

## ***RISKS AND THREATS TO STRATEGIC ENERGY RESOURCES IN THE CONTEMPORARY WORLD***

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*Abstract: Energy resources, especially oil and gas, are currently the most important factor that can provide economic and social development and, therefore, they continue to be cause for both cooperation and confrontation between the actors of our times. Limiting or prohibiting access to one of these types of resources may constitute a major threat to national and regional security with serious consequences for the international system. Therefore, any economy that depends on hydrocarbons imports, regardless of its degree of development, permanently faces energy risks and threats.*

*In this paper, we aim to clarify a series of theoretical aspects on strategic energy resources, energy risk and energy threat and identify and comprehensively analyze the main energy risks and threats which occur or may occur in the near future at national level (focusing on Romania), regional level (focusing on EU) and international level.*

Keywords: strategic energy resources, energy risk, energy threat, "energy weapon", energy security.

### **1. Strategic energy resources and energy risk**

In 1992, the UN's *Agenda 21* stated that "energy is essential to economic and social development and improved quality of life"<sup>1</sup>. More than 20 years after the first Earth Summit, Member States of the Organization reaffirm in the 2012 Resolution, *The future We Want*, "the critical role that energy plays in the development process, as access to sustainable modern energy services contributes to poverty eradication, save lives, improves health and helps provide for basic human needs"<sup>2</sup>, adding the sustainability characteristic of available energy resources.

In the following, we will use the definitions established in the specific literature to

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<sup>1</sup> United Nations, *Agenda 21*, Chapter 9 (9.9), Rio de Janeiro, 1992.

<sup>2</sup> United Nations, *The Future We Want*, Article 125, Rio de Janeiro, 2012.

conceptually clarify the notions as *strategic energy resources* and *energy risk*<sup>3</sup>. Thus, *resources* are defined as components that satisfy different needs of humanity<sup>4</sup>, means all quantity and quality factors of production which contributes to meeting the needs of economic and social development. We can include in that system of factors: amount of substances, organisms, energy, labor, knowledge, skills, information and capital available to the society, now and in the future.

*Natural resources* constitute the totality of mineral and ore deposits, available and cultivated land, forests and water available in a country<sup>5</sup>. They are formed as a result of natural processes and evolutions, without human intervention. In this category are included: air, water, soil, minerals, plants, animals, solar and wind energy, tides etc.

*Energy resources* as an important part of the natural ones are located in the 40 kilometers of the crust. Continental crust has three overlapping areas: basaltic stratum, granitic stratum, sedimentary stratum<sup>6</sup>, where exploiting resources of coal, oil shale and tar sands, oil, natural gas and uranium.

*Strategic resources* are those resources without it is almost impossible to conceive the social and economic development in a certain historical period<sup>7</sup>, namely certain and potential key resources available for achieving the strategic objectives of a state. According to the model proposed by Robert M. Grant<sup>8</sup>, the strategic nature of a resource is given by three characteristics: extent of the competitive advantage established (scarcity and relevance of that resource); sustainability of the competitive advantage (durability, transferability and replicability); appropriability (property rights, relative bargaining power and embeddedness). Therefore,

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<sup>3</sup> The issues of strategic energy resources and risks/threats to them was analyzed in more details in Cristian BĂHNĂREANU, *Riscuri și amenințări în domeniul resurselor energetice strategice*, “Carol I” National Defence University Publishing House, Bucharest, 2014.

<sup>4</sup> Gheorghe PREDA (Monograph ed.), Mihai MARINESCU, Gabriel NĂSTASE (Vol. I eds.), *Tratat: Valorificarea resurselor naturale. Volumul I: Bazele resurselor naturale*, International University Press Publishing House, Bucharest, 2004, p. 13.

<sup>5</sup> \*\*\*, *Dicționarul explicativ al limbii române*, “Iorgu Iordan” Institute of Linguistics of the Romanian Academy, Univers Enciclopedic Publishing House, Bucharest, 1999, p. 920.

<sup>6</sup> Gheorghe PREDA, Mihai MARINESCU, Gabriel NĂSTASE, *op. cit.*, 2004, p. 45.

<sup>7</sup> Silviu NEGUȚ, *Introducere în geopolitică*, Meteor Press Publishing House, Bucharest, 2006, pp. 135-136.

<sup>8</sup> Adapted from Robert M. GRANT, *Contemporary Strategy Analysis*, Seventh Edition, John Wiley & Sons Ltd., UK, 2010, p. 136.

strategic resources generate a sustainable competitive advantage and include assets, organizational capabilities and processes controlled by a company (a state, in our case) that bring added value, are rare, difficult to imitate and substitute<sup>9</sup>.

The strategic nature of an energy resource for national power and security is usually determined by political actors taking into account its economic value, military relevance, certain internal reserves, estimated surplus/deficit and concentration of the supply. Kenneth N. Waltz argues that the power in the international system is given by the distribution of different types of capabilities<sup>10</sup>, means that the status/position of a state in the international community is associated with increasing or decreasing of its national power, with increasing or decreasing of its strategic resources. Therefore, national power is directly proportional to the ability of that state to efficiently distribute the available strategic resources, mobilizing them and using them for fulfilling and promoting the national objectives and interests.

*Oil and natural gas* are considered, nowadays, the main *strategic energy resources*<sup>11</sup> due to the important role that they have in support of economic and social development, their rarity and near future exhaustion and lack of viable alternatives of substitute them.

In this context, any definition of energy security as a strategic component of economic security include terms like “risk” and “uncertainty” and various disputes and crises, resulting in malfunctions, short circuits and interruptions of energy supplies, bring more focus to the complex issue of security of energy supply.

The *energy risk* is often associated with the possibility of events or processes that cause major disruptions in the normal functioning of a national economy, businesses activities and

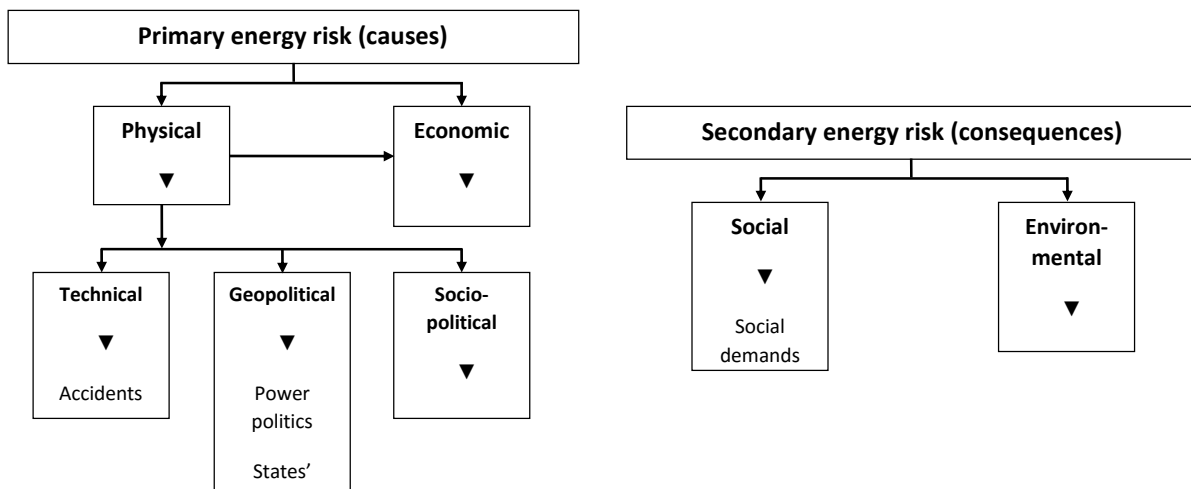
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<sup>9</sup> Jay BARNEY, *Firm Resources and Sustained Competitive Advantage*, in „Journal of Management”, Vol. 17, No. 1, 1991, pp. 99-120.

<sup>10</sup> Kenneth N. WALTZ, *Theory of International Politics*, Addison-Wesley Publishing Company, Reading, Massachusetts, 1979, p. 129.

<sup>11</sup> Silviu NEGUȚ, Marius Cristian NEACȘU, Liviu Bogdan VLAD, *Geopolitica resurselor energetice strategice*, in „Impact Strategic”, No. 1/2007, pp. 23-32 and Silviu NEGUȚ, *Tensiunile și reășezările de pe scena mondială ca factori ce influențează criza mondială*, in „The Romanian Economic Journal”, Year XII, Issue 31, March 2009, p. 80.

objectives and households interests, which ultimately can cause economic insecurity. The concept of energy risk involves some fundamental issues: a vast problematic, aimed at both sources and resources, and the prices, routes and markets; can be internal or external, but it can be generated by a combination of internal and external factors; is a constant issue facing any participant in economic processes and circuits, regardless the scale of its operations and its degree of development, particularly an economy dependent on external energy resources; can result in both economic and financial damages, once it becomes concrete; has an irreversible action, meaning that its effects, once produced, cannot be removed except with some expensive expenses; requires permanently analysis and means for prevention and control or management in the case it becomes real.



*Figure no. 1: Types of energy risks<sup>12</sup>*

The risk to the security of energy supply can occur in case of tensions and geopolitical rivalries (political risk), major changes in energy prices (economic risk) or any potential partial or total disruption of the physical flow of energy (physical risk). Political risks aims pressures of some actors on others through certain levers linked on pricing, quantity, quality, monopoly, etc. Economic risks are related mainly to the availability and accessibility of energy resources,

<sup>12</sup> Beatriz MUÑOZ DELGADO, *Energy security indices in Europe*, la Workshop: Economic Challenges for Energy, organised by „Fundación Ramón Areces” and „Economics for Energy”, Madrid, 7-8 February 2011.

energy prices, security of supply and demand, and income stability for producers and exporters of energy, and intermediates, etc. Physical risks are arising from armed conflict, terrorism, natural or anthropogenic disasters, nationalization, geopolitical rivalries, etc.

The analysis of these risks must consider dependencies, interdependencies and interactions on the national, regional and international energy scene between actors, between markets, but also between actors, resources and markets. It is clear that external energy risks are tough to control and manage because the causes that generates them are less known or difficult to avoid.

## **2. Energy risks/threats at international and regional level**

In contemporary literature, risks and threats to energy security are often linked to many political factors (international restrictions on the supply and technologies, sabotage and terrorism, etc.), economic factors (high or volatile prices, etc.), natural factors (scarcity of resources, extreme natural events, etc.) and technical factors (aging of energy infrastructure, technological accidents, etc.).

In its annual report, the World Energy Council<sup>13</sup> analyses a number of energy risks and vulnerabilities occurred at the macroeconomic level that may have an international impact. The most important are:

- *Global climate framework uncertainty* – outcome and time-horizon of global climate negotiations (i.e. the question of whether there will be a global/regional price on CO<sub>2</sub> and if so, at what level that price would be);
- *Extreme weather risks* – increased frequency and severity of extreme weather events (e.g. floods, storms) and the impact on energy systems and infrastructure design and resilience;
- *Large-scale accidents* – potential and implication of further energy-related large-scale accidents, as Post-Fukushima nuclear disaster and Macondo oil spill, and cost impact on risk insurance;
- *Global recession* – ongoing implications of economic and financial crisis and subsequent recession, including pressure on growth rates and economic security;

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<sup>13</sup> World Energy Council, *2015 World Energy Issues Monitor*, January 2015, p. 9.

- *Energy prices and volatility* – high volatility, relative price movements between technologies and regional differences in price levels (“security of demand” concern) affecting competitiveness and business;

- *Energy-water-food nexus* – the link expose energy supply chain to risks regarding changing water availability, including those to combat hunger;

- *Energy affordability* – high or increasing energy prices weighing on household budgets and increasing social concern;

- *Energy poverty* – 1.2 billion people are still without access to electricity, 87% in rural areas; new entrepreneurial models, creation of financing mechanisms, focused government policies to deliver solutions;

- *Cyber threats* – increased cyber vulnerability of energy systems due to increasing interconnectedness;

- *Terrorism* – physical risks affecting energy systems, infrastructure and markets.

Also, the International Institute for Applied Systems Analysis (Austria) identifies some major threats to primary energy sources in terms of robustness, sovereignty and resilience<sup>14</sup>. Robustness is focused on protection against disturbances originating from predictable and “objective” natural, technical, and economic factors such as resource scarcity, rapid rise of demand, aging of infrastructure, or rising energy prices. Sovereignty is focused on protection from disruptions originating from intentional actions of various actors, such as unfriendly political powers and overly powerful market agents, and implies the ability to control the behavior of energy systems and is often linked to the concept of energy independence. Resilience is focused on protection from disruptions originating from less predictable factors of any nature, such as political instability, game-changing innovations, or extreme weather events.

The oil resources are the most vulnerable in all three aspects analyzed by specialists of the Institute, although natural gas can achieve the same level of vulnerability in the near future. Depending on the perspective, the threats may be:

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<sup>14</sup> Thomas B. JOHANSSON, Anand PATWARDHAN, Nebojsa NAKICENOVIC, Luis GOMEZ-ECHEVERII (Editors), *Global Energy Assessment – Toward a Sustainable Future*, International Institute for Applied Systems Analysis, Laxenburg, Austria, Cambridge University Press, 2012, p. 327.

- *Robustness* – resources depletion, demand outgrowing supply, extreme natural events, failures of energy infrastructure;
- *Sovereignty* – malevolent exercise of market power, political embargoes, sabotage and terrorist attacks;
- *Resilience* – technology changes, variations of climate, market volatility, regulatory changes (all shows a strong unpredictability)<sup>15</sup>.

In this context, we can say that international energy security is endangered by six major risks and threats: depletion of oil and natural gas in the near future given their finite nature; global climate change; reduction/suspension/interruption of supply flows; price volatility and high energy costs for developing countries; using energy revenues to support undemocratic regimes; using energy as an influence tool.

On the other hand, the European Union's economic development and security hinges on a stable and abundant supply of energy resources<sup>16</sup>. Most likely the EU's energy vulnerability lies in the exclusive dependence of many Member States by a single external supplier of oil and especially natural gas, in this case Russia.

Although there is no consensus among politicians, economists and energy experts about the proper hierarchy of challenges to Europe's energy security in the medium and long term, we can still identify the following specific types of risks and threats:

- *Geological* – refers to the possible depletion of an energy resource. Oil and gas reserves in the EU are falling and more than three quarters of the world's hydrocarbon reserves are controlled by state companies in the Middle East and Eurasia. In addition, the growth of world energy consumption is a source of concern for the future availability of energy resources. We believe that such phenomena and processes, such concerns are legitimate, but, to some extent, exaggerated given that hydrocarbon reserves are relatively abundant in the world;
- *Technical* – includes the failure of energy systems, especially electricity ones, because of cyber-attacks, weather conditions, lack of capital investment or poor state of specific

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<sup>15</sup> Ibidem, pp. 330-332.

<sup>16</sup> European Commission, *European Energy Security Strategy*, Communication from the Commission to the European Parliament and the Council, Brussels, 28 May 2014, p. 2.

infrastructure. The electricity failure in September 2003, which affected a main part of Italy population for almost 9 hours, and blackouts in November 2006, originating in Germany, which affected 15 million European households, proved the possible consequences of such technical issues;

- *Economical* – mainly covers erratic fluctuations in prices of energy products on specialized markets caused by imbalances between supply and demand, speculative actions and abuse of market power. On the one hand, the increase in hydrocarbon prices creates monetary and trade imbalances between energy-producing countries and energy-consuming countries, which particularly affects the economy of the latter. On the other hand, the decrease in energy prices tends to reduce the capacity building investments in energy-producing countries, leading to the emergence of new bottlenecks in the supply of oil and gas;

- *Geopolitical* – relates to potential government decision to suspend energy supplies because of deliberate policies, civil conflicts, war and terrorism. Security of supply is threatened by political instability in exporting regions where civil wars, local conflicts and terrorism were often the cause of temporary destruction of energy facilities and infrastructure. In addition, the extensive state intervention in the energy industry in most producing and supplying countries increases fears that energy will be increasingly used as a political weapon to impose interest;

- *Environmental* – refers to the potential damages caused by accidents (oil spills or nuclear incidents) or emissions such as greenhouse gas emissions. Currently, Brussels put special emphasis on ways to reduce greenhouse gas emissions from burning fossil fuels, which continues to dominate the EU's energy mix.

A first distinction is the fact that risks and threats to EU's energy security differ depending on the time interval. On short-term a major concern relates to the disruptive effects of a shock of strategic energy resources prices or an unexpected reduction/suspension/interruption of supply due to some geopolitical conditions, accidents, extreme weather events, terrorist attacks or technical failures. In the medium and long term, the emphasis is on the availability of abundant energy supply that allows for stable and sustainable economic development.

Another distinction is the fact that the EU is facing energy risks and threats both internally and externally. Firstly, all aspects of dependence on energy imports belong to the category of



external risks, including geopolitical issues, international transit or technical problems in non-EU countries. Secondly, uncertainties about European demand for energy, infrastructure, energy policy guidelines and institutional developments concerns the internal energy insecurity.

In this context, the European Union as the largest consumer of energy continues to have a very vulnerable position in the global market. The dependence on Russian energy resources and increased energy risk and threat as the economy grows, concerns Brussels at the highest level. On the one hand, European energy policy has been continuously adapted in recent years to new geopolitical, geoeconomic and geostrategic realities in order to provide, in a much more integrated way, the supply of affordable energy, respecting market mechanisms, promoting energy efficiency and environmental protection. On the other hand, the Member States' energy interests and the delay in implementing European strategies and action plans undermines the process of ensure sustainable, competitive and secure energy.

### **3. Energy risks and threats at national level**

Currently, any analysis of the risks and threats to Romania's energy security must start from a simple reality: national reserves of hydrocarbons are reducing continuously and Russia remains the main source to cover the energy deficit of our country.

With the accession to the European Union, the authorities in Bucharest have prepared and approved a new *Energy Strategy of Romania for the period 2007-2020*<sup>17</sup>, whose main scope and objectives were fully consistent with those outlined in EU's energy strategy at that time.

According to the document, the most important *risks and vulnerabilities*<sup>18</sup> of the Romanian energy system are: the limited amount of internal reserves of oil, natural gas and uranium if no new major deposits will be discovered; the hydrocarbon price volatility in international markets; the trend of changing climate characteristics and hydrological regime instability; the possibility of negative effects on competition in the European energy sector, due to the concentration trends in energy industry; the uncertainties about the evolution of energy consumption and economic

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<sup>17</sup> Romanian Government, *Hotărâre privind aprobarea Strategiei energetice a României pentru perioada 2007-2020*, in "Monitorul Oficial", Part I, No. 781, 19 November 2007.

<sup>18</sup> Ibidem, p. 16.

recovery; the existence of arrears to some energy companies; the lack of effective fiscal instruments to support investment in energy efficiency programs and development of energy services; the high costs of uranium mining and the possible sharp rise in the world price of uranium; the additional costs from application of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community; the poor capacity to cope with terrorist actions directed against producing energy establishments and transport systems (oil and gas pipelines, electric networks); and, in our opinion, the most important, Romania was and remains dependent on energy imports.

Subsequently, the authorities publicly debated a number of energy strategy drafts designated to critical analyze the achievement of strategic objectives and update the action directions for the fulfilling the priority objectives of energy sector development. Thus, in the draft of *Energy Strategy of Romania for the period 2007-2020*, updated for 2011-2020<sup>19</sup>, are given the same Romanian energy system vulnerabilities and risks, meaning that the situation has not changed much between 2007 and 2011.

The current energy strategy draft <sup>20</sup>, launched for debate in December 2014, includes analysis of the actual situation of energy system and current national and international commitments in order to prepare the *National Energy Strategy for the period 2015-2035 and Outlook to 2050*. The main risks are categorized by hydrocarbon as follows:

- *Oil*: limited economically exploitable oil reserves and indigenous production downward trend, if no new major deposits will be discovered; investor interest are reducing in the absence of a predictable legal and fiscal framework in the medium and long term (10-30 years); degree of market concentration is high in production sector, a small number of competitors in the processing of petroleum products that through corporate strategy policy can have a major impact on the market; potential loss of users of the national crude oil transportation;

- *Natural gas*: limited economically exploitable natural gas reserves and indigenous production downward trend, if no new major deposits will be discovered; volatility of the

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<sup>19</sup> *Strategia energetică a României pentru perioada 2007-2020, actualizată pentru perioada 2011-2020*, [www.minind.ro/energie/STRATEGIA\\_energetica\\_actualizata.pdf](http://www.minind.ro/energie/STRATEGIA_energetica_actualizata.pdf).

<sup>20</sup> Energy Department, *Strategia energetică a României - Draft*, 2014.

hydrocarbon price in international markets; evolution of the structure of energy consumption; significant share of the population with a high degree of vulnerability in conditions of energy prices close to the European average, based on purchasing power; expanding public opposition to conventional hydrocarbon exploitation.

In my view, the competent authorities should conduct a detailed analysis of the advantages and disadvantages of each possible Romania's option to provide its energy security. These could be:

*I. Cover needs from domestic resources*

• *Advantages*: energy independence on limited term; avoid energy competition from regional and international markets; increase Romanian and European investments in modernization of national energy infrastructure, technologies and production capacities; construct a new nuclear power and hydroelectric plants; reduce production costs and energy prices; improve services quality; increase mutual interdependence between energy companies and government, between producers, suppliers and consumers; increase the share energy based on renewable energy.

• *Disadvantages*: increasing exploitation of national hydrocarbon reserves and therefore their more rapid depletion; need for significant investment in new production capacities; increasing state control over energy industry; decreasing competition in the oil and gas internal markets; increase environmental impact; disturbances of traditional economic relations with other countries.

*II. Cover needs through direct agreements with Russia*

• *Advantages*: safety cover hydrocarbon deficit; preserve national energy resources; negotiate mutually advantageous prices; increase investments; develop direct networks (pipelines, terminals, shipping) between the two countries; place Romania as an important energy hub between the EU and Russia; enhance cooperation between national energy companies and Russian ones; development of bilateral economic relations.

• *Disadvantages*: increase dependence on hydrocarbons imports; increase vulnerability by supplying from a single source; possibility of domestic oil and natural gas production to gradually decrease; increase Russian energy dominance in Europe; decrease of the energy share

based of renewable resources; more stringent regulations for transport and distribution; any energy transactions must be approved in Brussels; possible Romania exclusion from major European energy projects.

### *III. Cover needs through agreements with other resource-rich East countries*

- *Advantages:* diversification of supply sources at national and European level; preserve national energy resources; decrease energy dependence on Russia; lower prices; increase investment in the development of energy infrastructure (pipelines, terminals, etc.); connect those countries to the regional and international economic circuits; increase competition on regional and European energy market.

- *Disadvantages:* increase dependence on hydrocarbons imports; straining relations with Russia; undermine Russia's control of energy resources from Caucasus, Caspian, Central Asia; decrease share of Russian energy resources in Europe consumption; possible Romania exclusion from major Russian energy projects.

### *IV. Cover needs from energy transit*

- *Advantages:* preserve national energy resources; increase investment in the development of energy infrastructure (pipelines, terminals, etc.); increase Romania's role as a transit country of Russian resources to the West; negotiate mutually advantageous prices; diversification of supply sources at national and European level.

- *Disadvantages:* increase dependence on hydrocarbons imports and transit; possibility of domestic oil and natural gas production to gradually decrease; decrease competition in the oil and gas internal markets; increase environmental impact; disturbances of traditional economic relations with other countries.

These options are not mutually exclusive, but rather complement and positive results of an integrated approach could provide Romania's energy security on medium and long term. Therefore, the advantages and disadvantages of these four options of our country to achieve its security of energy supply and implementation of the most feasible option/combination of options could provide the necessary strategic energy resources at affordable price, secure supplying and respecting the principles of sustainable development, energy efficiency and environmental

protection.

#### **4. Conclusions**

The unbalanced distribution and predictable depletion of oil and natural gas, strategic energy resources that remain for now the “engine” of the global economy, have led to increased gaming on them and allowed some “monopolies” in terms of control of sources, routes and infrastructure, prices and markets.

Basically, one might say that strategic energy resources are drivers of security for their owners and drivers of insecurity for those who do not possess them. In practice, the natural resources and hydrocarbons therefore, are primarily production factors and cannot be considered an “incentive” of security or insecurity. Therefore, possession or control of energy resources does not guarantee security on all levels. Having energy security does not mean eliminating vulnerability to terrorism, weapons of mass destruction, organized crime and other risks and threats of the modern times.

The entire debate on energy security or competition for energy is only a consequence of the presence of governments in exploiting and controlling of the strategic energy resources. Aside we have transnational energy corporations and global cooperation and the other unfair relations and very dangerous energy dependencies. Limiting or blocking competitive and free access to strategic energy resources threaten the proper functioning of the economy and puts states and nations in the face of major challenges.

Therefore, the strategic energy resources are subject to permanent risks and threats generated by certain actions or inactions of the actors involved in the owner-operator-producer-exporter-transportator-importer-distributor-consumer energy chain, which exploit the existing vulnerabilities, and also by extreme weather events, technological accidents, terrorist attacks or different tensions, intra and interstate crises and conflicts.

Ideally, the energy should be only a good traded without any interference by political factors. Oil and natural gas should be considered international public goods. The energy chain actors should not use energy as an influence tool in order to promote/protect their interests, but

understand that interdependence is the key to achieve energy security and economic development to large scale.

Ensuring access and meet national energy needs means a greater energy security achieved at regional level and even international level. Therefore, we believe that we need an integrated approach to strategic energy resources, really connected with regional/international geopolitical and geoeconomic realities, able to maximize the geostrategic advantages and the national energy potential. This strategy must clearly identify major energy vulnerabilities, risks and threats, to pinpoint both concrete strategic objectives and action directions and ways to achieve them, providing a high level of energy security in the medium term and long term.

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