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Market reform is the main theme of this article. In particular, how market reform can be stymied by one actor having considerable market power. The authors outline the challenges to investment and economic efficiency caused by the market dominance of Petrobras.

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The article is devoted to the geopolitical features of ensuring the energy security of the Caspian regions of Russia and the Republic of Azerbaijan. The article analyses the main factors affecting the situation in both countries in the medium-term. Conclusions are drawn in the direction of the main actions so that the situation changes for the better. The authors also describe the main indicators of energy security that can be monitored for both countries.

Oil Refining in Brazil: What are the Main Challenges Right Now?

Fernanda Delgado and Felipe Perez

As Brazil's political pendulum swings to the far right with expectations of regaining economic growth from Bolsonaro's campaign on free-market economic platform, fiscal austerity, privatization, and the reduction of the size of the government, providing fuel for an ever-growing population within the confines of the current local refining industry and infrastructure will continue to be difficult.

Two essential characteristics of the sector have prevented local supply from keeping up with demand and new investors and players from joining the game:

1. *De facto* downstream monopoly of the NOC (national oil company, Petrobras)

Even 20 years after the legal reforms of 1997, with the introduction of the Petroleum Law, which relaxed the exercise of state monopoly (allowing free competition), liberated imports and eliminated explicit subsidies; the national oil company Petrobras still holds a hegemonic position in the local refining capacity and Transpetro (Petrobras subsidiary) owns effectively all the country's crude and product pipeline infrastructure.

2. Stability of the fuel pricing policy

Fuel pricing policy demands very short-term definitions that include issues such as reference-price equivalence, subsidies and refining investments. Numerous situations in the past indicated manipulation of Petrobras' position and implicit price controls by the government as a way to keep inflation in check.

This paper aims to explain the dilemmas of the downstream segment in Brazil, focusing on gasoline and diesel supply, which are the two largest oil products consumed in the country, and how the new government plans to deal with them.

Current Situation

Brazil is the seventh largest fuel market in the world according to the National Agency of Petroleum, Natural Gas and Biofuels – ANP.¹ The Brazilian refining market is supplied by a single agent – Petrobras – which holds approximately 98.2% of its capacity (approximately 2.4 MM bpd) and 13 of the 17 refineries in Brazil. Since 1997, however, there have been no regulatory restrictions on the entry of new agents, even though there were no major investment initiatives in the sector, except for Petrobras itself. In 2016, though, many importers started to supply the Brazilian market after Petrobras adopted and International Parity Price policy.

The projects to add refining capacity, on the other hand, were nothing but troubled. The RNEST refinery had only one of its two 115,000 bpd trains completed in 2013 at an exorbitant cost of over \$20 billion. The construction of the COMPERJ refinery, suspended since 2014, was only resumed at the end of 2018 due to the partnership formed between Petrobras and CNPC. Two other refinery projects, Premium I and II, were cancelled.

The Brazilian logistics for refined products is very constrained and vulnerable. Product transportation, either imported or from local refineries, relies mainly on road and cabotage. Just a little over 40% of the total annual sales of fuels are transported through pipelines,² which is the most reliable and cost-effective method. This situation was evidenced during the truck drivers' strike in 2018.

In the distribution segment, the market is more competitive since it has more than 200 agents, even though the three main distributors (BR, Ipiranga and Raízen) hold more than 70% of the total. In the retail segment, there are more than 42,000 resellers and more than 17,000 points of supply for large consumers.

With the movements of uncrossing subsidies from 1997 until 2001, free market practice³ started to take effect in 2002. Domestic prices (Brazil average price of the various products) would be the result of a moving average (without defined periodicity) in order to follow international prices in the medium and long term. Then, prices would be below the international average (Gulf Price used as reference) generating temporary losses for Petrobras, or they would be generating temporary gains that would compensate in the long term. Also, the Contribution of Intervention in the Economic Domain was created to focus on the fuel price of CIDE⁴ as one of its components.

Given the large multiplier effect on employment and income in some economic sectors, the government, aiming to stimulate the automobile sector with the sale of light vehicles to mitigate the effects of the American 2008/2009 crisis, decided that Petrobras should subsidize gasoline and diesel by selling these products at approximately 10 to 20% below international prices at the refinery to cover for inflation and its ultimate impact on the consumer, thus creating uncertainty surrounding domestic and international price alignment.

The move to subsidize gasoline and diesel consumption led to an increase in imported oil to maximize domestic production of these two products (since the 1980s the country was a net exporter of gasoline, a position that was reversed afterwards). According to OLIVEIRA and ALMEIDA (2014),⁵ this policy led to financial losses of around R\$ 39 billion in sales of gasoline and R\$ 63 billion in diesel only between 2011-2013, totalling losses of R\$ 102 billion (including opportunity cost) in Petrobras' cash flow.

By the end of 2018, Brazil's imports of gasoline and diesel were about 244,000 bpd and 556,000 bpd total refined products,⁶ respectively.

Recent Changes and Events

In the middle of financial distress and corruption scandals, Petrobras presented in its 2017-2021 Business Plan a relocation strategy in the downstream segment that included divestments and partnerships in refining.

The primary requisite to attract investors and partners to oil refining is a free-market pricing policy aligned with international prices. Petrobras started to adjust (at least once a month) gasoline and diesel fuel prices, according to references such as Brent. Its purpose was to improve refining profitability.

Prices at Petrobras' refineries started at the end of 2016 to follow the International Parity Price policy that would be the import price (market alternative) plus Margin and Risk (exchange rate volatility, oil and oil products and others) and then the corresponding Taxes (Federal - CIDE, PIS and COFINS - and State - ICMS).

The consequence of this period was the increase in imports of fuel by distributors, as well as other independent importers in the market.

With rapid loss of market share and a subsequently sharp reduction in its refineries' utilization rate, Petrobras reviewed its margins and reduced fuel prices at refinery gates in the middle of 2017 to contain the damage and improve the company's ability to compete. This action generated protests from independent importers alleging price manipulation below international parity.

In April 2018, Petrobras presented a preliminary model of its repositioning in refining⁷ to reduce its market share by creating two partnership opportunities: selling part of its refineries in two blocks – one in the Northeast (with the units of Bahia and Pernambuco) and the other in the South (with Paraná and the Rio Grande do Sul units). The model established that partners could acquire 60% in each block – equivalent to a little less than ¼ of the full domestic market – while Petrobras would keep the remaining 75%. This would potentially encourage the entry of new players into the market.

In June (2018), citing a cautionary action, a Supreme Court minister granted an injunction after determining that state privatization can only be done with the authorization of the National Congress, which led Petrobras to suspend the sales of shares in the two refining clusters.

Additionally, in the second quarter of 2018, a spike in diesel fuel prices at the pump because of rising crude prices and weakening of the Brazilian Real were the triggers for a nationwide truck driver's strike in May that paralyzed the entire movement of fuels and goods in the country. A discredited federal government in its final months of mandate budgeted and established a temporary subsidy on diesel fuel prices.

The Consequences

The consequences of this period last year were disastrous, and a series of reactionary measures followed.

The first consequence was to the Brazilian taxpayers. The subsidy of R\$ 0,30 in the price of a litre of diesel fuel, between the measure announcement in May and the end of 2018, cost taxpayers R\$9.58 billion.

Former Petrobras CEO Pedro Parente resigned from the company amid discussions and pressure from the government on the price policy of the state oil company. This was not a shock as Mr. Parente arrived at the company in 2016 with a plan of independence, cost reductions, and a focus on profitability and performance.

Independent fuel importers suspended their activities to avoid incurring losses right after the government intervention on diesel prices. These importers were the last group considered in the discussions, and there was a lack of clarity regarding how and when reimbursement for subsidies were going to be paid.

ANP even held a public hearing to decide on the frequency of the readjustments of the products and considered the possibility of controlling the prices. In the end, the price-control model was abandoned, and different pricing policies were developed separately for gasoline and diesel.

The Administrative Council for Economic Defense, CADE, the anti-trust organization, formed a task force with ANP with the objective of analyzing the structure of the fuel market and the promotion of competition as an instrument to increase competition and innovation in the Brazilian economy.

The June 2017 policy of making daily adjustments continued, however. In September 2018, Petrobras decided to use a complementary hedge mechanism to give flexibility to price management in order to reconcile the interests of the customers' demands and market agents in general, with the option to keep it stable for up to 15 days.

A broader and more extensive consequence stems from the frightening message this sends to local and international investors of the persistent high risk of government intervention and manipulation of Petrobras' position to control fuel prices.

Perspectives

With an initial pro-market platform, Bolsonaro is set to continue, inexorably, the current policies of opening the oil industry in search of expanding private competition and attracting investments, including breaking Petrobras' de facto monopoly in refining. The newly elected president mentioned in his campaign that his plans depend on the development of local market competition, with a gradual reduction of local content requirements. Bolsonaro also promotes a new role for Petrobras developing pricing models, which he believes should follow international markets, "but without short-term fluctuations," which would be reduced with appropriate hedging mechanisms.

The discussion is expected to be quite polarized in Bolsonaro's cabinet: on one side, his military supporters are inclined to hold total control of national oil assets. On the other side, the pro-business platform envisions privatization and a more diverse market, with the message of better returns for consumers, which in turn will boost the economy.

Monopoly feeds off government-controlled pricing policies and vice-versa. Will this administration be able to break the cycle?

Open access to fuels at fair market price with diversity in supply tends to be the norm in developed economies. However, will this Brazilian government resist interfering when prices are on the rise affecting inflation even if they succeed in reforms in the oil refining sector?

The evolution process depends on a patient and dialectical game between two fundamental institutions: the ballot box and the market, which demands they be independent of each other. That is not a trivial problem. The feeling is that Latin America is going through a turbulent moment, with the impression that something is out of order in democracies.

However, one fact is certain: the combination of political authoritarianism and free market economy is not new in Brazil or Latin America. Hence, there has not been a success story so far in the region. Separating economic and political freedom may seem like a shortcut to development, but in Latin America, the demand for strong government has been competing with a persistent desire for freedom.

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Endnotes

¹Available at: <https://duvidasgasolina.hotsitespetrobras.com.br/>

²Fuel productions and supply – Opportunities in Brazil. Available at: http://www.anp.gov.br/images/publicacoes/Fuel_Production_and_Supply_Opportunities_in_Brazil.pdf

³Prices defined by the products market with the convergence of domestic and international prices.

⁴Available at: <https://duvidasgasolina.hotsitespetrobras.com.br/>

⁵Impactos Recentes da Política de Controle Indireto dos Preços de Gasolina, Diesel e GLP na Petrobras – OLIVEIRA e ALMEIDA (2014). Available at: <http://www.gee.ie.ufrj.br/index.php/get-artigo/480-impactos-recentes-da-politica-de-controle-indireto-dos-precos-de-gasolina-diesel-e-glp-na-petrobras-2?highlight=WYJwYXRyXHUwMGVKY2h1IQ>

⁶Estimated from ANP. Data available from January to November 2018.

⁷Available at: <http://www.investidorpetrobras.com.br/en/press-releases/webcast-preliminary-model-petrobras-repositioning-refining>

Geopolitical Features of Energy Security in the Caspian Regions of Russia and Azerbaijan

Sergey M. Senderov, et.al

Introduction

Energy security studies are devoted to [1–7], which describe modern approaches and methods of its research in various countries. The studies of Russia's energy security are described in works [8–20], which describe the current state of energy security, approaches to its research and evaluation, show the results of an analysis of the state of the most important indicators of Russia's energy security, and describe the main problems of ensuring energy security in Russia and its regions.

Regarding ensuring energy security at the general state level, Russia and Azerbaijan combine features of the requirements for such a security system. For both countries, these requirements are mainly related to the need for a sufficient supply of their domestic consumers with the required types of energy resources from their own sources of these resources, as well as with the need to supply oil and gas for export in reasonable amounts [21, 22]. However, with the transition to the regional level and, in particular, to the level of the Caspian regions of these countries, the specifics of the power supply requirements of these regions for Azerbaijan and Russia differ sharply. These differences are caused by the different significance of the Caspian regions in terms of ensuring the energy security of both countries at the national level. If for Azerbaijan such significance of its Caspian region is absolute, then for Russia this significance is much lower.

All volumes of oil and gas produced in Azerbaijan fall in the Caspian regions (including offshore hydrocarbon deposits). The total share of all primary fuel and energy resources received is currently more than 95% [23] of the total volume of these resources produced in the country. With that said, for Azerbaijan, it is necessary to talk about regional threats to energy security of national importance.

Unlike the Caspian regions of Azerbaijan, the share of Russian Caspian regions in the total volume of primary energy resources produced in the country is just over 1%. At the same time, these regions themselves have their own problems with ensuring energy security. These specific problems will be discussed below together with a review of the overall situation with the provision of the energy sector of Azerbaijan and in the Caspian regions of Russia.

Before considering the problems of regional significance with ensuring the energy security of the Caspian regions of both countries, we first consider regional problems of national importance. For the reasons mentioned above, we consider these problems only for Azerbaijan.

The Main Threats to Energy Security of National Importance in the Caspian Region of Azerbaijan and the Current Scale of their Implementation

Let us consider the problems of national importance with ensuring the energy security of the Caspian regions of Azerbaijan through the real scale of the implementation here of the most important threats to energy security in recent years.

Azerbaijan has many oil and gas fields and prospective structures in the Caspian Sea. Proven oil reserves in Azerbaijan amount to 7 billion barrels, natural gas – 2.6 trillion m³. The predicted values of oil reserves – 10 billion barrels, natural gas – 3 trillion m³. Among the Caspian fields, the most significant is the Azeri-Chirag-Gunashli (ACG) oil and gas field, whose proven oil reserves are estimated at 1.2 billion tons, natural gas – 360 billion m³ [24].

Another large field is gas condensate – Shah Deniz, whose reserves are estimated at 1.2 trillion m³. According to forecasts at the second stage of this field, gas production can be increased to 24 billion m³ per year and another 600 billion m³ of gas – in such fields as Absheron, Umid, Ashrafi, Karabakh. In addition to the above fields, there are five more promising structures with a total stock of 2.2 trillion m³ of gas (Babek - 400 billion m³, Nakhchivan - 300 billion m³, Zafer-Mashal - 300 billion m³, Araz-Alov-Sharg - 700 billion m³ and Shafag-Asiman - 500 billion m³).

The development of oil and gas fields in the Caspian became possible after the signing in 1994 of the “Contract of the Century” [25] and the subsequent inflow of large investments. The project participants comprised 13 companies, including BP (35.8%), SOCAR (11.6%), Chevron (11.3%), Statoil (8.6%), and others. After signing the “Contract of the Century,” twenty-six agreements were signed with forty-one oil companies from 19 countries.

By 2020, the length of export gas pipelines to Europe in single-line terms will be 3,500 km. The capacity of TANAP is 16 billion m³ (to Turkey - 6 billion m³), (to Europe - 10 billion m³).

The analysis of the operating conditions of the oil and gas sector revealed the most significant threats to the energy security of Azerbaijan, the implementation of which can lead to problems in ensuring not only energy but also economic security. Among the most significant threats are:

- reduction of oil production in the region;
- the decrease in the export of hydrocarbon resources.

Each threat must be considered taking into account the mutual influence of internal and external risks and survivability.

Reduction in annual oil production in the Caspian region of Azerbaijan from 2010 to 2017 amounted to about 23% (from 50.8 to 38.8 million tons) [23], mainly due to the steady narrowing of the resource base. The main deposits of liquid hydrocarbons in the region are in the Baku oil and gas region (Apsheron Peninsula) and in the Apsheron-Pribalkhash zone of the deep-water shelf of the Caspian Sea – a powerful oil structure of ACG (Azeri-Chirag-Gunashli oil-bearing areas).

Today, 75% of the volume of oil from the Caspian region (and in Azerbaijan as a whole) is produced in the ACG areas. The remaining 25% comes from the old fields of the Baku region and the relatively small fields of the shallow shelf of the Caspian Sea (Oil Rocks, Mud Creek, O. Sandy, etc.).

The decline in oil production is 23% from 2010 to 2017. A slight reduction in gas production at a virtually unchanged level of domestic consumption of primary energy resources in the country

naturally reduced the export of hydrocarbon resources both in physical and monetary terms, although over this period, the share of the oil and gas sector of the Caspian regions in the country's export potential decreased slightly. In 2011 the volume of total exports of Azerbaijan was approximately \$26.6 billion, and oil and gas exports amounted to about \$25.1 billion, which corresponded to 94.5%. In 2016, the volume of total exports of Azerbaijan amounted to approximately US\$9.1 billion, while oil and gas exports amounted to approximately US\$8 billion, which corresponded to 87.4% [26].

If the decrease in exports of Azerbaijani hydrocarbons in physical terms was only 21.8% – 59 billion tons of fuel equivalent in 2016, it was 75 billion tons of fuel equivalent in 2010 [23], the decrease in “monetary” exports was several times greater – compared to 2011 in 2016, “monetary” exports of the country decreased by 2.9 times, and oil and gas exports by 3.14 times. This situation has developed due to the large difference in world prices for hydrocarbons in 2010 and 2016.

Analysis of the scale of implementation of threats to energy security of the national significance of the Caspian region of Azerbaijan showed that the overall situation in the country's economy and the level of its energy security is almost entirely determined by the situation with the development and functioning of the oil and gas sector in this region.

It should be noted that in the Republic of Azerbaijan today, all the requirements for the main energy resources are provided by internal sources. This situation should continue in the foreseeable future. Thus, from the standpoint of the reliability of fuel and energy supply, it can be stated that, in general, the situation in the Republic of Azerbaijan is assessed positively.

All the threats to energy security mentioned above relate to the foreign economic activity of the energy sector, and therefore the degree of their implementation is mainly determined by external conditions, primarily the price of oil. It should be noted that, following the devaluation of the Azerbaijani manat in 2015, 2016 was the worst year in economic terms in the last ten years, because the price of oil decreased more than three times, and, accordingly, the flow of currency from hydrocarbon exports decreased.

With the increase in oil prices, 2017 has become a year of stabilization in the economy. From the beginning of 2018, real growth in the economy is noticeable. In the first quarter, Azerbaijan's economy grew by 2.3%, while growth in the non-oil sector was about 3%, industrial production increased by 2%, and non-oil industry – by about 10%. During the first quarter, investments in the amount of \$3.5 billion were invested in the country's economy, with a significant portion being foreign investments.

In 2017, a new agreement was signed in Baku (extension of the “Contract of the Century”) on the development of the ACG block until 2049 with the share participation of BP companies (30.37%), SOCAR (25%), Chevron (9.57%), INPEX-9 (31%), Equinor (7.27%), Exxon Mobil (6.79%), etc.

In 2018 in Aktau, the “Convention on the Legal Status of the Caspian Sea” was adopted. But it wasn't considered the issue of dividing the bottom of the Caspian Sea between the five countries of Russia-Turkmenistan-Azerbaijan-Kazakhstan-Iran. Despite the unresolved issue of dividing the bottom of the Caspian Sea in the first quarter, as part of the new agreement (extension of the “Contract of the Century”) for the development of the ACG block, Azerbaijan received a \$450 million bonus, which indicates the attractiveness of the Azeri-Chirag-Gunashli “for leading foreign oil and gas companies.” It is expected that within the framework of the new 32-year agreement, US\$40 billion will be invested in the economy of Azerbaijan and 3 billion barrels of oil will be produced.

Despite the recovering positive trends in the oil and gas sector, the economic and energy security of Azerbaijan is determined and will be determined mainly by world prices for hydrocarbons. To reduce the economy's dependence on external factors (oil price), on December 6, 2016, the President of Azerbaijan signed 13 documents on creating the ideological basis for the development of the Azerbaijan Republic for short, medium and long-term periods, where the main leitmotif of development envisages diversification of the economy, reducing the share of the oil sector by accelerated development of the non-oil sector of the economy. Therefore, when considering the energy security of Azerbaijan, the focus is on electricity security, which will be discussed below.

The Situation with Energy Security of the Caspian Regions Azerbaijan and Russia

To assess this situation, it seems reasonable to use the methodology for assessing the state of the region's energy security [21, 22, 27], developed at Melentiev Energy Systems Institute. The methodology assumes the mandatory consideration of this situation by such analysis objects as:

- the ability to meet the needs of the region in the main types of energy resources with appropriate analysis of the possibilities of covering the maximum electrical load in the region;
- capabilities of the region to meet its needs for primary energy;
- the share of the dominant resource in the consumption of primary energy in case of an emergency decrease in the supply of this resource;
- share of the largest source in the production of electricity in the region;
- the ability to meet the peak of the growing demand for energy resources in conditions of significant cooling in the region;
- the state of the basic production assets of the energy sectors of the region, including the situation with the renewal of the production assets of the electric power industry, as an infrastructure sector.

The list of recommended indicators for use:

- the ratio of the total available power of sources of electricity in the region to the maximum electrical load of consumers in its territory;
- the ratio of the sum of the available power of the power plants and the transmission capacity of the intersystem connections of the region to the maximum electrical load of consumers in the region;
- the ability to meet the primary energy needs from the region's own sources;
- the share of the dominant resource in the total primary energy consumption in the region;
- the share of the largest power plant in the installed electrical capacity of the region;
- the level of potential supply of demand for fuel in the conditions of a 10% increase due to cooling in the region;
- the degree of depreciation of the basic production assets of the energy sectors of the region;
- the ratio of the average annual input of installed capacity and reconstruction of regional power stations over the last 5-year period to the installed capacity of the region.

Methods for calculating the indicators listed above and the procedure for reaching the integral assessment of the situation by ensuring energy security in the region are presented in the above-mentioned methodology.

The Situation with the Provision of Electricity Safety of Azerbaijan

As shown above, in the Republic of Azerbaijan all the needs for basic energy resources are provided from domestic sources, and therefore the task of ensuring energy security is transformed into the task of ensuring electrical energy security, and because of the scale of the territory of the Republic of Azerbaijan, the regional study of energy security countries [28]. Based on the above, the list of the indicators for Azerbaijan changes and they are presented below [29]:

- the ratio of the total available power of sources of electricity in the region to the maximum electrical load of consumers in its territory;
- the ratio of the sum of the available power of power plants and the capacity of intersystem connections to the maximum electrical load of consumers;
- the share of the largest power plant in the installed electrical capacity of the country;
- the degree of depreciation of the production assets of the country's power industry;
- the ratio of the average annual input of installed capacity and the reconstruction of the country's power plants over the last 5-year period to the installed capacity of the country;
- the share of alternative and renewable energy sources in meeting the need for electricity.

Before assessing electricity security through the selected indicators, it should be noted that, as in the case of meeting the needs for major energy resources, Azerbaijan is fully provided with electricity from domestic sources of electricity. Azerbaijan also exports electricity to the electricity markets of Georgia and Turkey, as well as supplies electricity to Iran in the island mode.

The structure of the power system of Azerbaijan is such that significant generating capacity is located in the western part of the country, and the main consumers are in the eastern regions of the country where the level of imported electricity reaches 40%, and therefore there are problems with the first indicator, although due to high-voltage power lines (330 and 500 kV), connecting the eastern and western parts of the country, the situation on this indicator can be taken as acceptable.

Azerbaijan satisfies both domestic electricity demand and peak power at the expense of domestic sources, and therefore the assessment of this indicator can be taken as normal.

The largest power station in the Azerbaijan energy system is Azerbaijan's thermal power plant with an installed capacity of 2,400 MW, which is 38% with a total installed capacity of 6,400 MW of the Azerbaijan energy system. The status of this indicator can be considered pre-crisis, although with the commissioning of new power plants (by the end of this year, the commissioning of the Shimal-2 power station with a capacity of 409 MW is expected) the state of this indicator will somewhat improve.

The degree of deterioration of the main production assets of the country's electric power industry is also mainly associated with the above-mentioned power station – the Azerbaijan Thermal Power Plant – built in the 1980s and expected to be dismantled soon. The degree of depreciation of the main production assets of the power industry is about 38%, and the accelerated rate of renewal of generating capacity will improve the condition of this indicator, today its condition is normal pre-crisis.

Over the last 5-year period, more than 800 MW of capacity has been commissioned in the Azerbaijan energy system, which is about 12.5% of the installed capacity of the country.

At present, the share of renewable energy in meeting the country's need for electricity is about 7%, and this figure is far from the target values indicated in various documents adopted in the Republic of Azerbaijan. The policy on the widespread use of renewable energy sources allows us to accept the status of this indicator as acceptable.

Integral assessment of the situation with ensuring the electricity security of Azerbaijan is characterized as acceptable.

The Situation with Energy Security of the Caspian Regions of Russia

The situation with ensuring energy security in the Caspian regions of Russia was assessed considering the main provisions of the above methodology. The Caspian region of Russia includes three subjects of the Russian Federation – the Astrakhan region, the Republic of Kalmykia and the Republic of Dagestan. Below, the results of the analysis will be briefly presented in turn for each of these regions.

Astrakhan region. The maximum electrical load can be ensured by its own electricity generating sources. It is provided with a sufficient margin due to the use of intersystem electrical connections with energy-rich regions. During the analyzed period (five years), the available capacity of the regional power plants increased from 572 MW to 740 MW with a slightly increased maximum electrical load. In total, over 5 years, 330 MW of electrical capacity was introduced.

Opportunities to cover the primary energy needs of the region are within acceptable limits with a considerable margin due to the production of sufficient volumes of natural gas in its territory. Under these conditions, a high proportion of natural gas dominance in the balance of primary energy consumption can be considered acceptable. The indicator of the share of the largest source in power generation is located in the region of pre-crisis values and is 51%, having decreased 65% over the past five years due to the commissioning of new electricity generating facilities.

Indicators of opportunities to meet the peak of the growing demand for primary energy in the conditions of cooling in the federal district in the Astrakhan region are in the realm of acceptable values of the corresponding indicator and indicate that such demand can be covered with an adequate margin.

The situation with the deterioration of the production assets of energy in the region has a steady tendency for improvement. At the same time, the depreciation of the production assets of the power industry today makes up 45% and is so far characterized as pre-crisis. At the same time, the pace of

renewal of the electric power industry in the region is sufficient to characterize the situation on this indicator as acceptable.

The integral assessment of the situation with ensuring the energy security of the Astrakhan region is characterized as acceptable (80% of the sum of the weights of the most important indicators of the regional level are in the zone of acceptable states).

The Republic of Kalmykia. The Republic is characterized by an insufficient share of its own power generation. The maximum electrical load on the territory of the republic can be covered only by 22% at the expense of its own power generating capacities. At the same time, this load with sufficient margin can be covered when using intersystem electric connections with energy-rich territories.

Only 20% of the Republic's demand for primary energy can be satisfied from its own sources (insignificant gas production) with gas dominating in the balance of primary energy consumption of about 98%. Such a situation can certainly be considered a crisis. The share of the Elista gas-turbine CHPP dominant in the Republic is 95%, which is very dangerous. In case of an emergency failure, this situation can also be considered a crisis. Depreciation of energy production assets in the Republic exceeded 50% and from the standpoint of energy security is considered to be a crisis, while there is a tendency of further ageing of these production assets. The same can be said about the situation with the renewal of the electric power industry.

The fact that 56% of the sum of the specific weights of the most important indicators of Kalmykia are in the zone of crisis conditions, the integral assessment of the state of energy security of the Republic of Kalmykia can be described as a crisis.

The Republic of Dagestan. In the Republic, the maximum electrical load is covered with a sufficient margin. Natural gas is produced in sufficient quantities to meet the Republic's own primary energy needs. According to these indicators, the situation with ensuring energy security in Dagestan is characterized as acceptable. At the same time, the 96% share of natural gas dominance from the standpoint of the region's energy security is extremely high and can be considered a crisis. The largest electricity generating source in the Republic is the Chirkey hydropower station with a disposable capacity of 1000 MW, which is 52% of the total capacity of the Republic. This indicator characterizes the pre-crisis state of the corresponding indicator. Opportunities to meet the peak increasing demand for primary energy in conditions of cooling in the federal district in the country are in the region of acceptable values of the corresponding indicator and can meet the demand for fuel in these conditions with an adequate margin.

Over the past five years, a tendency has emerged in the Republic for the ageing of energy production assets (depreciation of production assets amounted to about 54%), which is characterized as a crisis indicator. The rates of renewal of the electric power industry, which have been at a pre-crisis level in recent years, are also low. In general, the integral assessment of the energy security of the Republic of Dagestan is characterized as pre-crisis (more than 46% of the sum of the weights of the most important indicators of the regional level are in the zones of crisis and pre-crisis conditions).

In general, even in the Astrakhan region, where the situation with ensuring energy security is characterized as acceptable, for individual indicators, it can be seen in which direction, and at what scale, measures should be taken to improve the situation. In the Republics of Kalmykia and Dagestan, where the situation with ensuring energy security is far from acceptable, such measures for each relevant indicator should be even more intense. The uncompensated ageing of the production assets of energy is a common problem for all.

Conclusion It should be noted that the approach to analyzing the situation with ensuring energy security may be similar for the regions of Russia and Azerbaijan. At the same time, the influence of the Caspian regions of the two countries on ensuring the energy security of these countries is significantly different. If for Azerbaijan this influence is largely decisive, then for Russia it is not too significant. Thus, in this case, the problems of ensuring the energy security of the Caspian regions themselves

come out on top. At the same time, the main efforts should be directed at minimizing the problem moments of organizing the fuel and power supply of these regions, identified in the process of an indicative analysis of energy security at the regional level. As for Azerbaijan, a comprehensive analysis of the scale of implementation of the most significant threats to the energy security of the Caspian region showed that the level of energy security of this region and the country is determined by the situation with the development and functioning of the oil and gas sector in the region.

Considering all the above, among the emerging negative trends, it should first be pointed out that the export volume in the current decade has decreased from the oil and gas sector of the Caspian region of Azerbaijan. For the long-term perspective (over 15 years), this tendency, cannot be considered negative – especially if the proportion of non-energy-intensive, knowledge-intensive sectors of the state's economy increases with a decrease in oil and gas exports.

As for Russia, the analysis of the state of energy security is shown in the article for the Caspian regions. From such assessments, it follows the focus of action to implement the necessary steps to normalize the situation.

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