International Energy Security

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International Energy Security:
Common Concept for
Energy Producing, Consuming and Transit Countries

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1. Introduction

In late 2013, the Energy Charter Conference decided to launch negotiations on an updated version of the European Energy Charter adopted in The Hague back in 1991. The Charter is the founding document of the Energy Charter Process. It contains the basic principles and areas of cooperation in the energy sector and has to date been signed by 64 countries. The purpose of updating this political declaration is to attract new countries from all continents to sign up to its basic principles and to modernise the text in view of contemporary energy challenges.

One of the ambitions of the negotiators of the "International Energy Charter" – the new declaration to be developed on the basis of the 1991 declaration, has been to develop a common concept of energy security. Since the "International Energy Charter" was supposed to be signed by a heterogeneous group of countries including energy producing, consuming and transit countries, representing both developed and developing economies, the objective of developing a common concept of energy security posed a serious challenge. This is because these countries seem to have developed concepts of energy security which are specific in view of their state of development and position in international energy markets. The terms "security of supply" and "security of demand" seem to reflect fundamentally different approaches.

It is the purpose of this study to analyse whether on this basis a common concept of energy security can be developed that would reflect a balance among the policy objectives of the different categories of countries involved in the negotiations on the International Energy Charter.

2. General Overview of Energy Security

2.1. Brief History of International Energy (In)Security

Energy security has often been an issue in energy policy for the past 100 years. It is often cited how Winston Churchill or Georges Clemenceau regarded oil supply security as essential to fuel their armies for World War I (for example, Yergin 1991, pp.137-148, 161, Clo 2007, p.191, Frank 2009, p.173). Controlling the oil supply was a major aim for Germany and Japan to invade USSR and Indonesia, respectively, during World War II (Yergin 1991, pp.295-302, 317-322). For these wars, energy security was equivalent to national security. It was vital to secure oil supply to fuel warships, tanks, and fighter planes.

In 1950s and 1960s, world energy demand more than doubled, driven by North America, Western Europe, the Soviet Union, and Northeast Asia[1]. In these regions, economic growth, living standard improvement, motorisation, and electrification pushed energy demand in all demand sectors. More importantly for this article, international energy trade, the majority of which was oil, more than quadrupled for the same period[2]. The international oil supply system was controlled by the western oil majors. While those companies supplied cheap oil in a relatively stable manner, oil exporting countries were increasingly discontent with the distribution of wealth from oil exports and formed the Organisation of Petroleum Exporting Countries (OPEC) in 1960 (Yergin 1991, pp.501-505, Amuzeger 2001, pp.23-25, Jaffe and Morse 2005, p.124). While security of energy supply was not a high policy priority in developed countries, the majority of the population in many developing countries did not even have access to modern energy, especially electricity.[3] Although air pollution was becoming a major concern in many industrialised countries, global warming discussion remained in the realm of academia.

The 1970s could be described as the beginning of an energy insecurity era. This was caused by, needless to say, two oil crises. In the first oil crisis in 1973, oil embargoes by the Organisation of Arab Petroleum Countries (OAPEC) shook the oil importing countries to the core. Many OPEC counties gradually nationalised their oil assets throughout the decade (Yergin 1991, pp.565-567, 628-634, Jaffe and Morse 2005, p.125). The second oil crisis shot up international oil prices above $30/bbl, about $100/bbl in today's value. Oil insecurity resulted in various reactions in importing countries. Energy demand growth stalled, the inflation rate rose significantly, and the era of high economic growth was over at least in the Western World.[4] Importing countries started to implement various countermeasures under the name of energy security policy, such as energy efficiency, diversification, stockpiling, and energy investment in domestic and foreign areas. The International Energy Agency (IEA) was established in 1974 by the Organisation of Economic Cooperation and Development (OECD) countries in response to the Arab oil embargo in 1973. Energy security was now on a high priority issue on the policy agenda in view of its significance for the whole economy.

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1 According to United Nations (2013), the world energy demand increased from 1,676 Million Tonnes of Oil Equivalent (Mtoe) in 1950 to 4,197 Mtoe in 1969. North America, Western Europe, the Soviet Union, and Northeast Asia accounted for 89% of the growth.

2 International energy trade increased from 331 Mtoe in 1950 to 1,513 Mtoe in 1969 (United Nations 2013).

3 In 1969, 72% of the electricity was consumed in OECD countries that shares 20% of the world total population (United Nations 2013).

4 In 1970s, world oil imorts grew at 11%/y for 1970-1972, but slowed down dramatically at 1%/y for 1973-1979 (United Nations 2013).

Meanwhile, in terms of energy sources, international energy security still largely meant oil security.[5] Energy access issues in developing countries had not improved to any significant extent.[6] The awareness of climate change issues remained low.

Energy security of supply was alleviated in the 1980s, especially in the latter half of the decade, helped both by supply expansion and also lower demand due to high energy prices stemming from the oil crises. Global oil imports decreased by 25% during the first half of the decade. Oil was significantly replaced by nuclear and natural gas, especially for power generation[7]. OPEC lost control over oil prices, and pricing was increasingly market oriented. Some oil exporting countries started to enter the downstream market in importing countries, the first sign of attempts to manage international demand security (Luciani and Salustri 1998, pp.28-36, Stevens 2007, p.130). Energy access issues in the developing countries remained largely unchanged.[8] In rural areas in India, for example, only 15% of the population used electricity in 1983 (Pachauri and Jiang 2008, pp.4022-4035). Recognising that the earth's temperature is rising, the Intergovernmental Panel on Climate Change (IPCC) was founded by the World Health Organisation (WHO) and United Nations Environment Programme (UNEP) in 1988 to provide a scientific view on climate change.

The 1990s started with the Gulf War and the fall of the Soviet Union. The limited impact of the war on the world energy market fostered optimism in relation to energy security (Yergin 2006, p.71). The collapse of the USSR, however, resulted in devastating economic and social consequences in the countries of the former Soviet Union. Gas transit risk was already evident, especially in Ukraine: with some supply reductions by Russia in this decade (Stern 2006, p.2). At the end of the Cold War there was a need to overcome economic divisions especially in energy sector; for this and other reasons the Energy Charter process was initiated. In terms of domestic energy industries, the 1990s saw the trend towards privatisation and liberalisation of energy industries and markets, initiated by the US and the UK in the 1980s.

While national oil companies (NOCs), especially in the Middle East, continued expanding their integration into importing countries via asset acquisition and other business deals, a similar strategy was adopted by Russia's Gazprom in the European gas market (Stern 2005 pp.111-118). Therefore, security of energy demand remained an issue for some exporting countries.

Power demand in non-OECD countries grew much faster than that of the OECD countries, although 63% of electricity was still consumed in OECD countries (United Nations 2013). Global warming issues were gradually institutionalised throughout the decade. The Kyoto Protocol, the first international treaty that set binding obligations on industrialised countries to reduce emissions of greenhouse gases, was adopted in 1997.

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[5] Oil shared as much as 86% of the world energy trade in 1979 (IEA 2013). The Middle East supplied 58% of the internationally traded oil in the same year (United Nations 2013).

[6] In 1979, 67% of the electricity was consumed in OECD countries that shares 18% of the world total population (United Nations 2013).

[7] While the world energy demand increased by 20% per annum during the 1980s, the share of oil shrank from 42% in 1980 to 37% in 1989 for primary energy supply and from 20% in 1980 to 12% in 1989 for power generation (IEA 2013).

[8] In 1989, 62% of the electricity was consumed in OECD countries that shares 16% of the world total population (United Nations 2013).

Energy insecurity again became widely discussed in the early 2000s. The 9/11 terror attacks set the tone of the era, and soon led to the wars in Afghanistan and Iraq. More recently, the Arab Spring and the "Islamic State" have created further tensions and instability. Rising marine energy transport, and later the confrontation over Iran's nuclear programme raised concerns over the so-called "sea-lane issues" at transport chokepoints such as the Hormuz and Malacca Straits (EIA 2012). Energy security concerns also expanded beyond oil supply. The Ukraine gas crises in 2006, 2009[9] and 2014[10] the threat to energy security that has resulted from the standoff between Russia and the West over Ukraine in 2014 have forced gas importers in Europe to rethink whether they can continue to rely on Russia to meet their gas demand[11]. This crisis has also been a reminder of the transit risk. The Fukushima nuclear accident in 2011 raised a fundamental question about nuclear as a countermeasure for both energy independence and GHGs reduction. Meanwhile, energy security in the US has substantially improved thanks to the shale revolution.

On the other hand, with intensifying market liberalisation schemes aimed at achieving an internal gas market in the EU, Russia is concerned about the security of gas demand.[12]

The world has been electrified to a great extent. However, electrification rate in Sub-Sahara Africa is notably low at 35% in 2011 (World Bank 2014). The Fifth Assessment Report by the IPCC warns that the average world temperature could increase by 3.7-4.8 degrees centigrade by 2100 in the baseline scenario (without additional GHG reduction measures)(IPCC 2014).

2.2. Energy Security in the Context of Energy Policy

Energy is one of the basic necessities of modern human life, industry, and transportation. Clo (2007, p.187) argues that public intervention in energy is justified by the importance of energy in relation to economic development, the distribution of wealth within and among countries, the international balance of power and national security, and the process of social change. Therefore, it seems that energy security is connected with the socio-economic development of the welfare state.

Since the energy situation varies in each country, or even between one region and another within a country, the actual policy or risk management tools are wide ranging, namely: diversification of supply, sources and demand, security enhancement stockpiling, demand control (energy efficiency), pricing and vertical integration. It is important to note three characteristics of the nature of energy policy. Firstly, energy policy tools are not necessarily universally valid for each pillar of energy policy. Some tools work for one of the pillars but not always for the others. Luft el al (2011, pp.47-51) persuasively argue about the unintended consequences of energy policy. For instance, global warming could enhance energy security because it would reduce heating energy needs, create an Arctic sea transport route, make permafrost areas available for energy exploration, and biomass would grow faster. Meanwhile, they point out that climate policy could undermine energy security, by illustrating

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[9] Russia's Gazprom halted natural gas supply to Ukraine between 1 and 4 January 2006 and between 1 and 18 January 2009, after it had failed to reach agreement on the natural gas export price to Ukraine, transit charges on Russian gas to Europe and Ukraine's debt payment to Gazprom.

[10] Gazprom halted supplies to Ukraine on 16 June 2014 due to the dispute on the mounting debt of Naftogaz. Naftogaz made a payment and gas supply was resumed on 16 December 2014.

[11] The details of the EU energy security programme will be mentioned in section 3.2.

[12] The details of the Russian concerns will be mentioned in section 3.3.

for instance that adopting carbon taxes or discouraging coal use would reduce energy availability and that renewables can lead to fluctuation in the electricity output. Thus, the essence of a robust energy policy involves balancing these pillars, and prioritisation of one over another is often necessary, depending on specific energy challenges a country faces. For instance, Bradshaw (2014, pp.184-186) argues that rapid decarbonisation, demand reduction and improved efficiency are needed for the developed world, as well as improving energy efficiency and low carbon sources of energy supply for transition economies, securing sufficient energy and the improvement of living standards for emerging economies, and providing universal energy access and creation of sustainable energy systems for the developing countries in general.

Secondly, it is also important to understand that energy policy itself evolves, depending on external changes. As described in the previous section, energy security can be aggravated or improved over time. Thus, energy security is not always the first priority even in different areas of the same country. For instance, it is arguable that, as the shale revolution is expected to turn the US into a net exporter by 2020, security of international energy supply will be side-lined and the security of demand aspect could emerge in the country.

Thirdly, there is no clear cut energy security policy distinction between producing/exporting and consuming/importing countries, simply because almost all countries both produce and consume energy to a varied extent. Therefore, it is sometimes the case where a country faces a dilemma as to whether security of supply or demand is the priority. A lot of energy exporting countries face this dilemma, since their domestic energy demand is increasing rapidly.

3. Current Concepts of Energy Security

3.1. Ambiguous and Evolving Nature of the Concept

Despite many governments' emphasis on the importance of energy security, there is no consensus about what energy security is supposed to mean. As a result, there are a number of definitions of energy security. In other words, "where countries stand on energy security depends on where they sit" (Luft et al 2011, p.45). Sovacool (2011, pp.3-6) found as many as 45 different definitions of energy security, although these definitions share a great deal of similarity among them. According to the Oxford English Dictionary, "energy" is the strength and vitality required for sustained physical or mental activity and/or power derived from the utilisation of physical or chemical resources, especially to provide light and heat or to work machines. "Security" means, the state of being free from danger or threat.

If one wishes to follow the origin of the words in a straightforward way, that is combining "energy" and "security", energy security should merely mean stable energy flow. This was probably the case during the mid 20th century, but not any more. The flood of definitions tend to have meanings beyond stable energy flow, which arguably stems from the multi-dimensional, evolving, and easily politicised nature of energy security and energy itself.

The most distinctive difference in energy security concepts is found between energy importers and exporters, resulting from the emphasis on security of supply for the former and security of demand for the latter. One should remember, however, many producing/exporting countries also face energy insecurity of domestic supply.

As the nature of energy related challenges evolve over time, so does the concept of energy security. It is assumed that until the 1970s, the concept mainly emphasised the physical availability of energy, especially oil. It was after the oil crises that the concept started to be mentioned in terms of price level, in either "affordable" or "fair" contexts. Likewise, the more global warming issues are recognised by governments (especially since 1990s), the more explicitly sustainability is mentioned in relation to energy security. More recently, energy poverty issues are increasingly discussed under the concept of energy security.

Today, a typical definition of supply security is "the continuous availability of energy in varied forms, in sufficient quantities, and at reasonable prices" (United Nations 2000, p.113). An example of demand security is "stable commercial relations with their customers, whose purchases often provide a significant part of their national revenues" (Yergin 2005, p.56). Similarly, Dannreuther (2012, pp.149-150) analyses the essence of energy demand security, and states it is stable and secure revenue for development. These definitions coincide with stable energy flow, but, not surprisingly, there is no agreement about what "reasonable" prices are for importers and exporters.

This ambiguity of the energy security concept is often criticised by observers.

For example, Sovacool and Brown (2010, p.79) argue "notions of energy security are either so narrow that they tell us little about comprehensive energy challenges or so broad that they lack precision and coherence". The concept of energy security is described as "inherently slippery" (Chester 2010, p.893) and "fuzzy" (Valentine 2011 , p.56). Considering the multi-dimensional and evolving nature of energy security or energy issues in general, it is not easy for a universally accepted definition to emerge. Indeed, Chester

(2010, p.893) even concludes that attempting a standardised conceptualisation is folly. Reserving judgment as to whether creating a common concept of energy security is possible at all, we will look at the differences of the concept in more detail between importing, exporting, and transit countries in the next section.

3.2. Importing Countries' View

Energy importing countries are naturally concerned about energy security of supply. For instance, as an international organisation that has 29 member countries, largely consisting of major energy importers, the IEA defines energy security simply as "uninterrupted availability of energy sources at an affordable price" (IEA 2014). It should be noted here that this definition does not include any environmental and social notions.

The US is the largest energy importer and the second largest energy producer and consumer in the world.[13] With increasing needs for imported energy, energy security is traditionally aimed at so called energy independence, especially in oil (Bahgat 2007, pp.367-368). However, as Sovacool (2011, p.2-3) points out, neither the Food and Energy Security Act of 2007 nor the Energy Independence and Security Act of 2007 offer any definition of energy security. Seemingly, a paper from the Executive Office of the President of the United States (2014, p.20) is the only official document in recent years that refers to the term, by stating "energy security is used to mean different things in different contexts, and broadly covers energy supply availability, reliability, affordability, and geopolitical considerations". Thus, the paper generally follows the UN and IEA definitions.

It is a growing consensus that the shale revolution is transforming the US into a net exporter of oil and gas. According to the US Energy Information Administration (EIA 2014, p.MT-24), the US will become a net gas exporting country in 2018. There are a number of LNG export projects in planning, and some discussion has taken place about lifting the crude export restriction (Wall Street Journal 2014). Thus, energy security of supply has already been improved to a significant extent, and does not seem to be a priority in the energy policy in the US, at least in the near future.

Europe is a major energy importing region. Energy security measures were traditionally in the hands of each member country, and individual national initiatives still remain.[14] However, as a regional economic integration organisation, the EU has become increasingly involved in energy security, especially since the 2000s (IEA 2008, pp.79-80). While Europe generally shares American concerns over rising energy imports, the EU does not necessarily seek to maximise energy self-sufficiency and rather stresses supply source diversification (EC 2000, p.10).

One of the most characteristic features about the European energy security concept is the explicit linkage between energy security (of supply) and competition policy. This is based on the conviction that an effective market is the lowest cost way of addressing long-term energy security threats (Andrews-Speed 2004, pp.90-91). As mentioned in 2.1., this market-oriented

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[13] US Energy Information Administration, Independent Statistics & Analysis.

[14] For instance, Italy's gas imports from non-EU countries are authorised only when storage capacity is at least equivalent to 10% of the volumes imported annually. Similarly, in Spain, gas transportation companies and traders must not import over 60% of their natural gas from single country (Martin-Amouroux 2007, p.390).

approach towards energy security of supply has become controversial with energy exporting countries, particularly Russia.

Like in the US, there is no clear definition of energy security in EU policy papers. However, considering that the EC (2001, p.2)[15] states that,

> "the European Union's long-term strategy for energy supply security must be geared to ensure, for the well-being of its citizens and the proper functioning of the economy, the uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers (private and industrial), while respecting environmental concerns and looking towards sustainable development,"

the EU also largely follows the standard concept of energy security of supply. It seems that the environmental aspect is recognised here, but is not explicitly internalised within the concept of energy security. The energy poverty aspect is not mentioned in policy papers in relation to energy security.

Being almost totally dependent on imported energy, Japan has always been concerned about energy supply security. Tokyo's major energy policy paper, the "Strategic Energy Plan," understands that Japan faces increasingly severe insecurity of energy supply, especially after the Fukushima nuclear accident in 2011, and offers comprehensive measures that include domestic and overseas supply expansion of fossil fuels, accelerated energy efficiency, renewables expansion, restructuring nuclear policy, market liberalisation, and emergency responses (Ministry of Economy, Trade and Industry 2014, pp.31-83). While this plan does not offer a definition of energy security, another paper considers energy security as "securing necessary amount of energy for areas like people's living, economic and social activities, and national defence at a affordable price" (Ministry of Economy, Trade and Industry 2010).

After the US, China is the second largest energy importer in the world, and energy security is increasingly a pressing issue for the country. Jian (2011, pp.14-16) describes China's energy security concept as transformed from the principle of self-reliance before 1993 to resource diplomacy from 1993 onward,[16] and argues that energy security for China will require the integration of energy policy with macroeconomic and foreign policies (ibid, p.2).

Calling for a safe, stable, economical and clean modern energy industry, China's 12th Five Year Plan stresses developing a series of large scale energy expansion projects in the area of fossil fuels, nuclear, and renewables, from upstream to downstream, to meet rapidly rising demand (National Development and Reform Commission 2011, p.30). In the latest energy policy white paper, "energy security" is frequently mentioned throughout, but no definition of the term is given (State Council 2012). Nevertheless, stressing domestic supply expansion and energy efficiency, it is clear that the term is used in relation to stable, physical availability of energy. The paper urges a new energy security concept featuring "mutually beneficial (international) cooperation" (ibid). The paper also mentions the social and environmental aspects of energy challenges, but not in relation to the energy security concept.

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[15] Green Paper, 'Towards a European Strategy for the security of energy supply', adopted by the European Commission on 29 November 2000 (COM(2000) 769 final).

[16] China turned into net oil importer in 1993.

Like China, energy demand in India has been increasing rapidly, and its import dependency is rising.[17] India's 12th Five Year Plan (Planning Commission 2013, Volume II, p.134) states that "energy security involves ensuring uninterrupted supply of energy to support the economic and commercial activities necessary for sustained economic growth", and is concerned over increasing import dependency. As a countermeasure, the Plan urges more domestic coal production by opening the sector to private companies, as well as expanding the capacity of renewables (ibid, pp.169-170, p.187). The Plan stresses the importance of universal access to modern energy,[18] especially electricity, and targets the supply of electricity to every household in the country during the period of the Plan (ibid, p.131). However, the Plan seems to consider energy access under a general social framework, not necessarily under energy security. The same can be said about the environmental aspect. The Plan does not discuss climate change in relation to energy security, apart from the possibility of international coal supply restrictions due to, presumably, underinvestment of coal mines resulted from climate policy (ibid, p.166).

Turning to South America, Brazil is another country whose energy demand and imports are expanding.[19] The Brazilian government is certainly concerned about energy security of supply; indeed, energy security to meet demand at reasonable prices and universal access to energy are part of the objectives of its Ten Year Plan (Ministério de Minas e Energia 2013, p.345). While one can sense some concern about relying on foreign energy in the Plan, energy security is mentioned more in relation to the domestic supply of electricity, (ibid, p.71, p.93, p.117) oil products (ibid, p.241), and ethanol demand in the US and its impact on biofuel in Brazil (ibid, p.293). Apart from acknowledging biofuel expansion for both energy security and GHG reduction (ibid, p.310), the Plan generally addresses social and environmental aspects as separate issues from energy security. Thanks to the Luz Para Todos (Light for All) programme since 2003, access to electricity is now almost universal across the country (IEA 2013b, p.303). Like the US, Brazil has the potential to transform itself into a net oil & gas exporter. The IEA (ibid, pp.409-410) projects that Brazil will become net oil exporter after 2015, and net gas exporter around 2030, because of large scale "pre-salt" discoveries. Should that be the case, Brazil's concern over energy supply security might be eased in the future.

3.3. Exporting Countries' View

So far most literature on energy security focuses on security of supply for energy importers. Indeed, the standard definition of energy security from the United Nations, as mentioned in 3.1., only concerns security of supply.[20] However, for many energy exporting countries, international energy security means stable energy export flow at a "reasonable" price that can assure not only new energy investment but also general economic development. It should also be noted that security of domestic energy supply is increasingly an issue in many exporting countries.

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[17] According to IEA (2013), energy demand and imports in India have increased by 5% and 10%, respectively, since 2000. In 2011, India's energy import dependency was 37%.

[18] World Bank (2014) estimates electrification rate in India in 2011 was 75%.

[19] Brazil's energy demand and imports both grew at 3% per annum since 2000. Import dependence is 25% in 2011 (IEA 2013).

[20] Later, the United Nations (2004, p.43) does mention that energy exporters are anxious about energy security of demand, but their definition of energy security largely remains the same as United Nations (2000, p.113).

It is not clear when energy exporters started to argue that the security of demand element should be considered as a part of energy security. However, it was probably after the oil price collapse in 1986,[21] when oil exporting countries faced their oil export revenues falling. Many importing countries attempted to lessen (reduce) their dependency on oil as well. In this situation, it is no surprise that exporting countries wondered why they should invest in new production and export facilities that seem to be unwanted by importers. As a result, in 1988, Saudi Arabia announced its intention to make available an "ocean of oil" in exchange for "security of demand" (Wall Street Journal 1988).

Major oil exporting countries faced energy insecurity of demand when the oil price collapsed, especially in 1986, 1998, and 2009, and experiencing the latest fall of the price the summer of 2014. In the Riyadh Declaration of 2007, OPEC leaders underscored "the interrelationships between global security of petroleum supply and the security and predictability of demand". Individual OPEC members including Saudi Arabia, Kuwait, and Iran echo this claim in different occasions (Royal Embassy of Saudi Arabia 2012, Middle East Economic Survey 2004, Amin-Mansour 2013). The Gas Exporting Countries Forum (GECF),[22] deemed by some to be a gas OPEC, emphasises "the importance of equitable risk sharing among all gas market players to ensure the security of gas supply and demand" (GECF 2013), but offers no definitions of energy security.

Among the energy export countries, Russia is the most vocal about security of energy demand. At a G8 summit in 2006, President Putin stated that "measures taken to ensure reliable supplies must be backed up by measures taken to ensure stable demand" (President of Russia 2006). Moscow's main energy policy document, the Energy Strategy up to 2030 (Ministry of Energy 2010, p.24) regards energy security as one of its main strategic guidelines. Although the Strategy does not give a clear definition of energy security, one can argue that the Russian government recognises security of domestic supply and international demand in terms of energy security challenges. As far as international energy security of demand is concerned, the Strategy (ibid, p.55) calls for stable relationships with traditional and new consumers of Russian energy resources.

Russia's concern over demand security is intensifying in relation to their gas supply to Europe. Behind this concern is the EU's gas market liberalisation, weak gas demand in Europe, and the recent Ukrainian crisis. The EU and its member countries have been working on market liberalisation with the aim of creating a single internal gas market. In particular, the EU Third Energy Package requires effective third party access to gas infrastructures and strict unbundling, either via ownership or functionally, which Gazprom, with existing and planned gas infrastructure assets in and for Europe, strongly opposes. Weak gas demand in Europe, combined with increasing liquidity in the gas market in major EU countries, forced Gazprom to lower its export prices to major European importers (Platts 2012).

Taking all this into account, it is not surprising that Russia is increasingly conscious of gas demand insecurity. The new energy strategy up to 2035, currently under formulation,

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[21] The 1986 price collapse was the result of a decision by Saudi Arabia and some of its neighbors to increase their share of the oil market.(Lessons from the 1986 Oil price collapse, Dermot Gately, New York University).

[22] Its objective is to increase the level of coordination and strengthen the collaboration among gas exporting countries. The forum has been active since 2011. Member countries are Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Qatar, Russia, Trinidad and Tobago, United Arab Emirates and Venezuela. Kazakhstan, Iraq, the Netherlands, Norway and Oman have the status of Observer Members.

demands the protection of Russia's interests from market regulation in importing countries as well as security of energy transit (Ministry of Energy 2014, p.23).

Like Russia, Iran is another country that seeks energy security of demand. A member country of both OPEC and GECF, Iran has substantial oil and gas reserves and is the third largest oil exporting country after Saudi Arabia and Russia. The country was one of the first that claimed energy security of demand. Marcel (2006, p.225) points out that Iran offered upstream oil and gas assets for importers, in exchange for secured gas markets in Asia. A recent example is a speech at the International Energy Forum where Petroleum Minister Ghasemi argued that security of demand for producers and security of supply for consumers should be taken into consideration to achieve a stable energy market (Ghasemi 2012, p.2). Aghaie (2014) follows this "two way concept" of security of supply and demand, and argues that energy security is related to the social and environmental aspects.

Turning to North America, Canada is a net exporter of oil, natural gas, coal, and electricity, and international energy security of supply is certainly not a pressing issue. Indeed, the National Energy Board (2013) refers to "security" mainly in terms of protecting critical energy infrastructure in the country. Natural Resources Canada (2013, p.21) mentions that energy efficiency contributes to energy security (thus, security of supply). The Shale gas revolution in the US has decreased Canadian gas exports to the US by 26% since 2007. Canada is therefore facing insecurity of gas demand from its sole export market. Nevertheless, gas demand insecurity is not politicised so far. Natural Resources Canada (ibid, p.5) merely mentions the need to capture export opportunities in emerging economies and seek to attain the maximum value for its natural resources. Although petroleum producers already pursue demand security for their own production (New York Times 2013), whether the Canadian government will explicitly claim international security of demand in its energy policy remains to be seen.

Indonesia was a major oil and gas exporter, but the country turned into a net oil importer in 2004 and gas exports have been in a downward trend since 1999. Indonesia's concept of energy security increasingly resembles the ones in importing countries, despite its abundant resource base. The main policy document, the National Energy Policy, does not mention security of demand, rather, it emphasises domestic energy supply security, and targets a more diversified energy mix for 2020 (Government of Indonesia 2006). The concept of energy security of the National Energy Board, a government agency in charge of energy policy, focuses on availability and affordability and does not include demand security in export markets (Tumiran 2014, p.19). While policy documents do not clarify the meaning of energy security for Indonesia, the state oil company, Pertamina, understands that energy security "relates to safeguarding the country's energy future by securing a stable and secure supply of energy at affordable prices" (Pertamina 2013), which is very similar to the view of importers.

Another issue with energy policy in Indonesia is energy access. The electrification rate was still only 73% in 2011 (World Bank 2014), and blackouts have been common even in the capital, Jakarta (Alexandra 2012, p.22). However, it is not clear if energy access or reduction of energy poverty is dealt with in the sphere of energy security.

The emphasis on domestic supply security coincides in Nigeria, which is the largest oil and LNG exporter in Africa, and a member of both OPEC and the GECF. Nigeria's "National Energy Policy", formulated in 2003 but still valid and available on the website of the Energy Commission of Nigeria, argues that energy diversification away from petroleum will enhance energy security in the country (Energy Commission 2003, p.5). Although this policy paper

calls for special attention to fuel wood supply for rural areas (ibid, p.5), access to electricity is not treated under energy security. Independent research such as Oppewal (2011) acknowledges demand security improvement as Nigeria has diversified its oil markets, but the real focus of the paper is that oil and gas exports do not necessarily result in sustainable growth for the Nigerian economy and society. Likewise, Borok et al (2013) exclusively discuss supply security in the country.

3.4. Transit Countries' View

There are several significant global transportation routes for energy commodities. By far the largest is the oil flow from the Middle East (971 Million Tonnes in 2013, according to BP 2014). The Middle East is also the largest LNG exporting region in the world (121 Mtoe in 2013, ibid). Most of these flows are carried by tankers, and so do not involve any transit in a third country apart from some territorial waters of key choke points like the Hormuz and Malakka straits. Oil, LNG, and coal flows from Southeast Asia and Australia to Northeast Asia are substantial (about 340 Mtoe in 2010, according to the United Nations 2013 and BP 2011), but again these are exclusively sea transport. Oil and gas flows within North America, mainly from Canada to the US are significant (about 270 Mtoe in 2010, ibid), but little transit happens for these trades. Energy flows within the CIS countries and from Russia to Europe are large (about 380 Mtoe in 2010, ibid) and involve land transit countries like Ukraine and Belarus, and attract great attention since the fall of the Soviet Union. Yafimava (2011, pp.81-92) describes a number of technical and non-technical gas transit incidents and crises since the 1990s that happened in Ukraine, Belarus, and Moldova.

While the gas transit disputes between Russia and Ukraine have been widely discussed, oil transit in those countries has been a relatively minor issue. Despite that, Russia is trying to diversify away from Belarus and Ukraine transit for its oil exports (IEA 2014b, p.139). The less controversial situation of oil transit in Ukraine could be explained by the fairly diversified export routes for Russian oil, the market based oil prices with Ukraine that are already in place, and that the liquid oil market enables Ukraine to access alternative oil suppliers.

It is also important to note that those transit countries, particularly Ukraine and Belarus, are significant importing countries too. Ukraine imported 10 Mt of oil, 27 Mtoe of natural gas, and 10 Mtoe of coal in 2012, and the energy import dependency rate was 38% (IEA 2013a). Likewise, Belarus imported 28 Mt of oil, 17 Mtoe of natural gas, and 0.3 Mtoe of coal for the same year, and the import dependency rate was as high as 87% (ibid). Therefore, energy security for transit countries like Ukraine and Belarus could bear substantial similarity to energy supply security for importing countries.

In its "Energy Strategy 2030", the Ukrainian government cites enhancing energy security as one of the goals and objectives of energy strategy (Verkhovna Rada of Ukraine 2012, p.5). This Strategy defines energy security as "the attainment of a technically reliable, stable, competitive and environmentally sound supply of energy resources for the economy and social sphere of the country"[23] (ibid, p.133). This is a very similar definition as that of importers, and has no elements relating to energy transit in the country. Ukraine's policy measures for energy security are therefore similar to the ones of importing countries. The

[23] Unofficially translated from the original text that is "Енергетична безпека передбачає досягнення стану технічно надійного, стабільного, економічно ефективного та екологічно безпечного забезпечення енергетичними ресурсами економіки і соціальної сфери держави".

Strategy calls for measures like energy diversification, energy efficiency, and more domestic energy production (ibid, pp.134-135). Analysing future EU gas demand and supply, the Strategy assumes the Russian gas transit quantity in Ukraine will be 70-80 Bcm in the case of the baseline scenario, and recognises the need to modernise its network (ibid, p.94-95). However, it does not explicitly relate energy transit to energy security.

Turkey is on course to becoming a major transit country. Since the completion of Baku-Tbilisi-Ceyhan (BTC) pipeline in 2006 that transports Azeri crude to the Turkish port of Ceyhan, on the Mediterranean coast, the country promotes a number of pipeline projects to serve energy demand not only in Turkey but also in Europe. Indeed, according to the "Strategic Plan (2010-2014)" of the Ministry of Energy and Natural Resources (2009, p.29), "becoming an energy hub" is one of Ankara's strategic aims. Nevertheless, this Plan does not consider energy security of transit. Rather, it discusses energy security of supply just like an importing country, and calls for measures such as energy diversification and energy efficiency. The Ministry of Foreign Affairs (2014) follows a similar line, but mentions that Turkey intends to contribute to Europe's energy security. This statement seems to have something to do with energy transit, but gives no definition of transit security. BOTAŞ (2012), the state owned oil and gas company, also refers to energy security in terms of supply.

Meanwhile, in academia, Yafimava (2011, p.17) defines gas transit security as "the acceptable level of threat of supply and price disruption arising from risks associated with the transit of gas supplies". However, one could argue that this is part of energy security of supply. Indeed, Yafimava herself affirms that "transit security has become an increasingly important component of EU's gas security" of supply (ibid, p.17). Therefore, it might be reasonable to say that there is no clear concept of energy transit security yet.

4. Common Concept of International Energy Security

4.1. Scope of the Energy Security Concept

As already remarked, the meaning of energy security has expanded over time. Deviating gradually from the origin of the words that only suggested stable energy flow, the "fair" price element was added in the 1970s and 1980s. Recently, environmental and social aspects are increasingly linked to energy security.

Strictly speaking, even the "fair" price notion could already be beyond what the origin of the words might suggest. One could argue for including this notion because an "unfair price" could undermine physical availability in the short term (e.g., non-affordability due to high price) or long term (e.g., underinvestment due to weak price). However, environmental and social sustainability are not considered under the concept of energy security, at least not in the major policy papers.

Those who take a climate-inclusive approach to energy security would argue that global warming should be included because it could create catastrophic consequences on not only energy supply, but also on international security perspectives through, for instance, mass migration of refugees (Luft 2011, p.44). However, as Luft (2011, pp.46-51) challenges this view mainly on the account that security problems do not necessarily impact energy security. As argued above, energy security and global warming prevention tools like supply expansion of fossil fuels, energy subsidies, or uncoordinated renewable development could contradict each other. Thus, it seems reasonable to consider that climate change can not be fully integrated into the concept of energy security. This is not to downgrade the importance of tackling climate change. On the contrary, it is indeed important and that is why the environmental aspect is a separate pillar of energy policy. For the sake of a clear concept of energy security, however, it is consistent that climate change and other environmental aspects are treated as risk factors to energy security instead of uncomfortably attempting to internalise them.

Energy poverty is another serious problem. It should be examined whether an energy poverty problem is a result of domestic or international energy supplies, and whether it is about access to modern energy (thus, new energy flows) or the improvement of supply stability and/or affordability of an existing energy flow. If it is entirely about creating a new domestic energy flow, energy poverty could be better addressed under another pillar of energy policy or even within a social welfare system because energy security concepts usually assume existing energy flows. In the case of an existing domestic energy flow, it could be addressed as a domestic energy security issue, not an international one.

Should an energy poverty case involve energy imports, then one could relate it to international energy security. Even so, however, it is still arguably in the scope of supply security because stable and affordable energy flows might solve, or at least alleviate, energy poverty. Meanwhile, the social welfare aspect remains because one could assume energy subsidies would be provided to make expensive imported energy affordable to people. Therefore, although energy poverty has some linkage to energy security, it seems to be an ancillary aspect of the energy security concept rather than the core. Policy wise, it is probably better

dealt with under another pillar of energy policy[24] or even under general social welfare, and, as mentioned in the previous chapter, that is indeed the case in many countries.

4.2. Universal Core Principles, Objectives and Approaches to the Concept

Energy Security should be universal, for both rich and poor nations; it should seek to honour the spirit of Johannesburg 2002, the UN World Summit on Sustainable Development. It should arguably address both security of supply and security of demand as key aspects.[25] Certainly, it has to be recognised that the security of supply refers to the delivery and it is important for the consumers whereas security of demand deals with the transparency and predictability of the marketing and it is important to the producers.

Specifically, the need for security of demand is a legitimate concern of producers. Dialogue and cooperation play an important role in meeting the challenges of security of supply and demand.[26]

The international community has over the last decade made significant progress in view of the formulation of common principles of energy security. In particular, the G8 Declaration on "Global Energy Security" adopted in St. Petersburg on 16 July 2006 listed common energy security principles, including enhanced dialogue on on relevant stakeholders' perspectives on growing interdependence, security of supply and demand issues as well as diversification of energy supply and demand, energy sources, geographical and sectoral markets, transportation routes and means of transport. The Summit further supported the principles of the Energy Charter and the efforts of participating countries to improve international energy cooperation.

Three years later, the President of Russia, D. Medvedev, published his "Conceptual Approach to the New Legal Framework for Energy Cooperation".[27] This paper argued that common energy security principles should include a "recognition of indivisibility of sustainable global energy security and interdependence of all world energy exchange participants", and of "security of supply (delivery) and demand (transparent and predictable marketing) as key aspects of global energy security".

These principles served as a basis for a draft Convention presented by the Russian Federation to several international organisations, including the Energy Charter, in late 2010.[28] However, notwithstanding the prominent calls to address security of demand as part of a common concept of energy security, the draft Convention fell short of providing a definition of energy security serving that purpose. Instead, in its draft definitions part, it followed the established logic of security of supply, stating that "international energy security (…) means a state of the world energy system which allows the secure and uninterrupted supply of Energy Materials and Products to consuming countries under conditions satisfactory to all participants of the world energy market with minimum harm to the environment and with the aim of ensuring

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[24] In 2.2, it was mentioned energy security, economics efficiency, environmental sustainability, and accessibility to modern energy/reduction of energy poverty are often four pillars of energy policy.

[25] Hasan M. Qabazard, 'What about the security of demand?', published in September 2013 by Strategic Energy Security Initiative.

[26] A Speech by Mr. Mohammed Barkindo, Acting for the Secretary General, delivered by Mr. Mohamed Hamel, Head, Energy Studies Department at EUROPIA Conference, London, England, 15-16 February 2006.

[27] More details on the Conceptual Approach may be found at: http://archive.kremlin.ru/eng/text/docs/2009/04/215305.shtml.

[28] The Draft Convention is available online through the website: http://ua-energy.org/upload/files/Convention-engl1.pdf.

sustainable socio-economic development of the world community". The requirement to meet "conditions satisfactory to all participants of the world energy market", appears rather vague.

In conclusion it may be stated that global policy fora have become sensitive to the notion of energy security of demand. However, this has so far not lead to its incorporation into a common concept. During the negotiations on the "International Energy Charter" in Brussels in 2014, an attempt was made to develop a common concept of energy security for energy producing, transit and consuming countries, including developing and developed economies. In addition to security of supply and transportation it was supposed to include a reference to demand, either in connection with "stability", "predictability" or "security". The final draft of the declaration eventually recognised the importance of energy security for energy producing, transit and consuming countries, without specifying the various aspects of energy security. It did however include an emphasis on mutual responsibilities and benefits.

The reason why an agreement could not be reached seems more closely related with the political connotation than with a disagreement on business practices. Energy consumers, while generally accepting that major investments into energy production and transportation require some guaranteed offtake in order to be financeable, are more inclined to describe this necessity with the term "predictable demand". Many major energy consuming countries have in fact adopted policies to reduce primary energy consumption and are therefore not willing to provide "security of demand". In view of the difficulties to agree on this in a declaratory manner, it seems appropriate to continue to discuss the mutual relationship between exporters and importers in the context of concrete policy tools, in particular long-term contracts and pricing formulas.

Considering those issues, the a common concept of international energy security should be principally based on stable energy flows at a price that reflects the true value of the products to satisfy energy demand and enable future investment on energy projects, all in a socially and environmentally sustainable manner. Here one should note, first of all, that sustainability is mentioned as an ancillary element, rather than the core of the concept. The second note is that reflecting true value is not always achieved by the market (or in the case of natural gas, hub) pricing. Functional international energy markets will enhance energy security of both demand and supply, but one should not exclude more traditional approaches such as fixed pricing, oil indexation, or even vertical integration.

5. Main Policy Tools for Energy Security

5.1. Diversification

Diversification is certainly one of the common policy tools to address supply security, and it has three forms: diversification of energy sources (alternative energy development), of suppliers/consumers, and of supply routes.

Traditionally, alternative energy development almost always aimed at decreasing dependency on oil, especially after the oil crises, and particularly in the power and industry sectors. The development of nuclear, coal and natural gas were often encouraged to replace oil. While importing countries diversify their energy sources for the sake of supply security, exporting countries do that to reduce the instability of export earnings.[29]

Recently, in the face of air pollution and climate change, the policy emphasis is on renewables. However, it is clear that some energy diversifications create unwanted effects in other pillars of energy policy. Replacing gas for coal in power generation will result in more GHG emission, unless expensive carbon capture and storage (CCS) is used. Uncoordinated renewable developments could undermine power grid stability.

As far as diversifications of supply sources/markets and supply routes are concerned, the EU and China value them most clearly. The EU has been supporting the Southern corridor to diversify its gas supply sources and routes. China promotes new oil import pipeline projects such as in East Siberia and Myanmar, in pursuit of decreasing its dependency on Middle East oil and to reduce reliance on transportation via the Malacca Strait. Energy exporting countries also diversify their markets and supply routes. Russia's effort to develop oil and gas pipelines in Eastern Siberia aims to lessen its dependency on the European market. Similar moves are made by Kazakhstan, Turkmenistan, and Uzbekistan as they conclude oil and/or gas supply contracts with China and potentially India, with the goal of not having to rely on Russia as their transit outlet for energy exports.

5.2. Supply Expansion

Supply expansion measures can be applied to both domestic and overseas resource development. Domestic resource development is one of the first policies that an importer might consider when aiming to mitigate energy insecurity.

If domestic resource development is not enough to meet energy demand, an energy consumer may turn to foreign resources. Although importers could simply use the spot market to secure supply, overseas equity investment, often combined with long-term contracts, is perceived by some governments (especially in Asia) to be an effective strategy for enhancing security of the energy supply.

However, it is easy to imagine that supply expansion could contradict other pillars of energy policy, most notably the environmental aspect. Developing upstream energy projects involves some level of ecological damage. Encouraging fossil fuel(s) developments, and thus consumption, will not contribute to GHG reduction. While being a possible destabiliser of the

[29] Derosa, D. ' Increasing export diversification in commodity exporting countries', IMF Staff Papers, Vol 39, N.3, September 1992.

power grid, as already mentioned, renewables can also create new kinds of environmental consequences (e.g., noise from wind turbines).

5.3. Security Enhancement

Security measures, possibly associated with military options, are recognised as part of a supply security policy, especially in the US. It is often argued that military expenditure and periodic military activities are necessary conditions for a continued flow of and, particularly, access to Middle East oil.

Since the 9/11 terrorist attack, energy importers are increasingly aware of the vulnerability of energy supply infrastructure. The US has undertaken the most comprehensive measures in terms of protecting their energy infrastructure. Energy is regarded as one of the most critical infrastructure sectors by the government (e.g., Department of Homeland Security 2007). The EU considers transport and the energy sectors as being amongst the immediate priorities for any action against threats. Within the energy sector, oil and gas production, refining, treatment, storage and distribution by pipelines, electricity generation and transmission, and production and storage/processing of nuclear substances are also pointed out as critical infrastructure (EC 2006). In recent years, increasing attention has also been paid to the vulnerability of IT systems (e.g., Yergin 2013, European Commission 2014)

5.4. Stockpiling

Stockpiling strategy reserves of oil has been adopted for decades in many OECD countries. Indeed, one of the main aims of establishing the IEA by the OECD was the coordination of oil stockpiling within its member countries. Oil stockpiling in IEA countries and the IEA emergency response mechanism were first set up in 1974. Today, IEA's member countries are required to hold oil stocks equivalent to at least 90 days of net oil imports, either by industry or a combination of industry and a public entity, i.e. by the government and/or agency established to fulfil this role.[30]

An example of implementing the stockpiling strategy is the US; The Strategic Petroleum Reserve (SPR) is an emergency fuel storage of oil maintained by the United States Department of Energy. It is the largest emergency supply in the world with the capacity to hold up to 727 million barrels (115,600,000 m3).[31] While many IEA countries implement supplemental stockpiling, other emerging importers began oil stockpiling as their import dependency increased. For instance, China plans to boost total petroleum reserve capacity to approximately 500 mb by 2020 (IEA 2012b, p.3).

5.5. Demand Control

Demand control concerns two elements: energy efficiency and interruptible contracts.

Energy efficiency is a traditional countermeasure to tackle energy insecurity for importers, a classic example being Japan's Energy Conservation Law of 1979. The US Energy Policy Act 2005 provides a $1.3 billion tax reduction for conservation and energy efficiency. The EU regards energy efficiency as the most immediate element within a European energy security policy, and targets improving energy efficiency by 20% by 2020 (EC 2014). Facing rising

[30] International Energy Agency, 'Total Oil stocks in IEA region', publication: Energy Supply Security 2014. This obligation does not apply for Canada, Denmark and Norway on the basis of the I.E.P. agreement.

[31] This obligation does not apply for Canada, Denmark and Norway.

dependency on fossil fuels for power generation, Japan stresses efficiency on coal and gas fired power stations as well as other demand sectors (METI 2014).

An interruptible contract is an agreement that allows an energy supplier to interrupt shipments with agreed customers at agreed times. The IEA (2004, p.20) values interruptible contracts for natural gas, because they can offer flexibility at a lower cost compared to storage. While this type of contract is widely incorporated in North America and Western Europe for gas and electricity, it can be regarded as a last resort to minimise the impact of an energy supply cut. In the case of an emergency the supply to interruptible consumers, and especially to large scale industry users or power plants, would be cut in order to keep non-interruptible consumers (typically household users) supplied.

5.6. Energy Subsidies

Energy subsidies are not necessarily categorised as a policy tool to enhance energy security, since they are often in place to allow energy flows to low income population, rather than protecting existing flows. Nevertheless, since some countries argue that the reduction of energy poverty should be included in the energy security concept, it can be mentioned briefly.

Energy subsidies are intended either to make energy products affordable or to make energy production economically feasible (IMF 2013). It is estimated that fossil-fuel consumption subsidies worldwide amounted to $409 billion in 2010 (IEA 2014e). Oil products (LPG, gasoline, diesel, kerosene), electricity, and natural gas are the main fuels for consumer subsidies, especially in energy rich, exporting countries.

The IMF is against energy subsidies since they are seen to create market distortion, arguing that it disincentivises energy efficiency, and has fiscal and social costs, as well as other side effects (IMF 2013). The IEA agrees with the IMF, and even warns that subsidies threaten energy security by increasing imports due to wasteful consumption (IEA 2011). At the G20 Summit in Pittsburgh in 2009, world leaders committed to phase out and rationalise over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest, arguing that inefficient fossil fuel subsidies encourage wasteful consumption, reduce energy security, impede investment in clean energy sources and undermine efforts to deal with the threat of climate change.

5.7. Energy Trade and Pricing

While many of the policy tools listed above aim at lowering the mutual dependence of energy exporters and importers, energy trade will still be a dominant instrument for energy consumers to secure supplies and for producers to gain revenues. Whether the relationship between exporters and importers meets the requirement of security of supply and security of demand respectively depends on the terms and condition of such energy trade, in particular the commercial contracts concluded, their duration and the pricing formulas.

Many observers (e.g., Chester 2010, p.893, Luft 2011, p.45, Bradshaw 2014, p.24) have discussed what is a “fair” and “reasonable” price level or pricing structure. For price level, it is relatively easy to answer – a price level should be considered as “fair” and “reasonable” when it is equal to the cost of a marginal supplier. But a “fair” and “reasonable” pricing structure requires more consideration.

In the case of oil, President Bush requested that Saudi Arabia increase oil production to lower the price, thus, to improve energy security of supply (Washington Post 2005). When oil prices were rising in the 2000s, a large amount of money went into the oil futures market from institutional investors and pension funds (Energy Charter Secretariat 2011, p.29), and some argued the link between speculation and oil prices. For example, Abdalla Salem El-Badri, OPEC Secretary General, expressed concern about the volatility that has characterised the market in recent times, noting that non-fundamentals are now the major drivers of the market (OPEC 2008). The IEA (2009, p.65) concludes that speculative financial flows may well have played a part in amplifying the impact of shifting fundamentals on prices, both upwards and downwards. Therefore, price level and the volatility of oil become controversial from time to time, but not pricing structure. Market-oriented pricing has been firmly in place since the 1980s.

As far as international energy pricing is concerned, the current debate focuses on natural gas. This has become especially evident in gas trades between the EU and Russia and, to a lesser extent, between Asian LNG importers and some LNG exporters. In Europe, until recently, oil-linked pricing has been dominant. More precisely, the majority of imported gas prices have been indexed to the prices of oil products or crude oil, so that natural gas can compete with those fuels in importing countries. Asian gas importers followed similar logic.

However, as a result of gas market liberalisation, spot trading volumes at hubs in Europe have been increasing rapidly (IEA 2014d, p.192). Weak gas demand in Europe resulting from the economic downturn in 2008, as well as coal and renewables expansion for power generation, led to a situation where hub prices were considerably lower than oil-indexed prices. Consequently, European incumbent importers like E.ON, GdF Suez and ENI who import a large amount of natural gas under oil-indexed long-term contracts had huge losses, and demanded gas exporters like Gazprom adopt hub pricing for their gas contracts. Gazprom, on the other hand, has defended the rationality of oil-linked pricing on the grounds that oil and gas competition in Europe remains and is expected to increase in the transportation sector (Gazprom 2010 and 2014).

Many European importers even filed arbitration proceedings against exporters like Gazprom and Qatar's RasGas (Stern and Rogers 2012, p.167). Although it is not clear whether Gazprom has fully adopted hub pricing for its long-term contracts with European importers, a price gap between the German border price (assumingly close to the average long-term contract prices) and hub price has narrowed (IEA 2014d, pp.192-193).

Meanwhile, in Asia, the Japanese government calls for stable supply of competitively priced LNG (Ministry of Economy, Trade and Industry 2013a) and questions the rationality of oil-indexation (Ministry of Economy, Trade and Industry 2013b). Other importing countries like Korea and India argue in a similar way (Gastech 2014, The Hindu 2013). On the other hand, some LNG sellers argue that oil-indexation is necessary to cover increasing costs of new LNG projects (e.g., Total 2013). Whether international gas pricing in Asia will break away from oil-indexation remains to be seen, and both gas price structure and pricing are likely to be controversial areas for Asian gas security for some time.[32]

[32] See also the Workshop report "Contractual issues related to energy trade, Energy Charter Secretariat and Ministry of National Development of Hungary, March 2013, at http://www.encharter.org/fileadmin/user_upload/Conferences/2013_March_20/Budapest_workshop_report.pdf.

5.7.1 Applicability of Market Pricing on Internationally Traded Natural Gas

On what basis one can consider natural gas pricing in relation to energy security? This leads to another question, as to whether there are better ways to determine the price that will allow 'sharing the rent' between consumer and producer, and ensure the product's competitiveness against alternative sources of energy. These are important questions for any commodity, but especially for natural gas currently because its pricing structure is in transition towards a more market oriented one in Europe and, potentially, Asia.

That is not the case with oil, which already underwent significant pricing changes: from administrated prices (first by the Majors, then by OPEC), to market pricing in the latter half of 1980s onwards (Energy Charter Secretariat 2007, pp.76-78). This is not to say that oil pricing is perfect. As Fattouh (2011) describes, oil pricing has been criticised in terms of the rationality of benchmark crude selection, speculation, and market manipulation. Nevertheless, no one can impose a particular alternative pricing because the market is liquid enough to prevent that. In other words, oil pricing has already passed a point of no return from the old administrated pricing. In this situation, one can only attempt to make the market work – that is, eliminating market failures such as monopolies/oligopolies, information asymmetry, and manipulation.

Whether gas pricing has passed such a point differs region by region. It surely has in North America where the Henry Hub and other hub pricings have been in place since the late 1980s. Though Gazprom claims the rationality of oil indexation, it is not known that the company undertook the same argument in the US. In Asia, oil-indexation still dominates for long-term contracts, although there will be alternative pricing mechanisms available in the near future with US LNG that will be indexed to Henry Hub prices. For Europe (at least in Western Europe), market pricing is already used in about half the trade volumes in the region (IEA 2014d, p.196), and thus seems to stay, irrespective of exporters' preferences. This implies that "fair pricing" for Europe should be achieved by a functioning market without any market failure, just like the case of the oil market.

However, it should be noted that the market principle normally would not be applied where energy flow is non-existent or a "market" is absent. Green field projects, like gas export from Russia's Eastern Siberia to China, require integrated development from upstream, transportation, and downstream from scratch. There is no benchmark gas price in Asia, and China does not have a liquid domestic gas market. Therefore, gas pricing for this project cannot be totally market oriented, and reports suggest that oil-indexation pricing was adopted (e.g., New York Times 2014). While other alternatives for market pricing exist, such as fixed pricing (e.g., early Asian LNG trade) and barter trade (e.g., early intra-COMECOM gas trade), one could even argue that vertical integration – the elimination of a market (arms-length transactions) by internalising the whole supply chain – might be an option to realise an energy flow.

5.8. Vertical Integration and "Asset Swaps"

Some argue that "asset swaps" deserve support as a policy tool for energy producing and consuming countries and businesses in order to address risks associated with security of supply and demand. The "Conceptual Approach" of the Russian President Medvedev (see above) envisaged a joint "promotion of mutual exchange of energy business assets within investment activities". In the "Draft Convention" that the Russian government made available in late 2010, a "Principle of Assets Exchange" was included as a separate draft Article. It

stated that "in order to strengthen the most important factor in ensuring international energy security – the mutual dependence and complementarity of the participants of the world energy supply system – the Parties shall facilitate mutually beneficial investments by the Subjects of the Parties in production and trade of energy assets of other Parties."

These suggestions have motivated the Energy Charter Secretariat to conduct a study on key concepts of exchanges of business assets within investment activities in the energy sector.[33] It discusses the use of exchanges of assets among different parts of the energy value chain as instruments to mitigate investment risks, in particular to secure stable and predicable demand as well as uninterrupted and sufficient supplies of energy resources. The paper argues that such activities belong to normal business practice, without suggesting any concrete steps that could be taken on the policy level in their support.

Vertical integration is generally accepted as a tool to mitigate price and volume risks in energy trade.[34] However, recently the concept of "asset swaps" has suffered some serious setbacks.[35]

[33] Exchanges of Business Assets within Investment Activities in the Energy Sector, Key Concepts, by Irina Mironova, Energy Charter Secretariat, 2013.

[34] See Study on LT-ST Markets in Gas, Final Report, DNV Kema for the European Commission, August 2013.

[35] Reference is made to the cancellation of the planned Gazprom-BASF/Wintershall asset swap on 18 December 2014.

6. Conclusion

Energy security has been again high on policy agendas from the 2000s onwards. This paper introduces varied meanings of energy security among energy exporting, transit, and importing countries, and discussed the prospects of different perspectives on energy security, in particular between exporters and importers, to evolve into a common comprehensive concept that is applicable to any country.

Energy security has traditionally been understood as security of supply. The tools to ensure security of supply are manifold and include trade, diversification, supply expansion, security enhancement, stockpiling, demand control and, to some extent, energy subsidies. Security of supply is not challenged as a concept, as nearly all countries are in need of it, independent of whether they are themselves energy producers or transit countries.

Security of demand has been a matter of concern for exporting countries at least since the 1980s. Exporters' organisations like OPEC and GECF seek to find ways to agree with importers on the terms on which such security of demand could be provided. One of the options they may have is vertical integration into energy importing countries, although this option largely failed in the case of the oil market and faces reluctance by importing regions such as the EU in the case of natural gas.

A common concept of energy security, which would include an acceptance of the concept of security of demand by the importing countries, has not evolved yet. Energy consuming countries are hesitant to "secure demand" in view of their policies to decrease consumption. This does not mean that importers question that large investments into energy production and transportation require guaranteed offtake. Controversies will always remain on the commercial level regarding the "fair price".

The availability of a diverse set of tools to address security of supply can be understood as one of the main differences with security of demand. Supply security can be ensured by own production, diversification of sources and routes, alternative energy sources or less consumption. Demand security can be ensured by diversification of export markets and, some argue, by vertical integration.

Reliable supplies of energy are necessary for the development of the economy as a whole, while security of demand is needed to secure revenues from export sales. However, given the great share of energy exports in the GDP of many energy producing countries, security of demand can become a matter of concern for the whole national economy as well. Many exporting countries attempt not only to diversify the market for their product but also to diversify the whole economy, making it less dependent on revenues from energy exports. In many cases, this seems to be an even more complicated undertaking than curbing consumption on the importers' side.

This study demonstrated that transit countries have not developed any specific concept of energy security of transit. Given their role as a consumers of energy they rather adopt the concept of security of supply. Revenues from transit may be significant for the national economy, however hardly to the extent that revenues from sales are for energy exports.

The study further discussed whether access to energy for those who lack it, energy poverty and social aspects may be internalised into the concept of energy security. It was argued that

energy poverty has to do with access to modern energy (thus, new energy flows) in the first place, and could therefore be better addressed under another pillar of energy policy rather than that of energy security, or even within a social welfare system.

The same may be said about the proposals to internalise environmental issues, in particular climate change, into the concept of energy security. Environmental sustainability is already one of the pillars of energy policy in many countries. Environmental challenges could be better addressed under that pillar instead of uncomfortably internalising it into energy security.

A mutual understanding of the issues of security of supply and demand is evolving among energy exporters and importers. Several international fora have been created to promote this understanding by way of dialogue. A common concept internalising the two notions has not evolved. Whether this will ever happen in spite of the fundamental disagreement on "fair prices" and rent sharing will depend on the global development of energy markets. The changing roles of traditional energy producers and consumers with large producers now consuming much energy, and some large consumers becoming also large producers may or may not contribute to the development of a common concept of energy security. More dialogue will be necessary to better understand changing market conditions, including regulation and prices, mutual dependence and responsibilities.