Green Alternative's Policy Briefs are short analyses on some of the challenges to country's sustainable development. They are part of the broader Green Alternative's analytical works; some complement or summarize reports, while others combine analysis from the research with consultation around a pressing issue. The purpose is to convey urgent public policy problems and promote debate on courses of action to resolve them.

This policy brief is intended for public policy makers and practitioners; it will also be useful for those groups and individuals seeking to influence the policymaking processes.

Shah Denize gas field development

Introduction

The Shah Deniz gas condensate field covers 860 km^2. It is located on the deep water shelf of the Caspian Sea, 70 km south-east of Baku, in water depths ranging from 50 to 500 m. The estimated total reserves are 1.2 trillion cubic meters of gas and 240 million tons of gas condensate. The Shah Deniz field is operated by British Petroleum, which has a share of 28.8%. Other partners include of consortium includes Turkish Petroleum Overseas (TPAO) with17.9% of shares, State Oil Company of the Azerbiajan Repulic (SOCAR) with 16.7%, Petronas, Malaysia owns 15.5% of shares, LUKoil, Russia -10% of shares and National Iranian Company (NIOC) has 10% shares. BP operates Shah Deniz on behalf of its partners in the Shah Deniz Production Sharing Agreement (PSA). The Production Sharing Agreement between the companies that operated the gas field was signed in 1996 for 40 years[1] and was extended in 2013[2]. Industrial production from Shah Deniz phase 1 started in 2006. Shah Deniz Stage 1 began operations in 2006. It has the capacity to produce around 10 billion cubic meters of gas per annum (bcma) and approximately 50,000 barrels a day of condensate.

On December 17, 2003, the final investment decision was signed for the development of second stage of Shah Deniz Gas field. It includes a number of aspects: the construction of two platforms, the drilling of 26 subsea wells, the laying of 500-kilometer underwater pipelines at a depth of 550 meters, the expansion of the Sangachal terminal, the expansion of the capacity of the South Caucasus Pipeline Line throughout Azerbaijan and Georgia, and the construction of the Trans-Anatolian (TANAP) and Transadriatic Pipelines (TAP). For the implementation of this project, IFIs have allocated a large amount of money (Table 1).

The final investment decision (FID) for the second stage of the Shah Deniz project was signed on December 17, 2013.

1 https://www.bp.com/content/dam/bp-country/en_az/pdf/legalagreements/PSAs/SD-PSA.pdf
2 http://www.reuters.com/article/azerbaijan-bp-idUSL6N0AUAF620130125

Project	Bank	Date	Amount of loan	Organization which gets loan
To finance the missing part of the SGC 's share of the Shah Deniz gas condensate field development project	ADB	7.12.2016	USD 500 million for 15 years, and USD 526 million syndicated loan for 15 years	CJSC Southern Gas Corridor
TANAP	Asian Infrastructure Investment Bank	21.12.2016	600 million US dollars	CJSC Southern Gas Corridor
TANAP	WB	20.12.2016	800 million US dollars (400 million SGC, USD 400 million BOTAS)	Southern Gas Corridor and BOTAŞ
TANAP	EBRD	18.10. 2017	500 million US dollars	Southern Gas Corridor

As part of the Shah Deniz-2 project, annual gas production will increase from nine billion cubic meters in the first phase by an additional 16 billion cubic meters in the second phase.

During its implementation, 16 billion cubic meters of Azerbaijani gas will be annually supplied to Western Turkey and southern Europe. Of these, 6 billion will be used by Turkey, while the remaining 10 billion cubic meters will continue its way to Southern Europe. According to preliminary calculations, 8 billion cubic meters per year will be exported to Italy, and 1 billion will be transported to Greece and Bulgaria.

The project has one strange character. To ensure the supply of the relative small amount of gas, the capital investments of USD45 billion are planned. The question of the profitability of the project, especially for Azerbaijan, is crucial.

According to estimation of Caspian Barrel[3] from 2007 to October 1, 2013, the profit of Azerbaijan from the Shah Deniz field under the Stage 1 project was USD1,497 million; and for 9 months of 2013, USD290 million. The amounts, if compared with the same oil revenues, are quite small. Theoretically, in the future, deductions in favor of the state could grow (which is due to the gradual return on investment of the Consortium).

On December 11, 2013, on the eve of the signing of the “Stage-2” agreement, a sensational statement by Azerbaijan Deputy Finance Minister Azer Bayramov was published on Caspian Barrel with a catchy title "Azerbaijan's gas truth: It turned out to be bitter". Azer Bayramov said, "Azerbaijan will not receive economic preferences from the gas contract until 2017-2018". Based on the data, we can assume that an agreement has been reached, according to which the profit due to Azerbaijan in the "Stage-1" project will be invested in the Stage 2 project. After the start of gas production under this project, Azerbaijan will begin to make a profit. But he will receive the basic income after investments of the Consortium will pay off gas deliveries. But it will not happen soon. A number of experts conducted an independent evaluation of the cost parameters of the Stage 2 project.

The agreement on the Shah Deniz field development was concluded according to the PSA scheme – that is, on the basis of the Production Sharing Agreement. In the early years, the bulk of the gas produced will belong to the Consortium, including SOCAR. The share of Azerbaijan will increase based on royalties, as the Consortium compensates its capital expenditures. However, according to the statement of Azer Bayramov, Azerbaijan refused it for the period of capital investments in "Stage-2". According to the figures of Azerbaijan's profits, it is possible to calculate the percentage of

3 http://caspianbarrel.org/en/azerbaijanen/

products (gas and condensate) that the Consortium charges as royalties. In 2013, approximately 6% was deducted. The same amount of deductions was in 2007-2012.

The media reports that the Stage 2 project will be fully operational in 2019. This is not quite true. At December 17, 2013, BP published main characteristics of the project: "First gas is targeted for late 2018, with sales to Georgia and Turkey; First deliveries to Europe will follow approximately a year later". Therefore, the gas field can be fully operational only in 2020. The Stage 2 project is designed for 25 years, and will supply Europe with gas until 2044[4].

The capital costs for the implementation of the Stage 2 project are known. The operation costs can be estimated based on "Stage-1" costs reported by BP. Gas transportation costs correspond to commercial tariffs in Europe. The gas price expected by the Consortium is USD400 per 1,000 cubic meters in Southern Europe and USD350 in Turkey. The price of condensate corresponds to the price of Azeri Light oil, as it enters the Baku-Tbilisi-Ceyhan oil pipeline. This data is sufficient to calculate the discounted capital costs and the discounted amount of profits from the sale of gas and condensate. Based on the calculation results, the economic return rate of the gas supplies to South Europe and Turkey can be determined.

Total capital costs of the Stage 2 project will be paid off in only in 2027-2029 after 8-10 years of the full gas production. The Stage 2 project includes the construction of two gas pipelines Transanatolian (TANAP) and Trans Adriatic (TAP).

In Turkey, 1790 km TANAP will be constructed, at the cost of USD12 billion. The TANAP project company unites SOCAR with 58% of shares, along with BOTAŞ Petroleum Pipeline Corporation with 30% and BP with 12%). BOTAS is the operator of Turkish State Pipelines.

The Trans Adriatic Pipeline (TAP) will start at the Turkish border with Italy, as well as with Greece and Bugaria. With a discount rate of 6%, the capital costs of gas supplies to Italy will be repaid in 2029-2033. The payback period from the beginning of the project is 16-20 years, since the beginning of gas supplies will be 10-14 years. Taking into account only economic positions and ignoring geological, technological, economic, political, terrorist and environmental risks, the supply of gas to Italy under the Stage 2 project can be estimated as "on the verge of reasonable". The same applies to gas supplies to Greece and Bulgaria.

Therefore, it looks like profit received under TANAP will cover the costs of gas supply to Europe.

The Stage 2 project provides for the extraction of gas from two platforms at the level of 16 billion cubic meters for 25 years. This seems unrealistic. This most important indicator can also be estimated on the basis of gas production plans for "Stage-1" at 178 billion cubic meters. It could be assumed that 70% of this gas will be produced through 9.5 billion cubic meters per year. The duration of its maintenance is 13 years – i.e., up to 2020. By this time, the full gas production will start under Stage 2 project. The gas of "Stage 1" to Turkey will be replaced by Stage-2 Stage 2 gas. Deliveries of the gas to Turkey and Europe on this level is expected to be continue until 2031. In reality, until the time of economic returns, the project's capital expenditures realization would start. Therefore, there is no gas for Azerbaijan that would bring additional profits.

The contractual obligations of Stage 2 for gas supply for the period 2032-2044 will be fulfilled through development of the Stage 3. And after that the question for stage 4 may raise. In case of the production supply, there is one important issue. The commercial operator of the Shah Deniz project is SOCAR. SOCAR signed the gas supply contracts with Turkish BOTAS and nine European companies for a period of 25 years.

For the Consortium participants everything is clear and understandable. They will invest in projects "Stage-1", Stage-2, and "Stage-3". At initial stages, due to the sale of gas and condensate, these investments will be compensated, and the

4 (http://www.bp.com/en/global/corporate/media/press-releases/shah-deniz-final-investment-decision-paves-way.html

profit will be formed. The only drawback of such an organization for development of the Shah Deniz field is that the Consortium members will not receive excess profits.

For Azerbaijan, everything is also clear and understandable. SOCAR's investments in the Stage 2 project will amount to USDUSD13.569 billion (30.2% of total capital expenditures). SOCAR will finance the capital investments on the royalties received in Stage 1.

Azerbaijan takes responsibility for significant investments in the TANAP pipeline and substantial in the TAP. Therefore, the Azerbaijani gas supplied to Europe will be at the expense of Azerbaijan budget and its royalties. The responsibilities for all possible risks of fulfilling contractual obligations belong to Azerbaijan. Will Azerbaijan receive royalties from further Shah Deniz projects? It appears no. In the best case scenario, in certain periods, it will reach up to for USD244 million dollars per year. Therefore, even without taking into account other risks listed below, the project in its essence will not bring significant profit to Azerbaijan with large capital investments.

Political risks

Since the Caspian becomes the most important geopolitical region since the collapse of the USSR and falls into the zone of interests of many powers, then naturally, geopolitical risks increase, and at the regional level, they are highlighted much more strongly. First, due to the interests of the actors of the second lines (Armenia, Iraq, Tajikistan, Kyrgyzstan, Georgia) and the third lines (US, China, Europe), as well as pipeline projects, the risks of intra-regional conflicts between Turkmenistan and Azerbaijan, as well as Azerbaijan and Russia, increase. Moreover, Russia's interests in stabilizing the situation and preserving the general cultural security of the region contradict the interests of the United States; this can play on the centripetal processes that started back in the 90s. Also, China has interests in the Caspian, and they do not always coincide with the interests of the United States. Secondly, in the case of solving the problem of the legal division of the Caspian Sea on a sectoral basis, as suggested by a number of Caspian states, there may be a threat of a conflicting situation and the termination of the operation of the aquatorial transport corridors. If either Turkmenistan or Azerbaijan will block their water areas, and the whole Caspian transport system will be under trouble.

The Iranian version of the section is not accepted by most Caspian countries, and this is also the risk associated with the fact that the Caspian, as a lake, does not obey international maritime law. The lack of a coherent policy in this area is a constant factor that causes conflict.

The energy component is a key motive in the strategy of world and regional powers in the Caucasus-Caspian region. The energy and transport-communication potential of the states of the Caucasus-Caspian region became the subject of the risk of losing or strengthening influence on a certain geopolitical space. The highest risk in this game is for the countries of the region themselves. The lack of a balanced policy in one country (Georgia) and the commercialization of policies in others (Azerbaijan, Kazakhstan, and Turkmenistan) created a situation of violation of the state of strategic stability in the region (strategic risk).

Another risk arises from migration processes, which (by changing the level of ethnoconfessional mosaicism) increase the degree of conflict-relatedness of the territory. Almost the entire North Caucasus falls into the Russian risk zone. But here, one must bear in mind.

The project on the delivery of Azerbaijani gas to Europe is a political one and is designed to weaken the EU's dependence on Russian gas. But the recent changes that have taken place in the region, as well as in the whole world, create certain risks for the implementation of this project.

At present, the European energy market is experiencing events that are likely to lead to a big redistribution in the gas market. The interests of Russia and Azerbaijan, as energy powers, are on the European continent. Specifically, we are

talking about the export of gas, which Baku is going to supply to the Old World via the "Southern Gas Corridor" and Moscow through the new pipeline arteries "Nord Stream-2" and "Turkish Stream".

As shown, with recent events in connection with the seizure of the Baku-Supsa pipeline, Russia may well create aggressive problems for the transportation of Azerbaijani gas[5].

The situation in the Nagorno-Karabakh conflict worries and aggravates. In case of intensification of hostilities, most of the SCS is in the firing zone. Also, it is impossible not to take into account the Kurdish factor. The events taking place in the Middle East, and in particular in Syria, sharply exacerbated this factor.

Another significant factor is the possible supply to Europe of American liquefied gas. Sanctions imposed by the United States on Russian energy companies may at some point affect the implementation of the Shah Deniz project, represented by the Russian company LUKoil, which is part of the Shah Deniz consortium. "LUKOIL" is one of the Russian companies to which the EU and US sanctions were applied. In September 2014, the US and the EU imposed sanctions prohibiting the supply of equipment and services for the exploration of deep-sea deposits and oil production, oil exploration and production in the Arctic, and shale gas projects in Russia. LUKOIL is not listed separately in the EU sanctions list, but sanctions apply to it as one of the companies that carry out such activities, and this is why it applied for a license from the Russian government to develop Arctic shelf deposits. Depending on the further relationship between the US and Russia, sanctions may be tightened to LUKoil[6].

The internal situation in Azerbaijan is not conducive to the implementation of the project. The economic crisis due to the pushing the country development only to oil and gas sector, without diversification, resulted in a complete fiasco. All indicators of economic development decreased. Although the country is relatively stable, with the twice devaluation of Azerbaijani Manat, high inflation led to the impoverishment of a large part of the population, which in turn led to social tension in society.

Environmental risks and consequences

For Shah Deniz, the Environmental and Social Impact Asseent was prepared. The document gives a very scant risk assessment for the project impacts on environment. Therefore, it is reasonable to consider the general impact of oil and gas projects on the Caspian and sections of pipeline corridors.

In late January 2013, Greenpeace published the report "Point of No Return", which contains information on 14 industrial projects around the world that environmentalists considered the most dangerous. Among them is the expansion of oil and gas production on the shelf of the Caspian Sea, and this project is directly related to British Petroleum. Information on the pollution of the Caspian by BP is not stand alone case. In 2010, the notorious network project Wikileaks in a series of leaks, published diplomatic correspondence and a number of documents, which stated that a number of rather serious incidents occurred in the drilling rigs BP in the Caspian Sea in 2008 and 2009, and these incidents were previously unreported by the government.

The Caspian represents the remnant of the Tethys Ocean. After the separation of the Caspian basin from the world ocean, a number of alternations of periods of salt and fresh water occurred. When the sea water became fresh, sea species died; when it became salty for freshwater species, it was necessary to remain in the rivers.

As a result of such long-term changes in the Caspian Sea, only freshwater and marine species have remained in fresh water. After that, there were many of unfilled ecological chains, and this explains the adaptation of marine species in the

5 https://haqqin.az/news/106139; https://www.pravda.ru/world/28-07-2017/1343558-georgia-0/

6 http://www.rbc.ru/economics/04/08/2017/59824c529a7947b30d0818eb

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Caspian Sea. If we compare hydro-biological data before and after World War II, we will see how some species have adapted well to the Caspian Sea: gray mullet, ringed sea worm, mollusks and some randomly introduced species, such as algal species and *Mnemiopsis*. At the moment, unique and poorly protected from external influences, fauna and flora has formed in the Caspian. Yet any violations during the extraction of oil and gas can disrupt the delicate balance of this ecosystem.

In October 2012, the Department of Environmental Protection of the Ministry of Ecology and Natural Resources of Azerbaijan imposed fines on the company for violations in the process of oil and gas production. According to the ministry, monitoring conducted in 2011 revealed that BP did not ensure the proper disposal of drill cuttings, as well as industrial and municipal wastewaters, during work on the block of Azeri-Chirag-Gunashli oil fields, and Shah Deniz gas condensate field, where the company is technical operator. As a result, in 2010, the company was fined AZN 593,948 (about USD755,000), while 46,583 manats (about USD60,000) in 2011.

Deputy Head of the Environmental Protection Agency of Iran, Abdolreza Karbasi, said that BP is carrying out oil production in the Caspian Sea with numerous violations, and this caused serious damage to the water area of the region. According to the Iranian side, BP allegedly dumped oil waste on the surface of the sea, instead of burying them (pumping into wells) at great depth. "The last time, four months ago, we had to clear Iran's shores from several large oil spots. Their total mass was 25 tons", the Iranian official said. Additionally, representatives of the agency said that they are preparing a number of lawsuits to be submitted to the international judicial bodies for BP's transnational corporation.

Karbasi also stressed that as a result of the increased oil pollution of the largest lake in the world, there are no special hopes for the survival of the flora and fauna of the Caspian Sea. To understand the official's concern is not difficult. The Caspian is not the Gulf of Mexico, where on April 20, 2010 the largest accident occurred at the oil well operated by BP. The Gulf of Mexico is still communicating with the Atlantic Ocean, and the Caspian Sea is a unique lake-sea, in which more than 80% of the world population of sturgeon dwell. (By the way, according to news agency Mehran News, in 2008, Iran exported 7 tons of black caviar. And in 2012, the Iranian Ministry of Agriculture, according to the IRNA news agency, planned production of just 1 ton of the delicacy.) Unfortunately, revenues from black caviar (even exported by Iran in 2008 to just USD22 million) are not comparable with hydrocarbon revenues.

An important risk is the implementation of the Shah Deniz project. Although an EIA plan has been drawn up for this project, the long-term cumulative impacts on the flora and fauna of the Caspian Sea have not been taken into account. In the process of the Azeri-Chirag and Shah-deniz project (Stage 1), inevitable changes have already occurred that have negatively affected biodiversity. Prior to the implementation of the project in the coastal zone of Absheron, there were important KOTs (key ornithological territories) on which a large number of birds wintered and nested. So, in the Sahil coastline, ornithologists noted up to 180,000 birds. At present, monitoring conducted by ornithologists shows a significant decrease in the number of birds in this area to 30,000. It is also necessary to thoroughly study the migration routes of sturgeon and other valuable fish species. It is possible that the reason for a significant decline in the population of sturgeon can be implemented in the Caspian Sea projects.

Of course, it will not stop producing oil and gas on the shelf. However, it is quite obvious that it is necessary to dramatically increase the technical, technological and professional reliability of the executors and project operators. Therefore, it is advisable, for example, to create international groups and commissions for expertise of used equipment and technologies.

Economic risks

The rapid development of renewable energy can significantly affect the full implementation of the project. Renewable energy (drawing resources, mainly from the sun, wind and water) is now being billed in many European capitals. If this rate plays, then Russia and Azerbaijan, with their traditional approach to gas exports through pipes, will be doomed to only calculate losses. In this regard, while it's not too late, it's time to conduct a thorough risk analysis.

In principle, at present, alternative or renewable energy is developing all over the world faster than the traditional hydrocarbon one. The EU intends to bring the share of the first in the total energy consumption to 20% by 2020; the import of gas by 2030, on the contrary, will be reduced by 12%.

The EU countries occupy the leading position in the world for the production of energy on the basis of an unconventional renewable energy source. The most impressive success was achieved in the development of wind, solar, and biomass energy. At present, at least 70% of the world's energy produced by wind power units is provided by the EU-27 countries. In 2016, the commissioning of new generation facilities on renewable energy sources (RES) became record, reaching 9% more than in 2015, according to the annual report of the Renewable Energy Development Agency REN217. The leader of growth was solar or photovoltaics (47%), followed by wind (34%), and hydropower (15.5%). Over the past five years, investments in new renewable energy resources have almost doubled their investments in traditional energy and amounted to almost USD250 billion.

One of the main gas consumers in this project is Italy, which occupies one of the leading places in the European Union in terms of energy consumption. In 2011, the country spent more than 850 million tons of oil equivalents on its energy supply. However, this level of demand in Italy cannot be met at the expense of its own production, which in the same year did not exceed 34 million tons of oil equivalents.

Oil remains one of the most important energy resources for Italy, but its share in the energy consumption structure is gradually decreasing, giving way to gas. It is expected that by 2020 the share of oil in the structure of Italian energy consumption will be 35-40%. Almost 90% of oil consumption is covered by imports. The main partners for Italy here are Libya, Russia, Iraq and Iran.

In terms of gas consumption, Italy is in third place in the European Union, after Britain and Germany. Gas accounts for about 40% of the country's energy consumption, and for the future, it is projected to increase this share. Domestic gas production covers only 10% of demand. Most of the imports come from Algeria, the Netherlands, and Russia. The Italian concern ENI is the largest customer of the Russian gas monopoly Gazprom. Operating contracts provide for Russian gas supplies until 2035.

Coal is also an important component in the production of electricity in Italy, but its share will likely decline amid rising investment in renewable energy sources and gas power plants. In 2011, it amounted to 8%, and may fall to 6-7%.

The development of nuclear energy in Italy was discontinued after the nuclear disaster in Chernobyl NPP. In a referendum, it was decided to close all operating nuclear power plants. Repeated referendum, after the accident at Fukushima, forced to abandon plans to resume the production of nuclear energy.

Russia occupies serious positions in the Italian energy market. In fact, a close strategic partnership has developed between Russia and Italy. Russia is a major oil and gas supplier, providing gas supplies through a network of pipelines, and Italy, in turn, helps in the construction and maintenance of these supply routes.

The European Union wishes to reduce its dependence on external energy exporters, including Russia, in order to strengthen its political and economic positions. In order to increase the energy security of the EU, the Third Energy Package was adopted, in particular, since one of the tasks is the reduction of the level of energy cooperation with Russia.

To reduce the degree of dependence on energy imports, Europe needs sources for its replacement, one of which is "green" energy. The desire to diversify energy consumption is an important incentive for the development of energy production from renewable sources.

7 http://www.ren21.net

The first step in this direction was Directive 2001/77EC on supporting renewable energy production in the domestic market. In January 2008, the draft Directive on the Maintenance of Energy from Renewable Energy Sources, which was later called 2009/29/EC was submitted to the European Parliament. This document created a legal framework and proposed the measures necessary to achieve the level of 20% of RES in the structure of energy consumption by 2020.

According to the obligations imposed by this Directive, Italy by that date should reach 17% of the share of energy consumption from RES.

At the moment, Italy is one of the world leaders in energy production through renewable energy sources. In addition, among the G20 countries, Italy belongs to one of the first places in terms of investments in RES. The inflow of capital is observed not only in the construction and operation of power plants, but also in the production of technologies and the development of a research base in the field of renewable energy.

Due to its geographical location, Italy is a promising market for the development of alternative energy. In the field of solar energy, its "home" variety has a great potential. Wind energy, most likely, will take a course on the development of wind farms in central and southern Italy. Investments in bioenergy will help develop combined heat and energy production, and also contribute to the generation of energy from biofuel "next generation". Thus, from the above, it can be concluded that with the favorable development of renewable energy in Italy, the need for natural gas may decrease. A similar situation develops in Greece and Bulgaria.

Conclusion

The Shah Deniz project is subject to many risks, which during their aggravation can stop the gas supply to Europe. Also, the project's profits are not comparable with costs, even without integration of the environmental risks.

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Note: Some interviews of public officials has been taken out from internet.

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