

The role of natural gas in relation to climate and renewable energy governance

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The Russian perspective

Growing demands for energy have caused widespread debates in Europe about the perfect balance between the different types of fuel, which could best meet the growing needs of the society. Natural gas is the most environmentally friendly fuel, which is allocated with a minimum level of CO₂ emissions into the atmosphere. Gas power plants produce about 50% less CO₂ compared to stations operating on coal.

There are so many benefits, which can be produced from the natural gas – it means that the dark side is also quite large. For example there are problems with production, storage, transportation, transformation, R&D and utilization. In the meantime, Russian government is absolutely concerned about gas development, and the Russian economy is tightly connected with the gas resources; sometimes, even more than with oil resources. The problem of competition on the Russian gas markets is regulated by the Federal law, which allows Gazprom, the monopolist; regulate the access to the gas-pipeline.

Russian natural gas 97,8% consists of methane (CH₄), which is the strongest greenhouse gas. 1 kilo of CH₄ equals 35 kilo of CO₂, in terms of 20 year perspective of global heating. It means that methane will 35 times quicker change the climate within a period of 20 years. Meantime, CH₄ remains in the atmosphere comparatively less than CO₂, therefore within a period of 100 years its potential is 11 times more that CO₂; within a period 500 years – already 4 times. As per European Commission's monitoring the Russian gas pipelines and drill-holes produce 35 million tons CH₄, because huge losses arise while drilling, transportation and storing.

Norwegian ecological organization "Bellona" reports 42 billion of emission from the Russian Federation. In the meantime, emission data may seriously differ from organization to organization. For example: 9,7 m.tons, 17,7 m.tons, 21, 31, 35 etc. In practice it means that we probably do not know the real figures. In case we assume that Russia is losing something around 35 million tons – it means that we lose 5% of its production. Comparing to other countries (USA, Germany, and Netherlands) it is too much, because they lose around 1%. For example, gas losses occur while the crude oil is being produced. Russia is losing more gas than any other crude-oil producing country. Hence, we may seriously reduce losses and the greenhouse effects if we will learn to control and avoid those multi-losses. It will also be more effective when we will deliver the gas to the customers or produce electricity, than just loose it burning to the atmosphere.

To reduce and control the emissions Russia should modernize the equipment and develop the technology and maintenance procedures. Generally the activities of emission reducing are divided into 3 main categories:

1. Modernization of technology and equipment, for example adjustable valves, which may check and hold the pressure inside the pipelines;
2. Developing of procedures and practices of maintenance and repairs;
3. Improving management, for example implementation of IT solutions, which will detect, measure and promptly inform about the losses.

The key milestones for effectiveness of gas chain production are the following:

First, production. The gas can be produced either from the earth layers as a pure substance (CH₄), or dissolved in crude oil as an associated gas, or from coal mines as a collateral gas, or from under the surface of ocean bed. Earth layers: for example the backwoods of Urengoi region, in case of accidents will not lead to any catastrophic after-effects. None of populations will be injured; no gas will be spotted, due to its colorless and scentless. The gas will immediately flow up into the air, due to its weight (it's twice lighter than the air we breathe).

In case of the production from the ocean it is a bit more problematic in case of accidents, and identification of accidents. (By the way, professionals add odorants with unpleasant smell to identify leakage). At the same time, comparing to crude oil production gas accidents are much easier to remove.

Coal mines gas production is an obligatory procedure while producing coal. The gas must be taken out of the mine to avoid explosion. This type of gas production is less preferable, but it still gives up to 15% of gas production. Due to reduction of coal mining this type of gas production is also reduced.

Nonetheless, gas flowing into the air is hazardous to the atmosphere. Methane is very poisonous in case it exceeds 10% of the air. The regular air contains methane, but its concentration hardly exceeds 0,001% in the air. Methane will obviously react the ozone in the atmosphere and may change the Earth' ecosystem.

Second, transportation. The gas is mainly transported by the mean of gas pipes. Such transport is used to quickly cover long distances, as the gas is transported under high pressure in the pipe. It's interesting that the length of gas pipelines 20 times exceeds the circumference of the Earth. The pipe life cycle is about 70 years, in case of ideal utilization. Fewer problems will bring on-the-surface trunks, as man can check and change outworn without any difficulties. Another pair of shoes is the ocean trunks, where service and diagnostics may hardly be simple. Again, gas pipelines, especially under the water, is much more eco-friendly than oil's.

Third, storage. In order to cut seasonal peak of gas consumption in winter, it should be stored somehow. Main idea of storing the gas is its cooling and storing in tanks, preferably under the ground, due to cold climate and huge distances between recourses and end-users. Underground storage facilities secure natural gas supplies to consumers, regardless season or temperature. For example Severo-Stavropolskoye gas storage facility is the largest in the world. It contains over 43 billion cubic meters of gas underground. This amount is enough to meet yearly demand of France and the Netherlands. Practical idea of gas cooling is to reduce its volumes, as liquid (or pressured, or compressed) gas contains 600 times less volume than vapor gas. Drilling for gas storage requires additional earth holes that lead to tectonic plate movement, which may be the reasons of earthquakes.

Forth, research and development. It is very important to bear up R&D in gas sphere, especially in Russia. State strategic development program for the year 2030 contains high interest to gas area. It is well known that today not only raw gas can be used by end-consumers, but also chemicals, paints, automobile tires, medicines, electricity, heating, plastics and many other goods and services can be produced from the blue fuel. Still there is a geological exploration risk, where the exploration activities won't confirm gas bearing capacities. The main goal of geological and economic surveys is the minimization of geological risks influence on the final results of the site economic attractiveness estimation.

In addition, greenhouse gases in the gas industry are gases formed as a result of the industry production activity that contribute to the greenhouse effect in the gas industry. Carbon dioxide and methane are of the highest significance. In comparison with other energy sources natural gas produces less CO₂ per unit of produced energy due to rather low hydrocarbon content. Russian government constantly organizes environmentally efficient events for greenhouse emissions reduction (including CO₂ and CH₄). The programs for limitation and reduction of CH₄ emissions at subordinate enterprises and facilities are elaborated. All these projects have a common goal: greenhouse emissions reduction, improvement of the fuel gas effectiveness and optimization of its consumption rate. They can be successfully implemented under the International System of payments for greenhouse gas emissions.

To sum up, despite of all statistic data of troubles still Russian gas is very demandable for Europe. The European Union is working on the implementation of climate change program named "20:20:20". The program plans to reduce the CO₂ emissions in 2020 by 20% compared to the levels of emissions of 1990. The new project "Nord stream" is currently being developed by Russian and EU organization. The pipeline will take an important place in the region's increasing need for energy during the few years it would take the EU to create a reliable supply of alternative energy sources. It is also noticeable that the project is mainly financed by private investments, and uses the most advanced technologies. Thus, combining the rich reserves of Russian gas to the European system of gas supply, "Nord Stream" provides the energy needs of more than 26 million European households.

Detached view is the benefits, which European citizens and corporations gain from the Russian Gas. On the other hand, Russian citizens also obviously benefit from such joint business. For example, "Gazprom for Children" program is the nationwide project, which embraces 72 regions of Russia. 714 sport buildings have been built within this Program by Gazprom. Buildings include recreational complexes, swimming pools, stadiums, football grounds and other facilities. Additional 101 sport complexes are now under new construction, and over 200 under reconstruction.

Every day these complexes can accept over 90,000 children and adults to engage in physical training. What is above sports and children, those objects are not only fully financed by Gazprom and its subsidiaries, but also freely dedicated to sports committees of the city or municipality, where each complex is located. Currently any inhabitant has the right to use these facilities free of charge. For instance, 18 multi-sport-complexes were built in Saint Petersburg districts within last 3 year. Those complexes have swimming pools, hockey arena, fitness studios, and

football and basketball sections within one building. Average space of each complex is about 2000 square meters. New complexes are planned for 2013-2016. Gazprom views its mission in support of sport and social responsibility.

Interestingly, RIA News Agency analysts ranked the World's richest countries by oil and gas per capita earnings. According to RIA Rating's calculations, the leader in the ranking is Qatar, where the average oil and gas reserves are worth more than 6 million USD. Russia, with its largest reserves of gas in the world, and amongst the 10 countries with the largest oil reserves was only 17 in the rankings, largely due to its relatively-large population. Russian reserves were estimated by 23,5 trillion dollars. RIA analysts calculated that hypothetic selling out of all commercial oil and gas reserves will bring an amount, which equally divided, can give 165 thousand dollars for every Russian citizen.

Nevertheless, Russian Statistics shows that average monthly salary in 2012 was about 26000 rubles¹ (around 650 Euro). The President recently announced that 18 million citizens (over 12% of population) live in poverty with the revenue less than 5 000 rubles (125 Euro) per month. Such contradictions, concerning revenues of above 12% of population and the people in power (Forbes List Russian Millionaires) with their uncountable luxury objects, engage floating discontent in the public.

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