total</b> | <b>2120</b> | <b>4992,0</b>   | <b>3975,149</b> |



## Voltage quality

According to the temporary Distribution Code DSO is obliged to supply electricity to customers with adequate voltage (according to JUS NA2.001) and with allowed deviations. Allowed deviations from normal voltage values are as follows:

- Low voltage level up to 1 000 V + 10%
- medium and high voltage level + 5%

These limitations relate to 95% all 10 minutes medium effective voltage in any period of time during a week, excluding interruptions in supply.

The highest allowed change of voltage at the connection or disconnection appearing in the installation of generator pararel with network is as follows:

- in low voltage level + 6% of voltage 231/400V<
- in high voltage level + 2 of voltage 10 kV< 20 kV, 35 kV,

## Commercial quality

According to the Rule for supply of electricity, License for electricity supply and distribution, Public Supplier is obliged to keep records and develop an adequate database and report the Energy Regulatory Agency on monthly and yearly basis of the following:

- number of complains submitted on the accuracy of the bills or invoice for electricity consumed,
- number of disconnected consumers dut to non-payment of bills,
- number of call in the Call Centre

Data on issued and realized accounts for 2009 in the category „households“ are presented in the following table:

Table 11: Number of accounts issued and realized in 2009 in the category „households“

| Supply Units | Number of accounts issued in 2009. | Number of accounts realized in 2009. |
|--------------|------------------------------------|--------------------------------------|
| BAR          | 354,865                            | 216,433                              |
| BIJELO POLJE | 220,519                            | 82,366                               |
| BUDVA        | 221,803                            | 131,651                              |
| ŽABLJAK      | 64,780                             | 29,347                               |
| BERANE       | 263,899                            | 125,584                              |
| KOLAŠIN      | 63,811                             | 24,135                               |
| KOTOR        | 169,257                            | 101,080                              |
| MOJKOVAC     | 47,588                             | 28,114                               |
| NIKŠIĆ       | 345,044                            | 146,487                              |
| PLJEVLJA     | 178,245                            | 121,327                              |
| ROŽAJE       | 71,032                             | 35,412                               |
| TIVAT        | 103,020                            | 77,491                               |
| PODGORICA    | 1,029,863                          | 499,884                              |



| Supply Units | Number of accounts issued in 2009. | Number of accounts realized in 2009. |
|--------------|------------------------------------|--------------------------------------|
| ULCINJ       | 142,230                            | 78,321                               |
| HERCEG NOVI  | 276,347                            | 182,087                              |
| CETINJE      | 120,629                            | 49,998                               |
| PETROVAC     | 36,443                             | 21,737                               |
|              | <b>3,709,375</b>                   | <b>1,951,454</b>                     |

The complains on bills for 2009 are given in the Table 12.

According to the evidence of the Agency in 2009, in the following table are given complains of consumers against EPCG (Electric Power Industry of Montenegro

*Table 13: Consumers' complains to the Agency against EPCG*

|                          | Complain   | Accepted  | Rejected  |
|--------------------------|------------|-----------|-----------|
| EPCG resolutions         | <b>50</b>  | <b>45</b> | <b>5</b>  |
| Connection&disconnection | <b>32</b>  | <b>24</b> | <b>8</b>  |
| Metering problem         | <b>25</b>  | <b>21</b> | <b>4</b>  |
| Total                    | <b>107</b> | <b>97</b> | <b>10</b> |

At the beginning of this year, Public supplier has established Consumer Call centre for information, consulting and services rendering to consumers and free of charge phone number: 0800 83 555. Calling this number consumers may receive information on interruptions in supply and other services in the system.

In the following table is given number of calls in the Call centre for the first four months:

*Table 14: Number of calls in the Call Centre for the first four months of 2010 on number 0800 83 555*

| Month    | Total | Realized calls | Unrealized calls |
|----------|-------|----------------|------------------|
| January  | 26    | 18             | 8                |
| February | 91    | 62             | 29               |
| March    | 103   | 79             | 24               |
| April    | 85    | 79             | 6                |

In addition to calls in the Call centre, the Supplier received 3 to 4 mails per day.

The Energy regulatory Agency will introduce indicators, penalties and define the terms and conditions for supply of electricity in the New Rule for supply that will be issued, together with new Distribution Code and other very important documents, by the end of 2010.

Table 12: Complains to supplier for bills issued in 2009

| Supply Units | No. requests received | No. of request submitted to DU | No. of complains from DU | No. of request resolved | Positive corrections |                  |                   | Negative corrections |                   |                 | Unrealized |
|--------------|-----------------------|--------------------------------|--------------------------|-------------------------|----------------------|------------------|-------------------|----------------------|-------------------|-----------------|------------|
|              |                       |                                |                          |                         | No.                  | kWh              | €                 | No.                  | kWh               | €               |            |
| Bar          | 1,244                 | 82                             | 17                       | 1,229                   | 915                  | 793,598          | 68,785            | 170                  | -191,996          | -11,957         | 140        |
| Bijelo Polje | 338                   | 338                            | 0                        | 338                     | 188                  | 155,877          | 13,474            | 150                  | -136,940          | -12,737         | 0          |
| Budva        | 62                    | 62                             | 0                        | 62                      | 24                   | 115,716          | 10,229            | 38                   | -113,795          | -10,189         | 0          |
| Žabljak      | 50                    | 50                             | 0                        | 50                      | 17                   | 6,746            | 640               | 15                   | -12,063           | -893            | 0          |
| Berane       | 387                   | 224                            | 68                       | 387                     | 225                  | 154,260          | 11,860            | 224                  | -118,499          | -11,419         | 0          |
| Kolašin      | 10                    | 10                             | 5                        | 7                       | 0                    | 0                | 0                 | 10                   | -24,888           | -2,458          | 0          |
| Kotor        | 118                   | 118                            | 118                      | 118                     | 13                   | 36,215           | 2,972             | 105                  | -173,630          | -16,323         | 0          |
| Mojkovac     | 45                    | 45                             | 0                        | 43                      | 12                   | 2,962            | 245               | 31                   | -5,685            | -665            | 2          |
| Nikšić       | 772                   | 772                            | 621                      | 826                     | 268                  | 394,562          | 35,363            | 558                  | -734,749          | -29,797         | 90         |
| Pljevlja     | 412                   | 412                            | 0                        | 392                     | 357                  | 147,643          | 12,561            | 148                  | -92,065           | -8,769          | 0          |
| Rožaje       | 206                   | 182                            | 182                      | 206                     | 120                  | 22,000           | 2,404             | 86                   | -35,597           | -3,492          | 0          |
| Tivat        | 22                    | 22                             | 402                      | 424                     | 197                  | 129,627          | 9,938             | 0                    | 0                 | 0               | 8          |
| Podgorica    | 1,833                 | 1,413                          | 423                      | 481                     | 3                    | 2,450            | 178               | 382                  | -439,976          | -37,155         | 428        |
| Ulcinj       | 116                   | 116                            | 87                       | 95                      | 48                   | 117,881          | 9,743             | 47                   | -29,460           | -2,714          | 0          |
| Herceg Novi  | 787                   | 577                            | 469                      | 647                     | 363                  | 478,674          | 43,230            | 485                  | -508,521          | -49,499         | 90         |
| Cetinje      | 48                    | 24                             | 0                        | 31                      | 38                   | 23,487           | 1,963             | 45                   | -40,958           | -3,887          | 11         |
| <b>TOTAL</b> | <b>6,450</b>          | <b>4,447</b>                   | <b>2,392</b>             | <b>5,336</b>            | <b>2,788</b>         | <b>2,581,698</b> | <b>223,584.34</b> | <b>2,494</b>         | <b>-2,658,822</b> | <b>-201,953</b> | <b>769</b> |