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# GEOPOLITICS OF ENERGY AND ENERGY SECURITY

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Lisboa  
Julho de 2017

Instituto da Defesa Nacional

## Book Description

This publication reproduces presentations made at a workshop hosted by the Portuguese National Defense Institute (IDN), under the framework of the project *Geo4GER – Geopolitics of Gas and the Future of Euro-Russian Relations*. This project, funded by the Portuguese Foundation for Science and Technology (FCT) and developed by the Portuguese Institute of International Relations of Nova University of Lisbon (IPRI-UNL) in partnership with IDN, aims to analyse the complex and multidimensional relationship geopolitics of Euro-Russian gas, and develop alternative scenarios possible on the horizon of the next twenty years. Starting from the idea that there is an multidirectional interaction between international policy, security environment, and energy, the *Geo4GER* aims to: (1) identify the political, economic and geopolitical trends that in the coming decades can commit or facilitate the increased consumption and production of gas in Europe and in Russia; (2) predict the impact of these geopolitical changes, their implications for gas production and consumption in Europe and Russia, and their consequences for the gas market; and (3) assess how changes in the gas market could affect the future of Euro-Russian relations.

Given the complexity of the vectors to consider in the analyses of this complex issue, the editors invited specialists to treat, in a rigorous and synthetic way, some of the aspects which they believe to represent the basic points the project aims to develop. These authors, with very different origins, experiences and academic backgrounds, brought greater diversity and richness to the “ways of seeing” this reality. In a context of rapid changes, we believe their contribution will assure greater and more informed information about one major challenge in the coming decades, that energy security and Euro-Russian relations will bring to European societies, namely in what refers to natural gas.

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**Part I**

**THE GEOPOLITICS OF ENERGY  
AND ENERGY SECURITY**

# A Contribution to the Analysis of Energy Security

**Carla Patrício Fernandes**

Energy is crucial and indispensable to modern society, insofar as every domestic and service activity such as road, air and maritime transports and, consequently, trade and international economy, are dependent on this resource. In order for societies to keep evolving while preserving their internal economic, political and social stability, there is a need for “constant, affordable and uninterrupted” energy supplies. However, as human progress moves forward, challenges and problems also tend to become more multifaceted and multidimensional, leading several authors to call out for the replacement of the traditional<sup>1</sup> concept with a wider and more comprehensive concept of energy security.

In the present article, we set upon ourselves to analyse some of the questions that steer the issue of energy security, introducing, to begin with, a brief contextualisation of energy challenges since the beginning of the 20th century, when the strategic importance of oil gradually became evident. A second main point shall be the analysis and assessment of the concept of energy security, with the adoption and explanation, further ahead, of the multidimensional concept of energy security, featuring four dimensions: security, foreign policy, domestic policy and economic policy.

## **Energy: The Driving Force of the Development of Societies**

The history of energy<sup>2</sup> dates back to prehistory, with the acquisition, by Man, of the ability to control the use of fire, for food and protection. The progress of human civilisation was made possible by the discovery and taming of other energy sources. However, the replacement of energy sources is a “slow process, requiring stimuli in order for the new energy sources to assert themselves” (Silva, 2012).

The great milestone in the history of energy took place in the 18th century, with the invention of the steam engine and the beginning of the Industrial Revolution, marking

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1 Created following the oil crisis of 1973.

2 According to Priberam Dictionary (2013), etymologically, the word energy comes from the greek ἔργον (ergon) which means work. In Physics, energy is related to the capacity of a body or physical system to produce work. Energy, according to the laws of physics, cannot be created but only transformed (first principle of thermodynamics), and each type of energy is able to cause certain and specific phenomena in physical systems. Different energy sources can be found in nature and are classified, according to how they can be managed and produced, into two groups: non-renewable energy sources (for instance, mineral coal and oil) and renewable energy sources (for instance, hydro, wind and solar power).

the use and importance of energy for modern times. Later on, in the second half of the 19<sup>th</sup> century, two other energy sources have their début – oil and electricity.

However, as societies evolve, the consumption of and dependence on energy has increased at a global level, rendering countries ever more vulnerable as far as energy is concerned. Outside events that might impair their energy supply systems “can have a negative effect on the wellbeing of the country’s population and/or the integrity of the State, its territory and its institutions” (Christie, 2009, p. 277), and, ultimately, national security. In the words of Admiral Frank Bowman, Former Director, US Naval Nuclear Propulsion Program, “our national security is inextricably linked to our country’s energy security (...) Energy and economic security – key components of our national security – must be undergirded by alternative forms of energy available indigenously and from countries whose values are not at odds with our own” (2007, p. 41).

In this fashion, energy might be at once a leverage factor and a constraining factor for societies. In fact, in the last 100 years, energy issues have influenced a number of decisions by States and Institutions. A great number of such decisions served as models for current strategies of energy security. For instance, the diversification strategy goes back to the historical decision made by the First-Lord of the Admiralty Winston Churchill, on the eve of the First World War, to convert the source of power of the British fleet from coal to oil<sup>3</sup>. Such decision meant, on the one hand, the replacement of secure Welsh coal by insecure oil from the region known at the time as Persia. On the other hand, it meant granting the British Navy a great advantage in terms of speed and fuel autonomy. Moreover, it marks the first decision confirming the strategic importance of oil.

In its turn, seizing control of the territory according to oil production zones was the plan behind the German military operation Barbarossa, the invasion of the Soviet Union (1941) and the Japanese invasion of many countries in Southwest Asia, during World War II. In both cases, oil had a strategic dimension and energy security was a matter of national strategy (Yergin, 2006, p. 69).

In the 50s and 60s of the 20<sup>th</sup> century, thanks to the economic growth, the improvement of living standards, and the advent of the combustion engine and electricity, the increase in global consumption and the ensuing demand for energy more than doubled<sup>4</sup>. However, security of energy supply was not yet a major political priority for developed countries. The bulk of the population in developing countries did not such much as have access to energy, particularly electric power.

This increase in demand, in its turn, spiked an increase in international energy trade, which more than quadrupled, overwhelmed by the world oil demand (BP, 2011). Until 1980, the international oil market was dominated by an ensemble of Western oil com-

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3 According to Lopes Velho (2010, pp. 108-109), the pioneer in the conversion of ships from coal to fuel oil was Marcus Samuel which, along with Admiral Fisher, defended that the future of transports resided in the combustion engine, and that the British Navy should work in that direction.

4 It was driven by the boost in consumption in North America, Western Europe, The Soviet Union and Northeast Asia.

panies known as the “Seven Sisters”<sup>5</sup>. And even though these companies supplied cheap oil in a relatively steady fashion, oil-exporting countries became increasingly dissatisfied with the distribution of wealth resulting from exportations and created the Organisation of Petroleum Exporting Countries (OPEC) in 1960<sup>6</sup>.

In the following decade, the two oil crisis<sup>7</sup> that shook Western industrial countries brought about, for the first time, an era of insecurity in energy supply. These crises caused the – at the time – dominant energy source, oil, to become scarce and expensive, and made manifest, for consuming countries, not only the heavy dependence on a source of energy, but also the challenges of depending on supply from a single region or supplier. Concomitantly, the same crises represented a victory for the new actor in the world energy strategy games – the OPEC, which for the first time used oil as a “geopolitical weapon”, in an attempt of prompting political changes in consuming countries, in the face of Israel.

To cope with this threat, possible future disruptions in oil supply and the volatility of market prices, the International Energy Agency (IEA) was created<sup>8</sup>, in 1974, by the countries included in the Organisation for Economic Co-operation and Development (OECD). Its creation is a landmark in the history of energy security, not only because it meant the definition of a first concept of “energy security”, but also by virtue of the goals of this institution, particularly those related to energy cooperation among member States. Furthermore, it represents a positive outcome for this period of energy insecurity<sup>9</sup>, by drawing the attention of political decision-makers in consuming countries to the importance and need of cooperation in matters such as security of supply, long-term energy policies, development and research (IEA, 2016).

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5 They were Standard Oil of New Jersey (now ExxonMobil), Standard Oil of California (now Chevron), Gulf Oil, Standard Oil of New York, Texaco, Anglo-Persian Oil Company (now BP) and the Anglo-Dutch Royal Dutch-shell (now Shell).

6 In the early 1960s, as a reaction to the unilateral reductions in oil price brought about by the “Seven Sisters”, the First Arab Oil Congress was held in Cairo. Later on, between the 10<sup>th</sup> and the 14<sup>th</sup> of September of the same year, government officials from Iraq, Iran, Kuwait, Saudi Arabia and Venezuela met in the scope of a conference known as the Baghdad Conference, which resulted in the creation of the OPEC.

7 The first crisis, in 1973-74, was caused by a number of measures coordinated by the members of the Organization of Arab Petroleum Exporting Countries (OAPEC) directed to the countries that had supported Israel in the Yom Kipur War. In October of 1973, with the downturn in oil production from around 20.8 million barrels per day (mb/d) to 15.8 mb/d, the global oil demand standing at 57.1 mb/d. The decline resulted in a deficit in the international oil market and was followed by an upturn in oil prices, more than 400% above the previous levels (International Energy Agency, 1994, p. 28). The second crisis, similarly, comes about in association with events in the Middle East, mas was also catalysed by the considerable growth in world oil demand. The Iranian revolution beginning in 1978 along with the slump in output in Iran, in 1979, led to the soaring of oil prices since the middle of the 70s, doubling between April of 1979 and April of 1980 (Graefe, 2013).

8 This Paris-based Agency places a special emphasis on security of oil supply, and its goal is the creation of effective mechanisms for the implementation of policies in energy matters. More recently, its scope of work extended also to the policies of climate change. It has endeavoured to work in collaboration with the rest of the world, particularly with the great energy consumers and producers, such as the Russian Federation and the People’s Republic of China.

9 Energy insecurity is defined as “the loss of welfare resulting from a change in the price or physical availability of energy” (Bohi *et al.*, 1996, p. 1).



The insecurity of supply was gradually dampened in the course of the second half of the 80s, due to an expansion in output in non-OPEC countries, and a decrease in demand, which resulted in the shrinkage, for six consecutive years, of oil prices (Gately, 1986). During this decade, importers began to diversify the geographic origin of import resources – betting in countries that did not belong to the OPEC, to diversify primary energy sources and to encourage the production of endogenous resources, including in the energy matrix other energy sources, such as natural gas and nuclear power.

All these changes represent the first signs of an attempt to manage security of supply, and were accompanied by a number of other measures, equally relevant to energy security. Among them, emphasis must be given to the creation of the Intergovernmental Panel on Climate Change (IPCC) by the World Health Organization and by the United Nations Environment Programme, in 1988. The IPCC marks the acknowledgement of the negative effects of fossil fuel use on the increase in Earth's temperature and the need for the implementation of global climate policies.

The 90s began with two major events – the Gulf War (1990-1991) and the dissolution of the Soviet Union (1991) – that had a negative impact on energy security. The first triggered anxiety among the exporting States and cause oil prices to soar exorbitantly, alerting once again the consuming countries to the need for seeking suppliers in less volatile areas, specially outside the Middle East (Looney, 1992). The second event, in its turn, had devastating economic and social consequences for the countries emerging from the former Soviet Union. For energy security, particularly in Europe, it highlighted how hazardous it was the transit through Ukraine, when Russian gas exported to European countries was withheld, after Ukraine was deprived of gas supply by Russia, for short periods of time<sup>10</sup> (Stern, 2006, p. 2).

As far as energy is concerned, the end of the Cold war was signalled by the need to overcome divisions among Eastern European and former Soviet countries and the rest of Europe. By the need, in particular, to promote cooperation, development and security of supply of the European Economic Community. With this goal in mind, and as an answer to the growing energy interdependence between European countries, the process leading to the European Energy Charter, in 1991, was initiated (European Union, 2017).

In the early 21th century, several events, such as the terrorist attacks of September the 11th and the subsequent war in Afghanistan, unleashed a second era of energy insecurity that has persisted to this day. It is also a period marked by the rise in world energy consumption, mainly on account of the emergent economies of China and India.

In a volatile market, supply flows can be affected by the unreliable atmosphere of producing countries, often referred to as “resource nationalisms”, by geopolitical tensions, by terrorism or even natural catastrophes. Hazards and threats spark uncertainty as to the constant availability of supply, might compromise supply, unbalance demand and impact the energy market.

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10 This measure ensued from the lack of payment for Russian gas imported by Ukraine, unable to pay even 50 bcm (Stern, 2006, p. 2).

The upsurge in new challenges and tensions such as the Arab Spring and the “Islamic State” intensified the instability in traditionally producing zones, further exposing the risk, for consuming countries, of depending on unstable and fickle areas of the Middle East and Africa. The global boom in maritime transport of energy, in its turn, and later on, the confrontation involving the Iranian nuclear programme, generated concern within energy security over the so-called “sea issues”, in the world’s most important strategic “chokepoints”, such as Hormuz and the Strait of Malacca (EIA, 2014).

Concern over energy security extended beyond oil supply. The gas crises between Ukraine and Russia, in 2006, 2009 and 2014, forced European gas importers to rethink their strategies for security of supply and for the need to diversify routes and suppliers.

Lastly, the consequences of the nuclear accident in the *Fukushima Daiichi* power plant, on the 11th of March of 2011, raised the debate over the viability of nuclear energy as a measure for security of supply and for the reduction of the green-house effect gases. Meanwhile, technological development in the access to energy, namely hydraulic fracturing technology, made possible the access to and exploration of unconventional hydrocarbon reserves<sup>11</sup>, causing changes in the global energy market while shifting to energy security other and we concerns.

### **Energy Security: Concept and Characteristics**

Despite the spotlighted awarded, for decades, by experts and political leaders, to energy security as a pivotal national goal, there is no consensus concerning its meaning. Benjamin Sovacool (2011, pp. 2-3) quotes Aristotle’s claim that “who controls the definition, controls the debate” and States that energy security is multidimensional and the existence of a plurality of concepts<sup>12</sup> makes meaning “diffuse” and often “incoherent”.

This conceptual ambiguity is challenged by several authors (Chester, 2010, p. 893; Sovacool and Brown, 2010, p. 79). Hisham Khatib (2004, p. 14), for instance, in his article titled “Business as Usual”, points out that this tendency to define energy security as “the continuous availability of energy in the right form, in sufficient quantities and at reasonable prices” is self-contradictory. In the first place, it requires the existence of energy “in the right form”. Notwithstanding the defence of renewable energy sources as the more “right”, the only available energy sources, at the moment and in the near future, are fossil fuels. Secondly, this definition encompasses “reasonable prices”, also a controversial notion, especially when it is combined with national interests between producing and consuming countries. “Reasonable prices”, to the former, means high enough prices to ensure return on investments in the development of their energy output, whereas to

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11 According with European Commission (2017) the “unconventional hydrocarbons are resources found in reservoirs with geological characteristics and locations different from those where oil and gas are usually produced. They include natural gas from shale formations (shale gas); natural gas from coal seams (coalbed methane) and crude oil from shale formations or other formations with low permeability (tight or shale oil)”.

12 In the introduction to *The Routledge Handbook of Energy Security*, Benjamin Sovacool (2011, pp. 5-6) presents 45 different concepts of energy security.

the latter, prices are “reasonable” when they are low and represent a stimulus to the economic growth of their countries. In this sense, as Alhajji (2007c) claims, to have reasonable prices is an “elusive goal judged by subjective criteria” and should be replaced with “low price volatility”.

Upon analysing the concepts of energy security we observe that meaning varies according to energy resources, geographic location, political system, economy and the external relations of the countries themselves. However, a simple distinction can be carried out to clarify what is energy security to consuming and to producing countries. The former seek security of supply, the assurance of finding constant supplies for their needs, through a diversity of suppliers and adequate transport infrastructure. The latter prioritise security of demand, the assurance that their production will be purchased at a fair price, provided by a diversity of costumers and over a long term, so that national budgets might anticipate a steady and predictable revenue flow. They prefer to have maximum control over their energy industries, trying to obtain sufficient investment as necessary to maintain or increase output, ensuring that their economies are sufficiently diversified so that they are not reliant on fluctuating energy commodity prices (Fernandes, 2013, p. 32).

Thus, energy security means different things to European importing countries and to a producing country such as Saudi Arabia or a transit country such as Ukraine. The former Saudi Oil Minister, Hisham Nazer (1989 cited in Alhajji, 2007b) defined energy security as “maintaining and enhancing access to where the oil exists in such obvious abundance”. In this case, “abundance” is obvious and refers to a country possessing one of the largest reserves in the world. The EU, on the other hand, needs to “ensure the uninterrupted physical availability of energy” in the countries where it “exists in abundance”. Ukraine, in its turn, is an importing country and is as much interested in having access to the “abundance”; however, as a transit country, it favours cooperation with European countries. As President Viktor Yanukovich (Europapress.es, 2012) contended at the World Economic Forum in Davos, in 2012, Ukraine presents itself as a “trustworthy partner” of the EU, “in the transfer of hydrocarbons” from Russia and for the “country’s integration in the European space and to strengthen energy security in the region”.

Naturally, even among consuming countries, there are identifiable differences in the goals of energy security, depending on what the challenges entail for the country. Whereas the main goal of China, as the second largest oil consumer of the world, is to secure long-term oil supply contracts, in an attempt to mitigate the challenges of a growing external dependence based on maritime transport, the EU member-States are concerned with the challenges that the dependence on Russian gas and transport by a reduced number of transit countries involve, and seek to find reliable long-term partners.

In energy security bibliography, the outlook of consuming countries prevails, grounded in the defence of security of supply. Until the decade of 2000, the dominant trend in energy security was the one ensued from the oil crisis of 1973-74. It was defined as the “access to a continuous supply of energy, at reasonable prices” and was directed

mainly at “preventing disruptions to supply and minimising the effects, in consuming countries, of the impact of a supply crisis”, especially of oil.

The majority of concepts issued from the traditional school of energy security point to one other feature: the overwhelming prominence of the State as the main actor in charge and the chief receptor of energy security. The definition laid out by Daniel Yergin is inscribed in this traditional analysis of energy security, when he describes it as “securing regular and adequate supplies of energy, at reasonable prices, and in ways that do not jeopardise major national values and objectives” (1988, p. 111). This definition identifies “national values and objectives” as the assets to safeguard through energy security.

Countering the “Western dominion” in the concepts of energy security, various analysts and leaders from producing countries (Kaveshnikov, 2010; Minister of Petroleum of Islamic Republic of Iran, 2012; Putin, 2014;) defend that the security of demand element should also be considered a part of energy security. Among the energy exporting countries, Russia is the most exacting over security of demand. The chief document of Moscow’s energy policy, the Energy Strategy until 2030 (Ministry of Energy of the Russian Federation, 2010, p. 28) considers energy security as one of the most important elements of national security: “Energy security is the country’s security, that of its citizens, society, State and economy from the threats to reliable supply of fuel and energy”. This definition evinces Russia’s concerns as a consuming country, but is complemented with the outlook of an exporting country: “These threats are determined by external (geopolitical, macroeconomic, market) factors, as well as by the condition and operation of the country’s energy sector”. And he lists as threats: “instability of world energy markets and volatility of world energy prices, increasing competition at traditional markets, low diversification of export, transit dependency, and politicisation of energy issues” (Ministry of Energy of the Russian Federation, 2010, pp. 34-35).

There is no doubt that energy security is a common objective, despite covering the different interests of all the actors involved in the complex energy system. However, and precisely for being “common”, it should incorporate the interests of all involved parties: consumers, suppliers and transit countries.

According to Kaveshnikov (2010, p. 587), energy security should be defined as the elimination of threats that, in the long haul, might prevent energy from becoming a driver of the economic development of countries. Guided by this vision of energy security, energy importers must ensure the supply of energy in sufficient quantities and the right conditions to maintain the necessary economic development. Energy exporters, on the other hand, must have a guarantee of sufficient and lucrative demand, so as to keep the energy sector secure. This analysis of energy security sensibly incorporates the idea of a fairer distribution of profit and risks. Now, if all the actors defend the need for “stability”, both market (producing countries) and flows (consuming countries) stability, they should cooperate in the fight against the challenges faced by global energy security (Minister of Petroleum of Islamic Republic of Iran, 2012; Putin, 2014).

When the first two oil shocks occurred, the USA’s concern was centred on security of supply and the challenges related to the dependence on oil imports. Nowadays, their

concern extends other energy resources, such as natural gas e unconventional energy resources, and problems are multifaceted and multidimensional, ranging from climate change to demographic pressure, the threat of terrorism, cyberterrorism and piracy.

In addition to the fact that energy security also has become the target of threats, the State has ceased to be the only actor, because energy security is seen as a global asset, everyone's responsibility and for the good of all (societies, State, groups and individuals). This extension in the breadth of energy security translates also into values that transcend "national values" and include issues such as the environment, sustainability and public good<sup>13</sup>.

This need to add new dimensions to energy security may be observed in the reformulation itself of the concept of energy security made by the Energy International Agency. In 1985, the "adequate supply at reasonable prices" was the chief feature of energy security (IEA, 1985, p. 29), while a decade later, it was presented as "a new way to avoid market distortions" (OECD/IEA, 1995, p. 23), because "an international market working smoothly will offer accessible, secure and continuous supplies" (OECD/IEA, 2002, p. 3). More recently, energy security has also acquired a physical component and a price component, and has been presented as "an uninterrupted physical availability at an affordable price", while including a new value, "respect for environmental concerns" (IEA, 2011).

The traditional perception of energy security is currently regarded as very narrow, for it does not include the new actors, challenges and values of energy security. In this sense, a number of authors (Yergin, 2006, Fernandes, 2013; Silva and Rodrigues, 2015) argue the need for the establishment of a new concept of energy security for the 21<sup>st</sup> century. Such a concept should be able to meet a series of concerns, currently envisaged as overriding, in such a way as, for instance, "to integrate producers and consumers in a global treaty that ensures the flow of energy resources, promotes investment and trade, and works to spark competitiveness in supply and demand" (Silva and Rodrigues, 2015).

Some authors (Alhajji, 2007c; Baumann, 2008; Sovacool, 2011; Von Hippel *et al.*, 2011) contend that the new concept should be multidimensional, that is, a concept that encompasses internal and external actions, possessing a variety of dimensions. That according to Alhajji (2007c) "are general and universal, but weight of each differs by place and time. The level of interaction among them also differs from country to country and from time to time".

That dimensions can also be combined and whose number may vary according to the author. In Alhajji's view (2007c), energy security consists of six dimensions: economic, environmental, social, foreign police, technical and security. Bauman (2008, pp. 14-15), in his turn, lowers the number of energy security dimensions to four: internal, economic,

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13 In this article, we argue that the questions that guide "security for whom", "security for what values" and "security from what threats" security studies must be incorporated in the current energy security analysis. These questions are seldom dealt with in the bibliography devoted to these matters, showing up with similar interrogations "protect from what, from what risks and by whom" in works analysing Chinese energy security by Von Hippel *et al* (2011) and by Leuga *et al* (2014).

political and security. General Cabral Couto, at the conference “Energy sovereignty: a strategy for Portugal”, held at the Institute for National Defence, on the 26th of January of 2010, advocated the same multidimensional understanding of the concept. The dimensions he listed, applied to Portugal’s energy security, were also four: geopolitical, economic, military and internal.

### **Multidimensional Concept of Energy Security**

Given the complexity of the analysis of energy security and the multiple dynamics accompanying it, we shall adopt and analyse the concept of multidimensional energy security within view of four dimensions: security, foreign policy, domestic policy and economic policy.

The first, the “security” dimension of energy security, pertains to the security of means, infrastructure and information systems in the service of energy production, storage, transport and distribution. From this dimension springs the need for States to use Security Forces, Armed Forces or Information Services to protect the whole energy system from threats<sup>14</sup>.

Defining what threats and risks are might help to shed light on the analysis of the concept in this dimension. It is considered that there is a threat to energy security when a State or non-State actors use “means originating in a conscious will with the purpose of affecting the normal energy flow between consumption and output” (Duarte and Fernandes, 2010, p. 9). Also worth stressing are hostile pirate or terrorist actions against critical targets such as energy infrastructure, and the “use of energy as weapon” by a group or a country. In both examples, even countries that do not constitute themselves the target of threats might come to suffer consequences, through disruptions in supply and price upturn. Risks can be caused by adverse events that do not derive from hostile intention, and are divided into short and long-term risks. The former include physical disruption in supply due to human faults or errors and to adverse weather conditions. The latter comprehend the stockpiling of untenable and precarious tendencies at home or abroad, such as persistently low stocks and the growing and heavy dependence on imports (Duarte and Fernandes, 2010, p. 9).

Saudi Arabia is the world’s biggest oil exporter. Thus, a possible attack against any critical point of the Saudi oil system, that should cause a disruption in supply and deprived the market of oil for several weeks, might have devastating repercussions for consuming countries and for Saudi Arabia itself. That is why this country implemented security mechanisms to safeguard its energy resources. For instance, after the attack by terrorists (connected to radical Islamic organisations) against the Yanbu oil terminal, in the Red Sea, in 2004, it created a security system worth five billion dollars a year, with a work force of 35 thousand men<sup>15</sup>, to defend a network of over 152 000 km of oil pipe-

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14 For an analysis of security vulnerability of oil and gas pipelines, see Parfomak, P. W., 2013. *Keeping America’s Pipelines Safe and Secure: Key Issues for Congress*. CRS Report for Congress.

15 That work force received extensive training through a programme of technical support from the USA, and has as its sole responsibility the task of defending the Saudi energy system from internal and external threats (Obaid, 2011).

lines linking terminals, refineries and gas and oil wells. China, in its turn, concerned with the insecurity of its oil importations, arriving in the country chiefly by sea, is developing “energy security by proximity”, by setting up land corridors with neighbouring countries (Fernandes, 2013).

The States’ concerns over the vulnerability of energy transport are shared by multinational organisations such as NATO, which included energy security in its strategic concept, adopted at the Lisbon Summit on the 20th of November of 2010. According to Michael Rühle (2011), Head of the Energy Security Section, in NATO’s Emerging Security Challenges Division, the role of the Alliance must be that of “develop the capacity to contribute to energy security, including protection of critical infrastructure and transit areas and lines, cooperation with partners, and consultations among Allies on the basis of strategic assessments and contingency planning”.

The assessment of a country’s position in terms of energy security involves two phases. The first phase includes the identification of risks and threats to its supply, the assessment of the likelihood of their occurrence and the impact of any such occurrence. The second includes the formulation of an energy security policy in light of the country’s level of energy vulnerability<sup>16</sup>. The energy policy, in its turn, can be formulated according to short or long-term scenarios. In the first case, the concern may be the possibility of suffering a sudden disruption in energy supply, resulting in a pronounced inflation of prices<sup>17</sup>, demand sports or the abusive use of energy resources by the consumer. The second scenario is rooted in a concern ensuing from the possibility of an unexpected but prolonged disruption in energy supply which might entail, for the consuming country, the readjustment of its patterns of energy demand. (Fernandes, 2013, p. 38).

These two scenarios illustrate one other feature of energy security: its multidimensional nature in terms of time or era. That dimension can be found in the energy security concept of the International Energy, in the distinction between long and short-term energy security. The former “mainly deals with timely investments to supply *energy* in line with economic developments and sustainable environmental needs”. The latter deals “focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance” (IEA, 2011b).

In order to mitigate the short and long-term challenges, States can use the energy diversification strategy (Luft and Korin, 2009, p. 336), in its three more relevant forms: diversification of routes, suppliers or buyers and energy sources.

Diversification of routes must be analysed within a framework that accounts for the

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16 That vulnerability is aggravated by the fungibility of transports, the distance between the location of the resources and the facilities that receive them, the distance between resources and the consuming country, and even the political, economic and social circumstances of the producing country (Fernandes, 2013).

17 The most significant disruptions in oil supply, with an impact in oil prices, are related to momentous events, such as the Iraqi Revolution in 1978, the Iran-Iraq war between 1980 and 1988, the two Gulf Wars and the Asian crisis. In 2003 alone, three events occurring in different continents caused disruptions in the energy market that resulted in an upsurge in oil prices – the first, the onset of the Iraq War, the second, the attacks in Nigeria, and the third, the outcome of a strike in a State-owned oil company in Venezuela (Fernandes, 2013, p. 38).



costs and benefits of the development of new routes when compared to the risks and threats that weigh on the already existing routes. Diversification of suppliers is generally the way to reduce risk and maximize diversification. Lastly, diversification of energy sources concerns the decrease in the dependency on fossil fuels and the wager on clean and sustainable energy sources. Both diversification of routes and of suppliers may be placed in the “Foreign Policy” Dimension of Energy Security, insofar as the challenges posed by the dependence on one supplier, one market and a reduced number of transport routes may influence the external insertion of countries and their diplomatic alignments (Fernandes, 2013, p. 40).

The foreign policy of energy security is carried out by many countries and companies by means of “energy diplomacy”<sup>18</sup>, in the sense of “establishment of peaceful contacts, at a bilateral and multilateral level, with the detainers of powers in other countries. This contact involves a negotiating process with the purpose of “reaching a usually written agreement, over a specific problem” (Magalhães, 2005, p. 38), which might be substantiated in the signing of contracts.

China is the best example of the use of bilateral and multilateral energy diplomacy as an instrument of foreign policy by consuming countries. Since 2001, this type of diplomacy is aimed at three groups of countries (producers, transport and potential competitors) with different, albeit relatable, objectives. Supported by the “Going Out” strategy, it includes visits from high government officials and the establishment of strategic partnerships, enabling the creation of a favourable atmosphere so that national oil companies, through the financial support of the Chinese State-owned banks, may subsequently participate in the energy sector of producing countries and have access to *know-how* (Fernandes, 2013).

To producing countries, energy diplomacy “is an instrument of foreign policy to establish peaceful contact” with detainers of political powers in consuming countries, with the purpose of concluding contracts for the exportation of their energy resources and attracting investment for the development of their energy sector. In Andrews-Speed’s view (2009), the governments of producing countries have specific and differentiated objectives when seeking foreign investment in their energy sectors. These objectives can be grouped into six categories: (1) the need to attract foreign investment, in the face of the imposition of sanctions or other international restrictions<sup>19</sup>; (2) to decrease their dependence on certain external parts, despite their success in attracting foreign investment for the energy sectors<sup>20</sup>; (3) countries that either possess resources or offer conditions of marginal interest, at the moment, for the international oil com-

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18 The concept of energy diplomacy used here is based on the concept of diplomacy of Ambassador José Calvet de Magalhães (1995, p. 83): “it is an instrument of foreign policy to establish peaceful contact between the detainers of political power from two states”.

19 This category includes countries such as Iran, Sudan and Myanmar, which seek investment from countries such as China, India, Russia and Malaysia, restrained from competing in the international market for a long time.

20 It includes countries such as Kazakhstan and Turkmenistan, vis-à-vis the traditional Russian influence.



panies<sup>21</sup>; (4) the need for investment, both in their oil sectors and in infrastructure capable of boosting their economic development<sup>22</sup>; (5) countries that seek security of demand and are driven by the ambitions of their own national oil companies<sup>23</sup>; (6) States that seek political and strategic partners that might counterweight the USA or the West in<sup>24</sup>.

The third dimension of our concept of energy security is the “internal”. This dimension encompasses two types of energy strategies. Firstly, a strategy centred on the improvement, extension and integration of the whole energy system, which includes the expansion and construction of new energy networks and power plants, the construction of terminals and liquefied natural gas (LNG) storage facilities and the creation of national strategic reserves. This strategy enables countries to attain a greater resilience in their energy system, that is, a greater capacity to “prepare for, absorb, recover from and more successfully adapt to adverse events, it thus includes a dynamic and proactive notion of managing potentially harmful stressors” (Göbbling-Reiseman, 2016, pp. 1-2). Secondly, a strategy encompassing concerns with the type of primary energy consumed and the commitment in the diversification of energy mix in the energy matrix, and relies on investment in alternative endogenous sources, such as renewable (hydraulic, wind, solar and biomass) and unconventional (shale gas, coal bed methane, tight gas, oil sands and shale oil). This strategy, despite failing to protect countries from the challenges of the market, such as supply and price fluctuations, may assuage the challenges posed by natural disasters or political turmoil, thus contributing to continuous energy security and creating an adequate setting for sustainable economic growth. The USA are one of the biggest examples of the strategy of energy source diversification in the energy matrix, with their bet on the exploration of shale gas. This investment enabled the replacement of coal with gas in the bulk of electric and thermal power stations, the introduction of gas in the transport system and the outset of NLG exportations for Mexico, Chile and a number of Asian countries: China, South Korea and Japan.

These changes in the USA’s energy production are having an effect on the global market and the energy trade. The downturn in natural gas prices in the USA, for instance, is impacting the consumption of coal in the country, which, because it has decreased, resulted in an upsurge in the exportation of this fossil resource. In Europe, the increased exportations combined with a slowdown in Chinese demand have led to a fall in coal prices and a boost in coal consumption. In 2011 and 2012, in countries such as England, Spain and Germany, the use of coal to generate electricity grew steadily, to such an extent

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21 As is the case with Iraq, which, due to related challenges, has attracted the participation of Chinese State-owned companies, possessing ample funds and ready to run greater risks.

22 Very common in African countries such as Angola, Sudan and Nigeria.

23 It includes, for instance, Middle Eastern countries that are aware that Asia, not the West, will be their biggest client in the future and which, therefore, seek to establish improved economic and political rapport with the Asian governments.

24 It is the case with a series of Latin American governments which, from the point of view of foreign relations, appear to seize China’s interest in their resources as a counterweight to the USA.

that there was new investment in coal-fired power plants<sup>25</sup>, drawing attention to the weaknesses in the implementation of climate change European policies.

The exploration of unconventional hydrocarbons is triggering the creation of a “new strategic world map”, with the redefinition of the world energy map and the geopolitical importance of producing areas and detainers of energy reserves. In this map, giant suppliers such as Russia, Saudi Arabia and Venezuela may coexist alongside countries with a few internal resources to supply their own needs and which also have the potential to become themselves supplying countries.

Lastly, the fourth dimension of the concept of energy security is the “economic” one. As previously analysed, energy has always been key to the development of societies, although its importance has grown substantially following the industrial revolution and, to a considerable degree, due to the intensive use of fossil fuels.

Xavier Labandeira and Baltasar Manzano (2012, p. 2) argue that a minimum supply of energy is essential for the functioning of economies, and explain that the laws of thermodynamics imply that energy is necessary, at least, in a minimum quantity for the material transformations that are related to most productive processes. Energy goods are likewise important, not only as intermediate inputs for production and transport, but also as final outputs that are often necessary for basic human wellbeing. Energy-related issues are highly relevant across the economic system, due to the capital-intensive investment in durables (associated to different types and levels of energy consumption) and their subsequently long depreciation periods. The combination of these two factors thwarts the agents’ capacity to react in this area.

In this dimension, the countries are concerned with the impact of a possible scarcity in energy resources on economic development, inflation, unemployment, namely in the balance of payments or in the country’s currency value. It encompasses the concerns of consuming and producing countries that may also be affected by a downturn in demand by importing countries, decreasing energy-based export revenue and causing a slackening of their economies.

Energy security must be considered in a global perspective, as a concept involving reciprocity between energy exporting and importing countries. In 2008, during a meeting between oil consuming and producing countries in Jeddah, in Saudi Arabia (*Jeddah Energy Meeting*), the effects of price volatility – affecting not only companies and consumers in importing countries, but also energy producing countries – were debated. It was argued that price volatility, lest it earns the combined action of importing and exporting countries, will have an impact on all, as well as on the long-term stability of the international energy market and of world economy.

Among the chief consequences that were put forward, the following warrant special emphasis (OPEP, 2008, p. 13): (1) the negative impact on economic growth, particularly in the less developed countries, through the energy-economy link; (2) the effect of higher

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25 Another driving force was the relinquishing of nuclear power in certain countries, as for instance in Germany, following the accident at the Fukushima Daiichi power plant in 2011.

oil prices on high energy-consuming industries and on transport costs, which may result in a rise in inflation; (3) the persistence of oil price volatility encumbers upstream and downstream investment, causing delays in necessary financing; (4) higher oil prices and their volatility increase the activity of future oil markets, with a spiral effect.

One of the most important policies to improve the economic dimension of energy security, especially in emerging economies, consists of breaking or at least limiting the relationship between GDP and energy consumption, namely through an increase in energy efficiency and the reduction of energy intensity in the industrial sector. Energy efficiency is important for energy security in consuming countries, since that, by enabling a reduction in dependence on imported fossil fuels, it renders it possible to reduce the need for investment in energy infrastructure and also fuel costs. Consuming countries such as China, the USA and the EU member States recognise the importance of energy efficiency and have publicly presented the measures they are developing or the objectives they wish to carry through. The International Energy Agency (OECD/IEA, 2012, p. 7) argues that, although approaches for an efficient world scenario vary from country to country, energy efficiency can only become visible through the estimation and dissemination of its economic benefits.

## **Conclusion**

Energy remains a global challenge, despite the upsurge in the available types of energy sources. In the last years we have witnessed, triggered by technological advancements and environmental and climate concerns, a retrieval of the early low-carbon energy sources used by man. These sources allow countries such as Portugal to reduce their energy dependence and minimise the impact of price volatility in their economies.

Energy security has been guiding important decisions and strategies throughout history. If, until the end of the Cold War, it was essentially a matter of national interest, currently it is also a global issue, in the hands of all and for the benefit of all.

Concomitantly, the challenges faced by energy security were essentially short-term and supply-related, mainly concerning oil. Nowadays, reflecting the temporal dimension of energy security, concerns are a matter of long-term pondering of strategies that enable the energy system to react promptly in the face of sudden changes in supply and demand.

From 2000 onwards, energy security problems became more multifaceted and multidimensional. The threats are no longer only material, but also cybernetic, and can impact the whole energy system, a fact which has led a series of authors to appeal to the creation and use of a broader and modern concept of energy security.

Bearing in mind that these challenges convene all the actors in the energy system, we commit ourselves, in the present article, to an integrated analysis based on multiple dimensions (security, foreign policy, internal and economic) which comprehends, among others, factors such as energy availability and affordability, energy efficiency, the environment, economy and technology. The analysis applies, in its turn, a multidimensional concept of energy security that includes internal and external actions with different yet combinable dimensions.

In view of the fact that the creation of a “new strategic world map” is underway, with the redefinition of the world energy map and the geopolitical importance of producing areas and holders of energy reserves, it is important to ponder, in light of these changes, the evolution and adaptation of the concept of energy security. Lastly, curtailing limitations, ambiguities and inconsistencies in the meaning of energy security will allow for a shared language between scholars and political decision-makers, thus contributing to a wider analysis of the challenges faced by energy security.

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