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AFRICAN AND ASIAN STUDIES 17 (2018) 145-187

AFRICAN AND ASIAN STUDIES

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The EU-Energy Security and Geopolitical Economy

The Persian Gulf, the Caspian Region and China

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Abstract

Although energy supply security is an important long-term goal of the EU, member states are in control over external supplies and their domestic energy mix, and an overarching institutional structure is lacking. In this paper, we focus on the availability of oil and gas and the risks of supply disruptions for the EU. The last two decades have been marked by a decrease in fossil fuel production and increasing import dependence. Proven oil and gas reserves in the EU are very limited. Especially in the case of oil the outlook of both global and own EU reserves looks bleak. At the same time, global trends show an increasing demand for energy in the coming decades, concentrated mainly in developing countries, specifically in China. The Persian Gulf area and the Caspian Sea region hold some of the world's largest oil and gas reserves, and these will make them increasingly significant in global markets. These factors create a

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 | DOI 10.1163/15692108-12341404

setting for the EU of demand- and supply-induced and structural scarcity. The persistence of Arab patrimonial rentier states and societies are a domestic and geopolitical source of instability. These states' Sovereign Wealth Funds are used by ruling elites to divert assets from socioeconomic development towards individual profit. Emerging Asian economies involved in the ME and the CEA, especially China, will influence the regions' future geopolitical and geo-economic reality. China relies on resources for domestic development and the resource-rich Middle Eastern countries have long been a destination from which to acquire them.

Keywords

EU Energy Policy – energy supply security – China – unconventional fossil fuels – Central Asia and the Caspian Region – the Middle East and the Persian Gulf – geopolitical economy

1 Introduction

In this paper, we focus on the availability of fossil fuels (especially oil and gas) in sufficient quantities, and in particular on the risks of supply disruptions. The research consists of two parts; a quantitative part in which we assess the risks to energy security on the basis of indicators and a second part that focuses on geopolitical risks. In the first part we identify developments for demand-induced and supply-induced scarcity. The indicators used to analyze these include import dependence, global and EU fossil fuel production, fossil fuel reserves in the EU, shale oil and shale-gas reserves and global developments in energy consumption and supply. We look both at past trends in the period 1990-2014 and at future predictions. In the second part, the geopolitical economic risks are assessed by a qualitative analysis. In this part we will give an analysis of the geopolitical economic shift underway in the Middle East (ME) and the Persian Gulf and Central Asia and the Caspian Region (CACR) regions, partly as a result of China's fast industrialization and its direct involvement with these resource-rich regions and the changes in US-energy demands. For the second topic two regions are distinguished which include key energy suppliers: 1) The Middle East and North Africa (MENA) including the Persian Gulf, and 2) the Caspian Region (CR).

Security of energy supply is an important part of the long-term development goals of the EU, as it pursues such key policy objectives as competitiveness and stability. Concerns about energy security have been raised by declining

European energy production, the strain on global demand exerted by newly industrializing economies such as China and India, and the political instability in many energy-producing regions such as the Middle East and North Africa (MENA) and the Caspian Region (CR), (including Russia, Iran, Azerbaijan, Kazakhstan and Turkmenistan), (EEA, 2008; Amineh and Yang 2010; 2012).

Energy supply security in the EU was specifically addressed in the green papers "Towards a European strategy for the security of energy supply" (European Commission, 2000) and "A European Strategy for Sustainable, Competitive and Secure Energy" (European Commission, 2006). These argued, among others, to open up markets to create a stable, competitive environment and to develop an integrated approach towards tackling climate change, involving energy efficiency improvements and renewable energy use. These green papers formed the basis for energy policy in the EU. Electricity and gas markets were liberalized between 1998 and 2004, and a Market Observatory for Energy was established in 2008. Strategic Energy Reviews in 2007 (COM 2007/1) and 2008 (COM 2008/0781) led to European Council agreements on European energy policy targets.

In December 2008, the energy and climate change 'package' was adopted to reduce greenhouse-gas emissions, increase energy efficiency and renewable energy use by 2020 (COM 2008/30). The overall target is to reduce greenhouse gas emissions 20% by 2020, compared to 1990. For renewable energy use the target is to generate 20% by renewable energy sources by 2020, legislated through the RE Directive (COM 2008/19). The Directive on energy efficiency (COM 2012/27), established a framework for the achievement of 20% energy efficiency improvement in 2020. In support of the goals set for 2020, the European Strategic Energy Technology (SET) Plan was developed. This plan aims to accelerate the development of low carbon technologies (e.g. in the area of renewable energy, energy conservation, nuclear reactors and CCS). It furthermore sets targets for 2050 of 80-95% greenhouse gas emission reductions compared to 1990 levels (European Commission, 2010).

In 2008, the Green paper "Towards a Secure, Sustainable and Competitive European Energy Network" (COM 2008/782) discussed the aging European energy networks and poor east-west and south-north connections. These complicate intra-EU energy transport and threaten some regions with supply disruptions. Creating a clear and stable legal framework was a main aim of the energy and climate package and the third internal energy market package. This latter package (IP 2007/1361), adopted in 2009, should stimulate investments, synergies, efficiencies and innovation in energy networks. The 2nd Strategic Energy Review of November 2008 identified a number of infrastructure developments as energy security priorities. These are e.g. better linking

the Baltic region with the EU, a Southern Gas Corridor for Central Asian and Middle Eastern supplies, better gas and electricity interconnections within Central and South-East Europe and a North Sea offshore grid. The Southern Gas Corridor which links the Caspian region via Turkey to Europe is planned to be in operation by 2019 (Ratner et al., 2013).

The different types of policies in the EU that impact energy security can be categorized into (1) limiting energy use by energy-efficiency improvement, (2) more indigenous renewable energy use and (3) better connections to diversify imported fossil fuels. But are these policies sufficient to ensure energy supply security? Fossil fuel imports have increased throughout the last decade, despite a growth in the use of renewable energy sources. Another question is what contribution the deployment of new fossil fuel technologies such as shale oil and shale-gas might make to energy supply. There are concerns that influence many decisions, for instance, those on long-term oil or gas purchases or (low) levels of infrastructure funding. The majority of these are made at a national level, leading to difficulties in ensuring a coordinated EU approach to energy policy across multiple, potentially conflicting objectives (energy security, environmental concerns, and competitiveness) (CRS, 2008).

2 Concepts and Data

2.1 *Definitions*

Although there are multiple definitions of the concept of "energy security", the simple UNDP (2004) definition holds that energy security can be defined as the availability of energy at all times in various forms, in sufficient quantities, and at reasonable and/or affordable prices, without unacceptable or irreversible impact on the environment. Energy security can be threatened by different types of scarcity which can be affected by different types of geopolitical forces. According to Amineh and Houweling (2003, 2006, 2007), the need for energy security is enhanced by limited reserves and increasing extraction costs. Increasing oil and gas consumption, diminishing reserves and geopolitical rivalry creates a setting for the EU and other major consumer-countries such as China that can be characterized as (a combination of) demand-induced, supply-induced and structural scarcity. "Demand-induced scarcity," is caused by three factors; (1) population growth, (2) rising per capita income in high-income countries (which are the major per capita consumers and importers) and in late industrializing economies, particularly in South and East Asia (mainly China and India) and (3) technological change. The history of technological change since the 1850s has rendered access to fossil energy more,

not less, important for the production of wealth and power. Technological innovation, governance, and households depend on it. "Supply-induced scarcity" is caused by the dwindling of stock. The third type is called "structural scarcity", which is supply-induced scarcity by the deliberate action of a major power, by non-state actors such as major (national) oil companies (of resource rich countries), or by producer cartels such as the Organization of Petroleum Exporting Countries (OPEC). A major power that manages to gain control over conditions of access by third parties to the stock has the option of inducing scarcity for selected outsiders (see Yergin 1991; Bromley 1991, 2007). The Russo-Ukrainian gas crisis of 2009 provides an illustration of how Gazprom induced structural scarcity for 18 European countries simply by shutting down the gas pumps, which are under its control (See Yergin 1991; Amineh 1999a; Klare 2001; Abrahamian 2012).

2.2 *Data Sources*

Unless otherwise specified the data for the EU refer to EU28 and thereby include Croatia who joined the EU in 2013.

IEA Energy Balances are used for general developments in energy demand and supply (IEA, 2016). Throughout this paper primary energy use is expressed by the physical energy content method, as used in IEA and Eurostat statistics, and in lower heating value. This means that for wind and solar energy the amount of primary energy is equal to the amount of final energy. For biomass and nuclear electricity a conversion efficiency of 33% is used and for geothermal electricity an efficiency of 10%.

For import dependence, the Eurostat Statistics Database (Eurostat, 2015) is used. This database includes imports and exports to countries within the EU, by country of origin or destination. Conversion rates used are 41.868 TJ/tonne crude oil and 29.3 GJ/tonne coal. Natural gas use, given in TJ-higher heating value, is converted into lower heating value with a factor of 0.9. Import dependence on EU level is calculated by dividing net imports (imports – exports) to EU countries by "gross inland consumption". For exports the following data tables are used: nrg_134a for natural gas, nrg_133a for crude oil, nrg_132a for solid fuels, and for imports: nrg_124a for natural gas, nrg_123a for crude oil, nrg_122a for solid fuels. For gross inland energy consumption and production data tables: nrg_101a for solid fuels, nrg_102a for oil, nrg_103a for gas and nrg_100a for total gross inland energy consumption are used.

For fossil fuel reserves the British Petrol Statistical Review of World Energy 2016 (BP, 2016) is used. Conversion factors used are one cubic foot natural gas equals 0.9783 MJ and one "barrel of oil equivalent" (boe) equals 5.4 GJ (both lower heating value). Shale oil and gas reserves are based on the report

"Technically Recoverable Shale Oil and Shale Gas Resources" by the US-Energy Information Administration (2013).

Future projections are based on a number of sources including the World Energy Outlook 2012 (IEA, 2012), BP Energy outlook 2030 (BP, 2011 and 2012), the International Energy Outlook by the US EIA (2012 and 2013f) and official EU projections (European Commission, 2013d).

3 Dependence on Imported Energy in the EU

Due to a combination of high consumption, limited resources and domestic production, the EU is a net importer of energy. In this section we will present the development of import dependence in the EU in the last two decades. First we discuss primary energy use and fossil fuel reliance. After that we will assess import dependence per fossil fuel and the overall import dependence (section 4.1). Lastly we discuss developments in EU fossil fuel production (section 4.2) and future trends in import dependence (4.3).

Figure 1 and 2 show the development of total primary energy use in EU28 in the period 1990-2014, by energy source. Besides a decreasing trend in energy use since 2006, it makes clear that the share of coal has decreased, natural gas increased and oil and nuclear stayed relatively stable. Coal as share in fossil fuel consumption decreased from 33% to 24% in the period 1990-1998 and after that remained constant. The share of natural gas increased from 22% in 1990 to 34% in 2010 and decreased to 31% in 2014 (IEA, 2016). Oil as share in fossil fuel use remained at about 45% in this period.

The share of fossil fuels has slightly decreased from 83% in 1990 to 72% in 2014, mainly replaced by more biofuels/waste use, which increased from 3% in 1990 to 9% in 2014. The total share of renewable energy increased from 5% to 13% in this period, from 3.1 EJ to 8.4 EJ. Relatively strong growth is visible for solar/wind/others; 0.02% in 1990 to 2.2% in 2014. Hydro remains constant at around 2%.

3.1 *Import Dependence for Natural Gas, Crude Oil, Coal and Total Primary Energy Use*

Figure 3 and Figure 4 show the origin of natural gas per EU country (1990-2013). The category own supply refers to natural gas produced and consumed domestically. Intra-EU imports/exports refer to trade between the EU28. This consists for 95% of natural gas exports from the Netherlands to mainly Germany, Italy and Belgium. The figures show that net imports of natural gas in the EU are mainly coming from Russia, Norway, Algeria, Qatar and Nigeria. Since 1990,

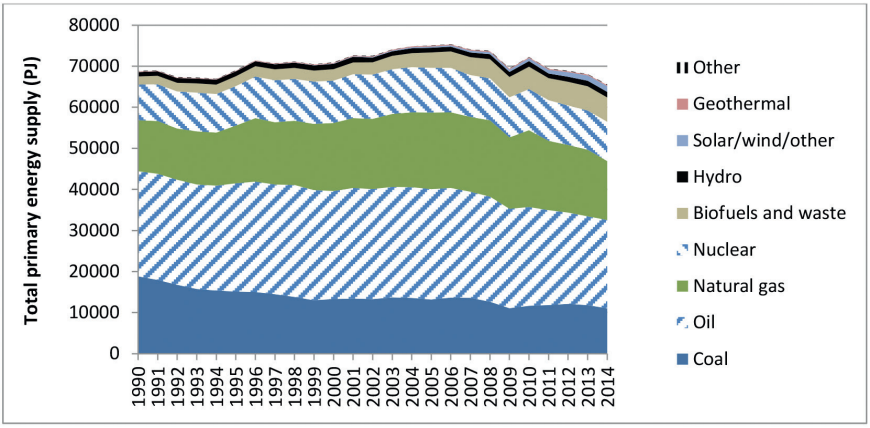

FIGURE 1 *Total primary energy supply in EU28 by source (based on IEA, 2016).*

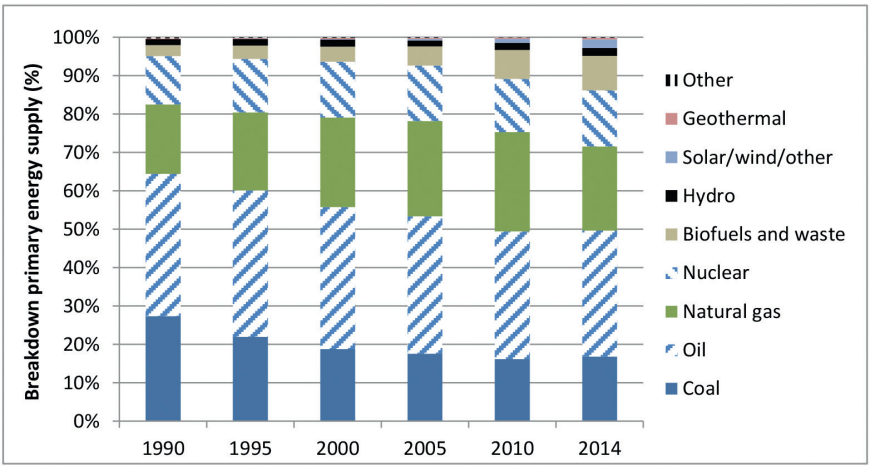

FIGURE 2 *Primary energy use in EU28 by source (based on IEA, 2016).*

Norway's contribution has increased from 7% to 20% while Qatar's share increased from 1% in 2004 to 6% in 2010-2013.

Total net natural gas imports amount to 65% in 2013, compared to 46% in 1990. The difference can be explained by a decreasing share of domestic supply and an increase of imports from Norway. Excluding Norway reduces import dependence to 38% in 1990 to about 42% between 2000-2013.

A large share of natural gas imports come from the MENA region (Middle East and North Africa) and the Caspian Region. In 2013, these countries delivered 65% of natural gas imports, which is a decrease in comparison to 1990

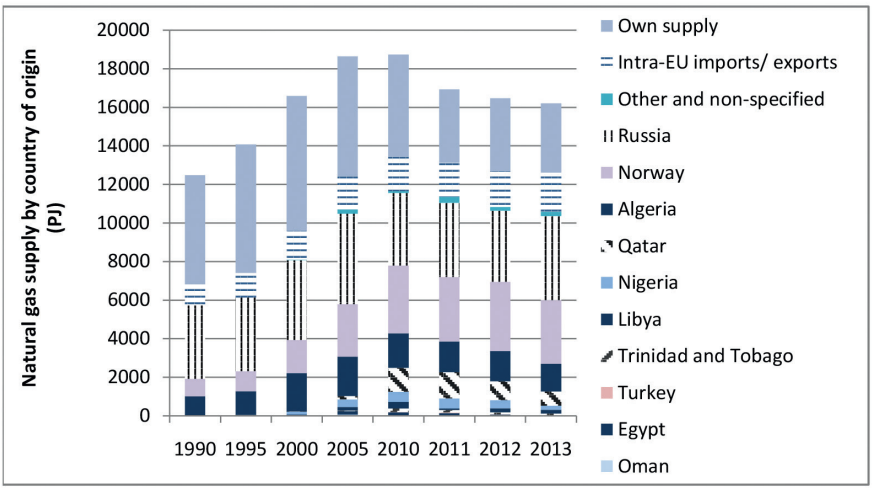

FIGURE 3 *Natural gas supply in EU28 by country (based on Eurostat, 2015).*

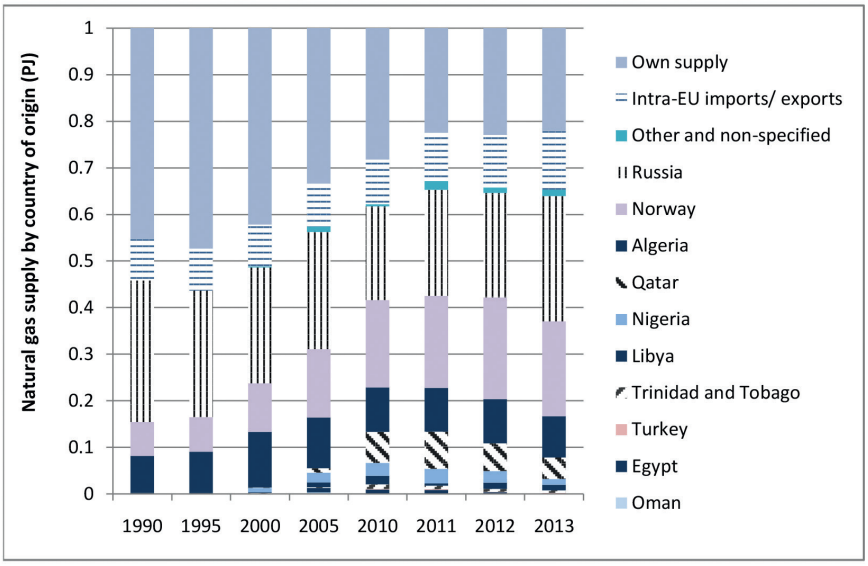

FIGURE 4 *Natural gas supply in EU28 by country as shares (based on Eurostat, 2015).*

when 85% originated from these regions. This is mainly a result of the increasing share of Norway in imports.

Figure 5 shows crude oil use in EU28 by country of origin between 1990 and 2013. Crude oil supply grew up to 2005 and decreased thereafter. Both absolutely and relatively, crude oil supply from Russia increased, from 1 EJ in 1990 to 7

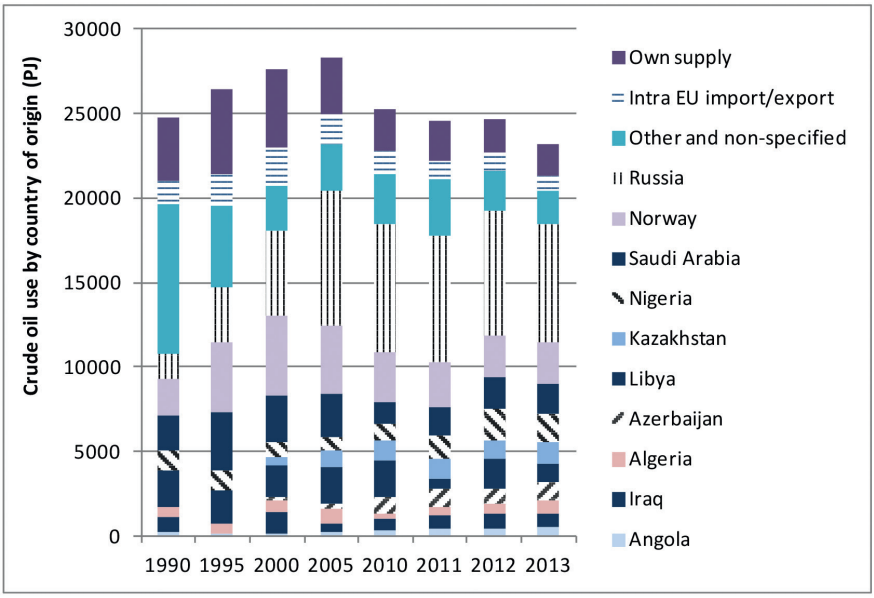

FIGURE 5 *Crude oil supply in EU28 by country of origin (based on Eurostat, 2015).*

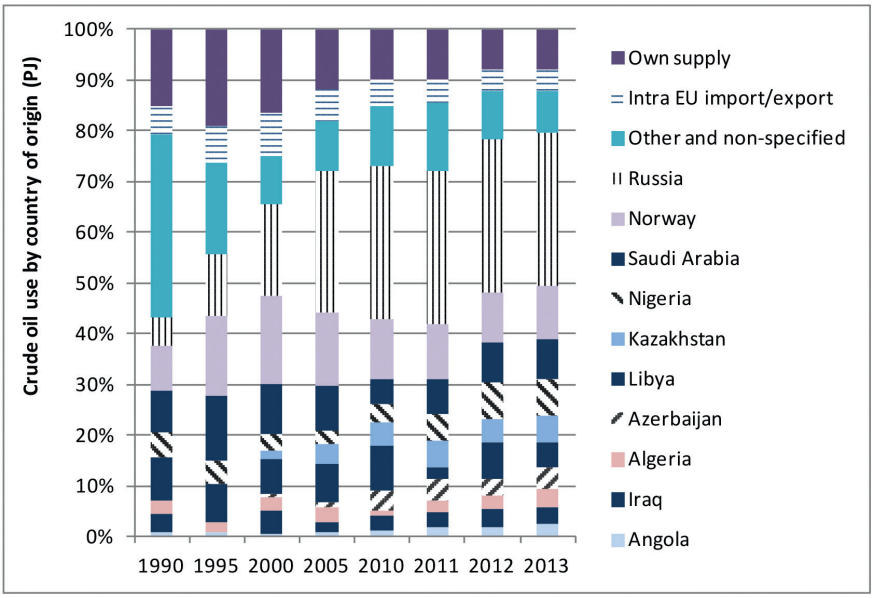

FIGURE 6 *Crude oil supply to EU28 by country of origin as shares (based on Eurostat, 2015).*

EJ after 2002 with an increasing share from 5% to 30% after 2004 (see Figure 6). Import dependence of oil has increased from ~75-80% in the period 1990-2000 to 88% in 2013. Excluding Norway, these figures dropped to 60% in the nineties and around 75% in 2010-2013. Domestic and intra EU supply has decreased from 20% in 1990 to 12% in 2013. Intra EU imports and exports consist mainly of oil supply from UK and Denmark to the Netherlands, Germany, Sweden and France. In 2013, 73% of oil imports originate from the MENA and CR. Contrary to natural gas this is an increase compared to 1990 (66%).

EU coal supply shows the impact of the economic crisis, with a sharp decrease of coal supply in 2009 and a slightly increase thereafter (see Figure 7). Russia is the biggest supplier of coal to the EU. Its share increased in the period 2000-2013 from 3% to 17% (see Figure 8). Thereafter follow Colombia (13%), the United States (12.6%) and Australia (4.2%) in 2013. The contribution of South Africa decreased from 12% in the early 2000s to 3.9% in 2013. Overall import dependence of coal increased sharply from 21% in 1990, to 44% in 2010 and as much as 57% in 2013. Notable is the increase of United States in coal imports in 2011. As a result of the shale gas revolution, the US has increased the level of its coal exports (EUISS, 2013).

Table 1 summarizes net import rates per fossil fuel source in the EU. While looking at the trends in imports of the different fossil fuels, we saw that crude oil and natural gas have the highest import rates of 88% and 65% in 2013, respectively. Excluding Norway, these figures decrease to 78% and 42%, respectively.

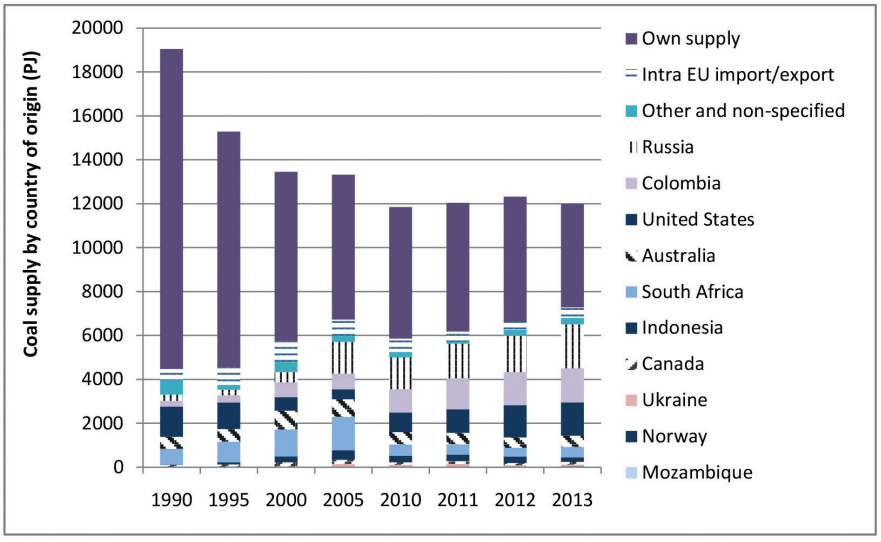

FIGURE 7 *Coal supply in EU28 by country of origin (based on Eurostat, 2015).*

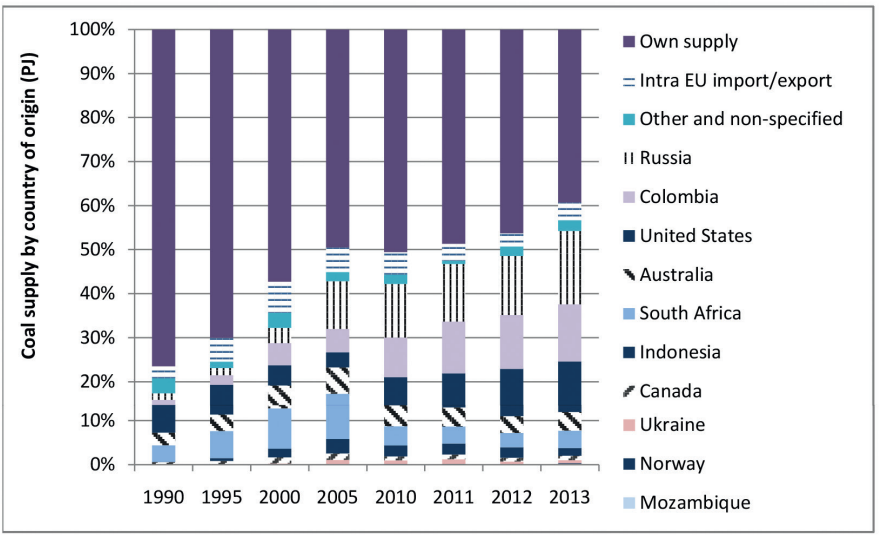

FIGURE 8 *Coal supply in EU28 by country of origin as shares (based on Eurostat, 2015).*

TABLE 1 *Net import rate in EU per fossil fuel source (share of energy use in EU28 that is net imported).*

	1990	1995	2000	2005	2010	2011	2012	2013
Coal	21%	25%	36%	45%	44%	47%	51%	57%
Natural gas	46%	44%	49%	56%	60%	65%	65%	65%
Oil	80%	74%	75%	82%	85%	86%	88%	88%
Total primary energy use	**43%**	**42%**	**46%**	**51%**	**51%**	**53%**	**54%**	**54%**
Excluding Norway	39%	35%	37%	42%	42%	45%	47%	49%

SOURCE: BASED ON EUROSTAT (2015)

For all, import dependence increased between 1990 and 2013. The share of natural gas imports increased from 46% to ~65%, crude oil from 75-80% to 85-88% and coal witnessed the strongest increase from 21% to 57%.

The overall import dependence for total primary energy supply in the EU amounts to 54% in 2013, compared to 43% in 1990. Excluding Norway, these shares are 39% in 1990 and 49% in 2013.

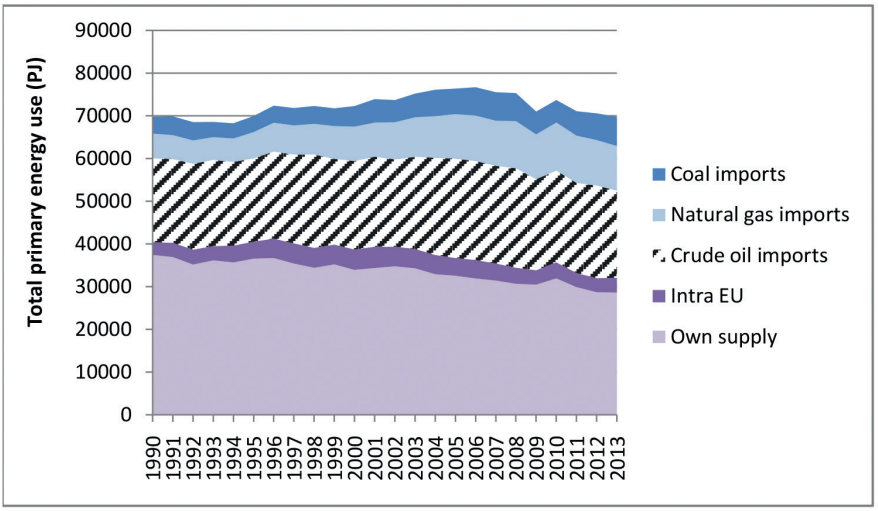

FIGURE 9 *Total primary energy use in EU28 by type of origin (based on Eurostat, 2015).*

Figure 9 shows the development of total primary energy use in the EU and its origins. The category own supply includes supplies from fossil fuel production, renewable energy and nuclear energy within EU countries. "Intra EU" refers to supplies from other EU countries, and consists mainly of natural gas supply from the Netherlands and oil supply from the UK. In absolute terms, crude oil imports are the highest, followed by natural gas.

Figure 10 shows a breakdown of primary energy supply by country of origin. All countries supplying 1 EJ or more of fossil fuels to the EU in 2013 are included. Two main suppliers can be identified; Russia and Norway. Their shares have increased from 8% in 1990 to 19% in 2013 for Russia and from 4% to 8%, for Norway. The remaining imports come from countries such as Algeria (natural gas), Saudi-Arabia (oil) and Colombia (coal). The share of the MENA and the Caspian Region in total imports equals 63% in 2013, the same as in 1990.

3.2 *Fossil Fuel Production and Reserves in the EU*

In this section we will discuss production and reserves of fossil fuel sources in comparison to consumption. Figure 11 shows EU fossil fuel production trends between 1990 and 2015. Compared to 1990, oil production had decreased by 45% in 2015, natural gas production by 35% and most notably, coal production (hard coal and lignite) decreased by 62%. Hard coal production decreased more than lignite (74% compared to 41%). In the past 20 years, many coalmines were closed, mainly because of cheaper imported coal, while by 2018,

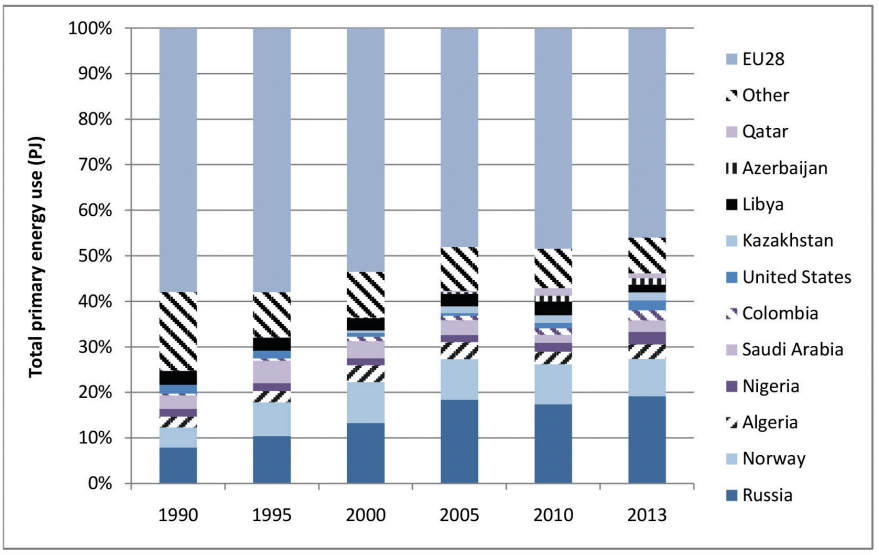

FIGURE 10 *Total primary energy use in EU28 by country of origin as shares (based on Eurostat, 2015).*

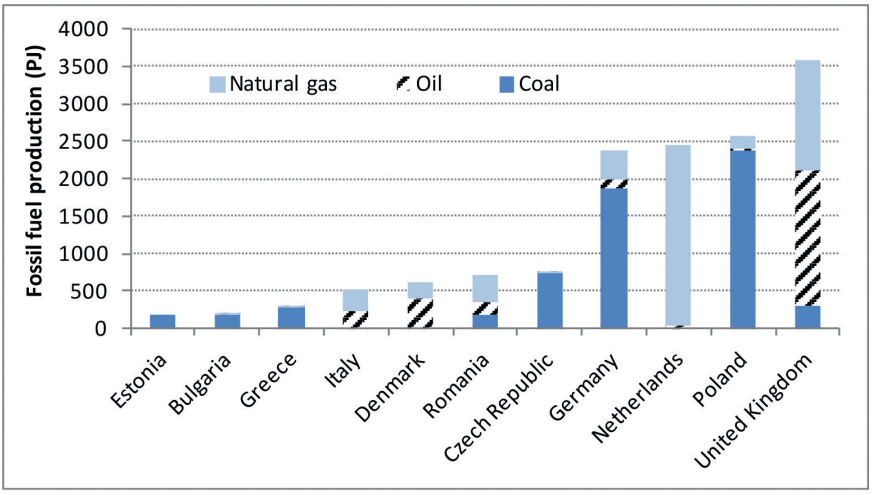

FIGURE 11 *Fossil fuel production in EU28 by country in 2013 (based on Eurostat, 2015).*

subsidies to coal mines will end (Hrushka, 2010). Further decreases of coal production are therefore to be expected. Peat and oil shale and sand production was negligible in EU in this period with 0.2 and 0.1 EJ respectively in 2014 (IEA, 2016).

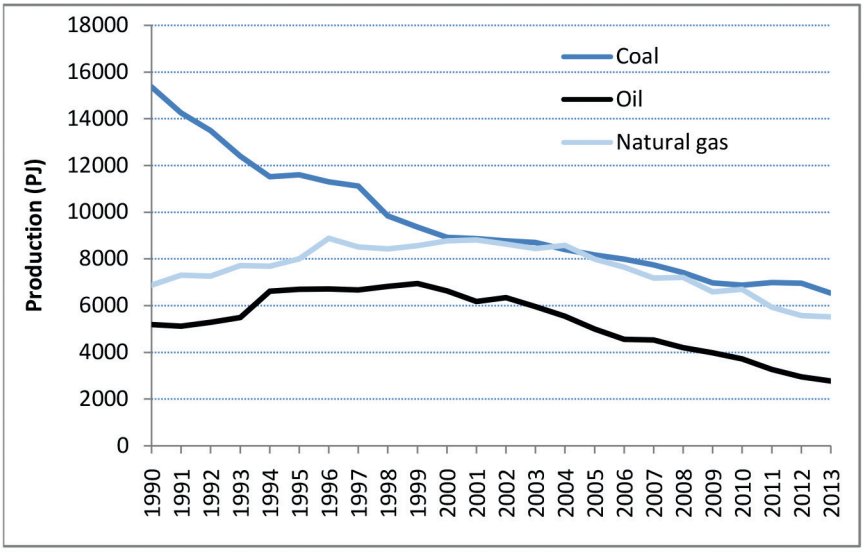

FIGURE 12 *Fossil fuel production in EU28 in period 1990 to 2013 (based on Eurostat, 2015).*

Figure 12 shows fossil fuel production by country in 2015 (left) and for the years 1990, 2000 and 2015 (right). In 2015, more than 70% of fossil fuel production occurs in only four countries; The UK (oil and natural gas), Germany (lignite), Poland (hard coal and lignite) and the Netherlands (natural gas). Coal production is largest accounting for 43% of fossil fuel production, followed by natural gas with 33% and oil with 22% in 2015. The countries not included in the graph produce less than 50 PJ of fossil fuels in 2015. Estonia is the only EU country with oil shale production of 177 PJ in 2015. The time series show a decrease of hard coal production in the UK and the rise and fall of natural gas and crude oil production in the UK mainly and to a lesser extent in Romania. Also the closure of lignite mines in Germany in the nineties is noticeable.

Table 2 shows consumption, production and proved reserves of fossil fuels in the EU, together with their global share. For oil and natural gas the EU share in global production and especially global reserves are low compared to consumption. This is reflected in the low R/P ratios of only 10-11 years and the reserves are barely sufficient to cover more than 1-3 years of consumption levels. Coal consumption is somewhat lower compared to natural gas and oil consumption while coal production is higher and most remarkable coal reserves are much higher, reflected in an R/P ratio of 111.

Table 3 shows estimated technically recoverable reserves for shale oil and shale gas per country. These are clearly larger than conventional oil and gas

TABLE 2 *Global and EU consumption and production in 2014 and proved reserves per fossil fuel source.*

	Global			EU			EU as share in global		
Unit: EJ	**Crude oil**	**Natural gas**	**Coal**	**Crude oil**	**Natural gas**	**Coal**	**Crude oil**	**Natural gas**	**Coal**
Consumption	182	121	164	25	14	11	14%	12%	6.7%
Production	180	123	166	2.9	4.9	6.0	1.6%	4.0%	3.6%
Reserves	9167	6,456	18,280	30	45	681	0.3%	0.7%	3.7%
R/P ratio	51	53	114	10	11	112	–	–	–

SOURCE: ENERGY DATA IS BASED ON IEA (2016). PROVED RESERVES AND R/P RATIO ARE TAKEN FROM BP (2016)
NOTE: CONVERSION FACTORS FOR BP DATA: 1 CUBIC FOOT NATURAL GAS = 0.9783 MJ (LOWER HEATING VALUE). 1 BOE = 5.4 GJ (LOWER HEATING VALUE).

TABLE 3 *Unproven technically recoverable shale gas and shale oil in the European Union.*

In EJ	**Shale oil**	**Shale gas**
Bulgaria	1	17
Denmark	0	31
France	25	134
Germany	4	17
Netherlands	16	25
Poland	18	145
Romania	2	50
Spain	1	8
Sweden	0	10
United Kingdom	4	25
European Union	*70 (3.7%)*	*462 (6.6%)*

SOURCE: US EIA (2013A).
NOTE: CONVERSION FACTORS: 1 CUBIC FOOT NATURAL GAS = 0.9783 MJ (LOWER HEATING VALUE). 1 BOE = 5.4 GJ (LOWER HEATING VALUE).

reserves; 70 EJ of shale oil and 462 EJ of shale gas, or 3.7% and 6.6% of global unconventional reserves. Shale oil reserves are limited, as they would barely be sufficient for three years of consumption. Shale gas reserves, however, would cover 33 times the 2014 consumption. However, the MENA countries and Russia are estimated to have large reserves of shale gas (~1400 EJ) and shale oil (~700 EJ) (derived from US EIA, 2013a). So local shale gas production might compete with importing future (cheaper) shale gas.

This section showed decreasing EU-fossil fuel production, and increasing import dependence in the last two decades. Only coal and shale gas production are options for larger scale fossil fuel production within the EU, sufficient to cover demand for the coming decades. However, as mines are closed, coal is unlikely to be developed in the short term. The production of shale gas, however, is being discussed and drilling tests are conducted in many EU countries. As comparison, in the US, shale gas contributed to 47% of natural gas production in 2013 (US EIA, 2015). In terms of import dependence, fossil fuel imports from Russia and Norway are noticeable. Natural gas production in Norway is still increasing, but reserves are exploited rapidly (Soederbergh et al., 2009). After 2020 decreasing production is expected, which would reduce Norway's role in gas supply.

3.3 *Trends in the EU's Fossil Fuel Import Dependency*

Presumably, the EU's dependence on fossil fuel imports will continue to grow. The European Commission has warned since 2000 (Green Paper) that net energy import dependency will rise from 51% in 2005 to 70% of total requirements by 2030. Moreover, MENA's contribution thereto will rise from 40% (2011) to 90% (2030). The situation for gas is similar. In 2013, 42% of the EU's gas imports came from Russia, 32% from Norway and 14% from Algeria. By 2035, the European Commission expects 60% of gas imports to come from Russia while overall import dependency will rise to 80% (BP, 2012). Increasing dependency on Russia, combined with the replacement of oil with gas, is particularly concerning.

The Energy and Climate package is expected to positively impact energy security. But what will the impact of the "20-20-20 targets" be on import dependence? The document "EU Energy, transport and GHG emissions trends to 2050" (European Commission, 2013d) presents a scenario including the expected impacts of these policies. Therein, EU primary energy use decreases from 70 EJ in 2013 to about 68 EJ in the period 2020-2050. Apart from the implementation of energy efficiency and renewable energy, net imports increase from 54% in 2013 to 57% in 2030 and 59% in 2050. This is mainly related to decreasing EU fossil fuel production, which is partly compensated by increasing

renewable energy supply. Intra-EU fossil fuel production decreases from 15 EJ in 2013 to 11 EJ in 2030 and 6 EJ in 2050, whereas renewable energy supply increases from 7.7 EJ in 2013 to 12 EJ in 2030 and 15 EJ in 2050 (see Figure 13). Net natural gas imports, as share of consumption increase from 65% in 2013 to 72% in 2030 and 83% in 2050. Oil imports increase from 88% in 2013 to 90% in 2030 and 97% in 2050. And, lastly, coal imports decrease from 57% in 2013 to 49% in 2030 and to 44% in 2050.

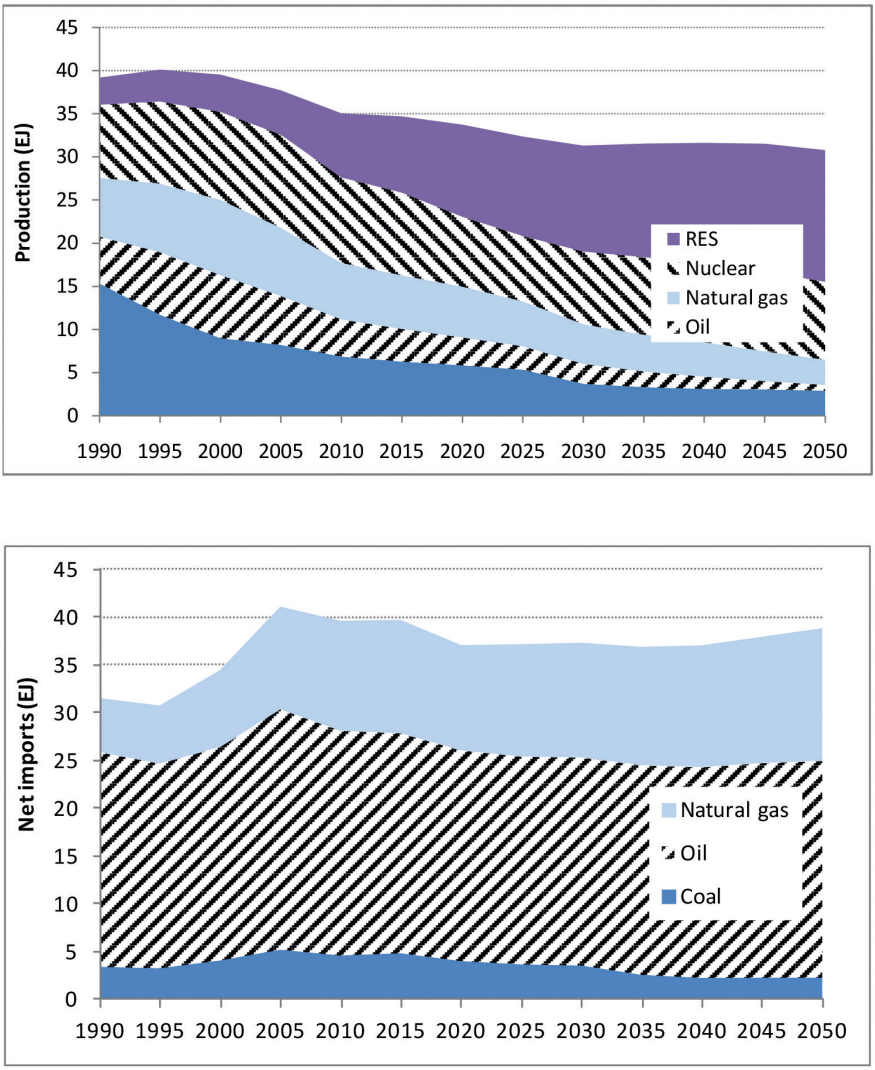

FIGURE 13 *Production and net imports in EU in period 1990-2050 in reference scenario (based on EU, 2013).*

To conclude, trends predict growing import dependency in the EU, but multiple factors influence energy security. The importance of import dependence for energy security will largely depend on global developments in supply and demand. In section 5 we will look at expected developments of energy demand (section 5.1) and supply (section 5.2).

4 Developments in Global Energy Demand and Supply

4.1 *Developments in Global Demand*

Global primary energy demand, according to the International Energy Agency – World Energy Outlook 2012 (IEA, 2012), is projected to increase over one third between 2012 and 2035, although this depends on, amongst others, economic growth. Sixty percent of this growth is expected to originate from rising living standards in China, India and the Middle East. Meanwhile, there is a shift away from oil, coal (and, in some countries, nuclear) towards natural gas and renewables. The growth of demand in industrialized or Organization for Economic Cooperation and Development (OECD) countries, such as EU member states and the US, will be more modest, as they already have high levels of per capita use. Consequently, it is predicted that in 2035 more than 30% of world demand will come from developing countries and specifically from China. Table 4 shows that in most industrialized countries, total oil demand is expected to decline as natural gas use increases. High annual growth rates are estimated for natural gas use in China (5.3%) and Africa (3.1%). For oil highest annual growth rates are expected for India (3.1%) and China (2.5%).

4.2 *Developments in Global Energy Supply*

Despite substantial increases in demand, up to 2035, oil and gas supplies are predicted to come from fewer countries (IEA, 2012). This is because proven oil and gas reserves are unevenly distributed in the world and only a few countries are surplus producers.

4.2.1 Oil and Gas Reserves

Table 5 shows proven oil and natural gas reserves in the world and for key countries located in the MENA and the Caspian region including Russia, in 2012.

The total proven global oil stock at the end of 2012 was estimated to be 9000 EJ, of which 73% was located in OPEC states (BP, 2013). Fourteen countries account for 90 percent of total global proven oil reserves: Saudi Arabia, Iraq, the United Arab Emirates (UAE), Kuwait, Iran, Venezuela, Russia, Mexico, the US, Libya, China, Nigeria, Norway, and the UK. Just five countries (Saudi Arabia, Iraq, UAE, Kuwait, Iran) hold almost half of total proven oil reserves.

TABLE 4 *Projected global oil and natural gas consumption 2010-2040.*

Region/country	Oil			Natural gas		
EJ	2010	2040	Annual average growth 2010-2040 (%)	2010	2040	Annual average growth 2010-2040 (%)
North America	46	48	0.1	29	41	1.2
US	37	37	0.0	23	29	0.7
OECD Europe	29	28	-0.1	19	24	0.7
Industrialized Asia	15	16	0.1	6.6	10	1.3
Japan	8.7	7.7	-0.4	3.7	5.1	1.0
South Korea	4.3	5.3	0.6	1.5	2.4	1.7
Non-OECD Europe and Eurasia[a]	9.5	14	1.2	21	29	1.0
Russia	5.9	7.7	0.9	15	19	0.9
Developing Asia	39	77	2.3	14	36	3.3
China	18	39	2.5	3.7	17	5.3
India	6.5	16	3.1	2.3	4.0	2.0
Central and South America	12	16	1.0	4.8	8.7	2.0
Middle East	13	20	1.3	13	25	2.2
Africa	6.7	9	1.0	3.5	8.6	3.1
World Total	171	227	0.9	111	181	1.7

a Central Eurasia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgystan, Tajikistan, Turkmenistan and Uzbekistan.

SOURCE: BASED ON EIA-INTERNATIONAL ENERGY OUTLOOK (2013), TABLE A5 AND A6, PP. 184-185.

NOTE: CONVERSION FACTORS: 1 CUBIC FOOT NATURAL GAS = 0.9783 MJ (LOWER HEATING VALUE). 1 BOE = 5.4 GJ (LOWER HEATING VALUE).

Global natural gas reserves at the end of 2012 were estimated at 6500 EJ. Proven gas reserves are slightly less concentrated than oil reserves. Over 70 percent is located in the Persian Gulf region. The proven gas reserves for Azerbaijan, Turkmenistan, Kazakhstan, and Iran are estimated to be 3100 EJ, which nearly equal the combined proven gas reserves in Europe, the US and the Middle East.

The Middle East has substantial gas reserves, but they remain largely untapped. This is because of difficulties and costs involved in exploring and developing these reserves. Compared to the international oil market, the

TABLE 5 *Proven oil and natural gas reserve in the Caspian Region, Europe, US, Persian Gulf Region and North Africa, 2012.*

	Proven oil reserve (EJ)	Proven natural gas reserve (EJ)
***Caspian Region*[1]**		
Azerbaijan	38	31
Kazakhstan	162	45
Turkmenistan	3	605
Iran [2]	848	1162
Russia	471	1137
Persian Gulf Region	0	0
United Arab Emirates	528	210
Iraq	810	124
Kuwait	545	62
Oman	30	33
Saudi Arabia	1436	284
North Africa	0	0
Algeria	66	156
Egypt	23	70
Libya	259	53
Tunisia	2	
US	189	293
EU27	37	60
World Total	**9012**	**6471**

SOURCE: BP (2013).

NOTES: [1] The Caspian Region refers to Azerbaijan, Kazakhstan, Turkmenistan, Iran and Russia; Persian Gulf region countries refer to Iran, Iraq, Kuwait, Oman, Saudi Arabia and United Arab Emirates. [2] Iran is member of both regions, the Middle East and the Caspian Region.

international gas market is still very much a regional one, divided into Asia's LNG market, the Russian-European market and the North American market.

The Caspian region holds one of the world's largest oil and gas reserves, which is significant for global markets. Iran and Russia have the largest energy reserves in the world (36% of global natural gas reserves and 15% of oil reserves). Iran has the world largest proven natural gas reserves and ranks fourth

in proven oil reserves. Russia ranks eighth in proven oil reserves and second for proven gas reserves.

4.2.2 Oil and Gas Production, Consumption and Net Exports

Table 6 shows oil production, consumption and net exports for 2002, 2007 and 2012 in key oil and gas producer-countries. It shows the development of production, consumption and the resulting exports in the last decade. Compared to 2002, the increased net exports of the Caspian Region are clearly visible. These increases occur in production in Azerbaijan, Kazakhstan and Russia. Furthermore, increases in the United Arab Emirates, Iraq, Kuwait and Saudi Arabia are notable. The largest oil exporting countries in 2012 are Saudi Arabia and Russia, which together supply 25% of oil consumption.

IEA projections indicate that non-OPEC oil supply (less than 97 EJ in 2011) will peak up to over 105 EJ per year in the mid-2020s, and then decrease to 99 EJ by 2035 (IEA, 2012). The increase is mainly expected to come from a surge in unconventional energy production in the US and Canada and deep water offshore production in Brazil. It is expected that a large share of the Middle East's oil export in 2035 will reorient towards Asian newly industrializing countries, mainly China (IEA, 2012). Nonetheless the market share of OPEC countries in oil supply is expected to increase from 43% in 2012 to 46% in 2030, and continues a longstanding growth trend (BP, 2012).

According to IEA (2012), Iraq might become a geopolitical issue in the oil market. Iraq's projected oil production will rise from 6 EJ in 2012 to 12 EJ in 2020 and to over 16 EJ in 2035. This implies exports of over 8 EJ in 2020 and 12 EJ in 2035, up from more than 4 EJ in 2012. Iran's production levels have decreased as a result of strong sanctions implemented by the United States and many of its EU member states' allies. In 2012, Iran's oil production fell to 6 EJ – its lowest level since 1989 (BP, 2013). Part of the reason therefore is that after 2012, economic sanctions aimed to pressure Iran's ruling elite into giving up its uranium enrichment program were also targeted at Iran's petroleum sector. Oil revenues accounted for over 70 percent of Iran's government revenues during the past decade. Although Iran is re-starting production, much investment is needed to re-establish pre-sanction and pre-war production levels sustainably.

Table 7 shows natural gas production, consumption and net exports for the years 2002, 2007 and 2012. Russia is currently the world second largest natural gas producer, after the United States (BP, 2013). In terms of net exports, Russia is the largest, supplying 20% of world natural gas consumption.

TABLE 6 *Caspian Region, Persian Gulf Region and North Africa oil production, consumption and exports 2002-2012.*

Country	Production			Consumption			Net export*		
EJ	Production 2002	Production 2007	Production 2012	Consumption 2002	Consumption 2007	Consumption 2012	Net exports 2002	Net exports 2007	Net exports 2012
Caspian Region									
Azerbaijan	0.6	1.7	1.7	0.1	0.2	0.2	0.4	1.5	1.7
Kazakhstan	2.0	2.9	3.4	0.3	0.5	0.5	1.5	2.4	2.7
Turkmenistan	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2
Iran	7.1	8.5	7.3	2.9	3.7	3.9	4.3	4.7	3.6
Russia	15.3	19.8	21.0	5.0	5.5	6.3	9.9	14.2	14.2
Persian Gulf Region									
United Arab Emirates	4.8	5.9	6.7	0.8	1.1	1.4	4.0	4.9	5.1
Iraq	4.2	4.2	6.1	1.0*	1.1*	1.5*	3.0	3.0	4.4
Kuwait	4.0	5.2	6.2	0.6	0.8	0.9	3.4	4.5	4.8
Oman	1.8	1.4	1.8	0.1*	0.2*	0.3*	1.7	1.2	1.5
Saudi Arabia	17.6	20.2	22.7	3.3	4.3	5.8	14.1	16.0	17.1
North Africa									
Algeria	3.3	3.9	3.3	0.4	0.6	0.7	2.7	3.3	3.0
Egypt	1.5	1.4	1.4	1.0	1.3	1.5	0.4	0.0	-0.2
Libya	2.7	3.6	3.0	0.5*	0.5*	0.3*	2.3	3.1	2.6
Tunisia	0.1	0.2	0.1	0.2*	0.2*	0.2*	0.0	0.0	0.0
World Total	148	162	170	155	171	177	–	–	–

SOURCES: BASED ON DATA FROM US EIA (2013C),* BASED ON DATA FROM BP (2013).

TABLE 7 *Caspian Region, Persian Gulf Region and North Africa natural gas production, consumption and exports 2002-2012.*

Country	Production*			Consumption*			Net export*		
EJ	Production 2002	Production 2007	Production 2012	Consumption 2002	Consumption 2007	Consumption 2012	Net exports 2002	Net exports 2007	Net exports 2012
Caspian Region									
Azerbaijan	0.2	0.4	0.6	0.3	0.3	0.4	−0.1	0.1	0.2
Kazakhstan	0.5	0.3	0.4	0.5	0.4	0.4	−0.1	−0.1	0.0
Turkmenistan	1.8	2.4	2.3	0.4	0.7	0.7	1.5	1.7	1.6
Iran	2.6	3.9	5.2	2.7	3.9	5.3	−0.1	0.0	−0.1
Russia	19.3	21.1	23.3	13.3	14.9	17.4	6.0	6.2	6.2
Persian Gulf Region									
United Arab Emirates	1.5	1.7	1.8	1.3	1.7	2.6	0.2	0.0	−0.4
Iraq	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kuwait	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Oman	0.3	0.4	0.5	0.3	0.4	0.5	0.0	0.0	0.0
Saudi Arabia	0.5	0.8	0.9	0.2	0.4	0.6	0.3	0.5	0.3
North Africa									
Algeria	2.7	2.9	2.9	0.7	0.9	1.1	2.0	2.0	1.8
Egypt	0.9	1.6	2.1	0.9	1.1	1.8	0.0	0.5	0.4
Libya	0.2	0.5	0.3	0.2	0.2	0.1	0.0	0.3	0.1
Tunisia	0.1	0.1	0.1	0.1	0.1	0.1	−0.1	0.0	−0.1
World Total#	87	81	116	0.9	80	115	–	–	–

SOURCES: * BP, 2013 AND US EIA, 2013C.

Non-OECD Europe, Eurasia and the Middle East accounted for approximately 40% of global natural gas production in 2012 (BP, 2013). These regions are expected to account for 80% of the increase in production between 2005 and 2030 (BP, 2011). Simultaneously, OECD production decreases from 39% to 27% of world total. Hence, it is estimated that by 2030 world gas supplies will originate from fewer countries.

To conclude, the EU's import dependence and global energy demand are expected to grow, while global trends show that fossil fuel production might become concentrated in fewer countries. This combination could impact EU energy supply security, depending on factors such as the domestic situation in supplying countries and geopolitical economy's factors.

5 EU Energy Security and Geopolitics

As shown by the previous sections, global oil and gas markets are looking bleak as the result of ever-growing energy consumption, an increasing exhaustion of conventional reserves, and a growing geographical concentration of production. Against this background, it is likely that state- and corporate actors will assign more significance to economic and resource concerns and that, energy relations will be increasingly politicized. On the one hand, growing energy imports of emerging economies such as China and India can be added to those of the EU and the US. Moreover, the anticipation of future supply disturbances is generally reflected in rising oil and gas prices, and, in particular, their increasing volatility and the inelastic demand of major consumers. On the other hand, on the basis of the location and the increasing scarcity of world oil and gas reserves, a geographical concentration of energy supplies is expected to materialize in the politically unstable countries of the Middle East, the Persian Gulf and the Caspian region.

This section provides an overview of the main domestic and geopolitical factors that threaten the sustainable EU's energy supply security with focus on these particular regions. In this respect, four main concerns have to be taken into account.

First, the Arab patrimonial rentier-states that hold large oil and gas reserves are susceptible to political instability and social unrest.

Second, the ME and to some extent the CEA region experience frequent outbreaks of violence related to radical politicized religious (Islamic) movements and organizations.

Third, the ME and CEA regions are dealing with geopolitical crises, war, and external interventions of different major state powers, creating a continuously shifting and complex set of alliances that greatly influences the domestic situation in many resource-rich countries.

Fourth and final, the rise of China and other newly industrializing Asian economies increases competition for the oil and gas resources of the ME and CEA region.

5.1 *Domestic and Geopolitical Threats to EU Energy Supply Security*

A first major concern regarding the energy security of the EU is related to the way in which the state and society of the resource-rich countries in the ME, Persian Gulf and CEA region is constructed and functions. Despite political and ideological differences, almost all Arab resource-rich countries in these regions belong to a type of patrimonial rentier-state and society (Elie Kedourie 1992, Amineh 2014; 2017). Following Max Weber (1946; 1968), this regime type displays three main characteristics. First, it relies on personalist rule based on loyalty to an individual; governments do not have a professional, career-oriented view. Second, loyalty is based on bonds between persons at different levels of power in a network of patron-client relations who determine the distribution of rents. Third, the personal authority of individual leaders exists by virtue of their traditional status.

To continue, the political economy of these Arab patrimonial rentier-states is centered on the role of resource-endowments. State control over oil and gas reserves, extraction and industry constitutes an independent source of state-revenue. This form of rentierism has given resource-rich states autonomy from society and social classes which are dependent on the ruling elite for resource distribution (Mahdavy 1970; Schwartz 2008; see also Colgan 2011). However, the heavy dependence on the exploitation and export of oil and gas makes the economies of the resource-rich patrimonial rentier states fragile as they are unsupported by other sectors. Besides, declining oil prices may lead to cuts in social spending and subsequently cause social and political unrest (Amineh & Yang 2012). Albeit some countries, such as Qatar, Dubai and Abu Dhabi have made efforts to diversify their stream of income, holding percentages of the London Stock Exchange, NASDAQ and Citigroup (Harris 2009; see also Bernstein, Lerner & Antoinette Schoar 2009) and having invested in air and maritime transportation hubs, healthcare and sports (Saberi 2014), the Gulf Cooperation Council' member states failed to transform their rentier-state economy and society and continue to rely on the export of oil and gas (see Looney 1994; ESCWA 2001; Belwai 2011). To continue, poor and uneven

economic development, a centralized power structure, nepotism, corruption and violent conflicts draw a heavy burden on the economy and society and impose a threat to the uneasy (unwritten) agreement between the state and society to continue the existing state-society structure. As a result, the Arab rentier-states and in some extend Iran are amongst the least industrialized, lack a diversified economy and are locked into an inferior position in the global markets (Looney 1994; Karshenhas & Hakimian 2005; Shochat 2008; Hvidt 2014). These poor economic conditions, the lack of decent and productive jobs (UNDP, 2016) and opportunities for development in combination with a growing population of educated youth, the lack of public accountability and the ever increasing concentration of political and economic power in the hands of the ruling class are factors that have proven to stir civil unrest, for instance during the 'Arab Spring', and pose a threat to the political stability of the resource-rich patrimonial rentier states (Salloukh 2013; Anderson & Slahsen 2012; Meissner 2010; Schwartz 2008) and thereby to the energy supply security of the EU.

The Sovereign Wealth Funds (SWFs) managed by Arab patrimonial rentier-state systems have domestic and global impacts. SWFs have proven to be an asset in both the developing and developed economies that manage these assets. The funds have been used to buffer the 'Dutch Disease', or to encourage industrialization, economic diversification, and eventually the development of civil society. The rub is that, in patrimonial states SWFs are undermined by corruption and the diverting of assets away from long-term socioeconomic development, to benefit political elites. In fact, Arab SWFs are now one factor contributing to the persistence of the Arab patrimonial rentier-state system (See Amineh and Graus 2014).

The second concern regarding the energy security of the EU, and one of main potentially destabilizing forces in the Middle East, is fundamentalist Islam. Islam as a political ideology and corresponding social movements emerged during the nineteenth century in response to the expansion of Europe at the time when the last Muslim Empires of Ottoman-Turkey, Safavid-Persia, and Mughal India started to decline. While the industrial revolution transformed Europe into the dominant region of the world system, the Muslim empires failed to imitate or adjust to the power-wealth generating machinery of industrialization and were threatened with colonization, humiliation and exclusion (Amineh 1999b, 2003; 2007; Amineh 2007/2017: 11-41). In the twentieth century post-colonial state-societies of the Muslim world, fundamentalist Islam gained momentum in reaction to external interventions, democratization programs and the universalization of Western, modern and secular normative

structures[1] and the efforts of the domestic ruling elites to build strong secular nation-states and state-led western-oriented socio-economic modernization (Amineh 1999; Senghaas 2002; Amineh & Eisenstadt 2007/2017; Amineh 2010; Amineh 2007: 13-53). The authoritarian path to modernization, secular-nationalism and Arab socialism (e.g. Iraq, Syria, Algeria, Libya and Egypt) failed to achieve a balance between economic development and political participation of particularly the urban middle class which created widespread dissatisfaction in the Muslim countries of the Middle East and led to the rise of politicized Islam as an 'alternative' and the emergence of radical groups such as Al-Qaeda and ISIS (See Rashid 2000; Roy 2011). Currently, state sponsored terrorism is another feature of some of the resource-rich Arab rentier-states in the Middle East. For example Qatar was accused of funding Islamic fundamentalism in Mali while Saudi Arabia was a financial supporter of Al-Qaeda and other terrorist groups (Armstrong 2014; Walsh 2014).

The third concern is related to the geopolitical dynamics of the Middle East. In different historical phases, foreign policies resulting in competitive power projections brought together Great-Britain, France, the Soviet Union, Russia, Germany, the United States, China and the EU. In general, the post-Cold War global politics were characterized by unipolar US military power and economic tripolarity between North-America, the EU, and Southeast-Asia. Currently, the US remains the main geopolitical actor in the Middle East (Amineh 2007: 13-57; Bromley 2007), pursuing three primary strategic, geopolitical and geo-economic priorities: (i) Providing support to Israel, (ii) maintaining good relations with the resource-rich Arab Gulf countries (Klare 2001; 2002; Blanchard 2012), and (iii) containing emerging contender states including China, Russia and Iran. Its primary objective is to secure oil and gas resources, production and exports as this remains one of the pillars of its global hegemony.[2] However,

1 Capitalist expansion as a social relation or globalization was accompanied by the emergence and spread of the nationstate worldwide, but excluded norms and values, as they relate to the cultural production of meaning, which Clifford Geertz (1973) states, is always local. But, if norms and values spread beyond local cultures in which they are rooted, they can become universalized. This means that the concepts of globalization and universalization refer to different domains: while globalizaion has a structural and institutional connotation, universalization has a normative character. Islamists consider the nation-state to be an 'export from the West' and therefore question its legitimacy. Hence Islamism can be considered the challenging 'milestone on the road' towardsa a de-westernization in world politics; of a 'total revolt against the West'.

2 For other studies of US interests, see Elizabeth Wishnick, *Growing US Security Interests in Central Asia,* Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, 2002;

history shows that US hegemony has not been unconditional as it has been challenged by multiple events such as the Iranian Islamic revolution of 1979 and the Soviet invasion of Afghanistan in the same year and the recent outbreak of violence and instability that was related to the 'Arab Spring'. However, although the relationship between the US and the Middle East has not been without complications (Anderson 1981; Pollack 2002; Bromley 2005; Haass & Indyk 2009; Roy 2009; Stokes & Raphael 2010; Lesch & Haas 2011; Michaels 2011; Atlas 2012; Byman 2012), the US has prevented that its energy security was threatened or that contender states[3] would decrease the US grip on the Middle East by engaging in direct military interventions (e.g. the Gulf War[4] and the Iraq war), by arming and training the Mujahedin in Afghanistan to fight the Soviet Union's army,[5] and to build alliances with Saudi Arabia and the Gulf States, who, in effect, exchanged military security for cooperation on pricing and production decisions in OPEC (Rashid 2000; see also, Bromley 2007: 90-91). However, US hegemony and established alliances may be subjected to change in the future. Bilateral agreements between China and Russia, China and Iran and Russia and Iran, as well as regional multilateral pacts such as the Shanghai

Idem., Strategic Consequences of the Iraq War: US Security Interests in Central Asia Reassessed, Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, 2004; Jacquelyn K. Davis and Michael Sweeney, *Central Asia in US Strategy and Operational Planning, Where Do We Go From Here?* Cambridge, MA and Washington, DC: Institute for Foreign Policy Affairs, 2004; Lieutenant Colonel Jon E. Chicky, USA, *A Military Strategy for Central Asia,* Student Research Project, US Army War College, 2004, *passim;* and the author's two earlier studies, *The Future of Transcaspian Security,* Carlisle Barracks, PA: Strategic Studies Institute US Army War College, August, 2002; and *US Military Engagement with Transcaucasia and Central Asia,* Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, June 2000.

3 The multipolar world arried with the rise of new contender states that have evolved and expanded quickly as a result of globalization. The shifting world order and rise of potential rivals has been graphically described by Yergin (1992: 14): "With the end of the Cold War, a new world order (was) taking shape (where) economic competition, regional struggles and ethnic rivalries may replace ideology as the focus of international – and national – conflict."

4 See for the relevance of oil in the US foreign policy: Foiuskas and Gökay, *The New American Imperialism*: 152-153, 174, Dan Briody, *The Halliburton Agenda: The politics of oil and money* (New Jersey: Wiley, 2004): 199, Chalmers Johnson, *The Sorrows of Empire: Militarism, Secrecy and the End of the Republic* (London: Verso, 2006 edition): 145-146, 155, Michel Collon, *Media Lies and the Conquest of Kosovo: NATO's Prototype for the Next Wars of Globalization* (New York: Unwritten History: 2007): 6, 8, 29, 34, 35, 91, 93, 97, 99, 104, 105, 107, 108, 112-114, 118, 121, 123, 124, 127-130, 134-136, 145, 154, 156, 172, 210 and Peter Dale Scott, "The Background of 9/11: Drugs, Oil and US Covert Operations", in David Ray Griffin and Peter Dale Scott (eds) *9/11 and American Empire: Intellectuals Speak Out* (Glouchestershire: Arris Books, 2007): 76.

5 As Brzezinski stated in the summer of 1979.

Cooperation Organization[6] (SCO) and China's One Belt One Road (OBOR) strategy are stepping stones to such a development. China and its non-Western multilateral institutions are becoming the main strategic concern for US hegemony, and the rift between the two is set to become the main geopolitical-strategic reality in CEA, while the EU, Japan and India play a secondary role. These changing geopolitical realities may potentially influence the ability of the EU to sustain import oil and gas from the Middle East and thereby threaten its energy supply security. The increasing economic and geopolitical importance of China is potentially the most important concern for the energy supply security of the EU.

China's Oil Dependency and Its Geopolitical Economy Implications

Potentially the most important threat to the EU's energy supply security is related to the rise of the Asian economies, particularly China. Chinese capitalist state-led industrial development created dual results: (i) wealth and power generation and domestic resource scarcity with accompanying (ii) societal pressure of unfulfilled energy demands. This dynamic poses a new policy strategy in China's cross-border economic activity of accessing foreign resources and markets (See Amineh & Yang 2017).

According to the World Energy Outlook 2012 of the International Energy Agency (IEA), global energy demand is projected to increase by one-third over the period 2012 to 2035 (Amineh & Yang, 2014), and rising living standards in China, India and the Middle East account for sixty percent of this growth. Besides, British Petroleum (2013) predicted that by 2035, developing countries, specifically China, the largest global energy consumer, will account for more than 30 percent of world energy demands, China's energy consumption share being 22 percent in 2012, compared to the United States' 18 percent. (BP, 2013).

Over the last 10 years, the Middle East has been China's main supplier of oil and gas, and China became a main force competing with the US and EU for the region's energy supplies. As China's economic growth depends on securing resources, the Chinese ruling class and the State Owned Enterprises (SOEs), mainly National Oil Companies (NOCs), are increasingly involved in the exploitation of oil and gas in the resource-rich countries of the ME and CEA (Victor, et al., 2012; Amineh and Yang 2014). The intensifying competition for resources from China – against the background of declining US hegemony – poses a new geopolitical threat to the EU's energy security. The EU depends

6 The members countries of the SCO are Russia, China, Kazakhstan, Kyrgyzstan, and Tajikistan. Iran, India, and Pakistan have observer status in the organization.

mainly on Russian oil and gas imports and to a lesser extent on those of the Caspian region. Hence, non-Russian resources are crucial for the EU to balance its energy import dependence and achieve energy supply security. Now that China has become a new competing force and as the country is increasing its regional presence, some resource-rich countries have responded to China's diplomatic efforts and foreign direct investment by so-called 'looking east for alternative alliances'. The increased Chinese footprint and Beijing's expanded diplomatic and economic ties give smaller regional powers and additional partner alongside the US and the EU. Between 2005 and 2009, China's trade volume with the ME increased by 87 percent to USD $100 billion and reached USD $200 billion in 2012 . In 2010, China surpassed the US as the main destination of Middle Eastern exports (Chen 2011; Wood 2014). China's oil imports almost reach America's and grow 10 percent per year, meeting 60 percent of domestic consumption, while between 2000 and 2012, China accounted for 50 percent in world oil consumption growth (Noel: 2014: 248). Figure 14 illustrates the growth in oil trade between China and the states of the Persian Gulf which can be perceived as a threat to US and EU regional interests.

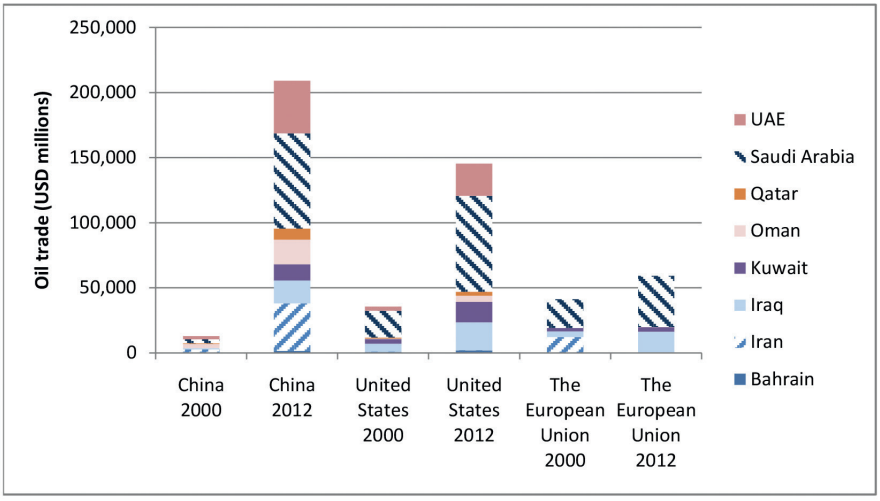

FIGURE 14 *Total Gulf Oil Trade Comparison* (*in USD millions*).
NOTE: DATA FOR THE EU FOR QATAR, BAHRAIN, AND UAE IS NOT AVAILABLE.
SOURCE: US CENSUS BUREAU: US BUREAU OF THE ECONOMIC ANALYSIS: NATIONAL BUREAU OF STATISTICS OF CHINA; EIA; EUROPEAN COMMISSION, MARKET OBSERVATORY FOR ENERGY, REGISTRATION OF CRUDE OIL IMPORTS AND DELIVERIES IN THE EUROPEAN UNION EU 27.

Over the past years, China has focused mainly on four resource-rich countries: Saudi Arabia, Iran, Iraq and Kazakhstan. Together, these countries accounted for 35 percent of China's oil imports in 2013. Although Saudi Arabia, Iran and Iraq form the three most important oil suppliers of China, much of China's expanding regional presence and role is linked to geopolitically important Iran. In addition, China has intensified its ties and benefited from the resources of Saudi Arabia, which is a political pivot to the US. Table 8 compares the total oil trade of selected resource-rich countries in this study: Iran, Iraq, Saudi Arabia, Kazakhstan and Russia with China, the US and the EU.

Figure 15 measures the magnitude of trade growth between China and its key Middle East energy partners. It illustrates that China has become a major trading partner for all countries, reflecting the intensifying trade-relations and economic involvement with the ME and the CEA region.

China's growth led it into the top two importing nations from these selected countries. Note that China has a position leading the US in each, except in the case of Saudi-Arabia where it is marginally behind US imports. In the case of Qatar, the difference is more noticeable. Turkmenistan is by far the most dependent on China, as 73 percent of its total exports between 2011 and 2013 were destined for China.

TABLE 8 *Total oil trade of selected resource-rich countries – comparison* (*in millions of dollars per day*).

Key resource-rich countries	**China**		**US**		**The European Union-27**	
Year	**2005**	**2012**	**2005**	**2012**	**2005**	**2012**
Iran	2,487	36,466	185.6	253	12,182	5.637
Iraq	975	17,568	6,076.3	21,3194	4,380	16,240
Saudi Arabia	3,098	73,314	20,589.8	73,639	22,008	39,151
Kazakhstan	NA	NA	NA	NA	10,370	22,932
Russia	NA	63,409	24,780	31,218	65,238	103,854
Total	NA	NA	NA	NA	48,940	83,960

SOURCE: US CENSUS BUREAU: US BUREAU OF THE ECONOMIC ANALYSIS; NATIONAL. BUREAU OF STATISTICS OF CHINA; EIA; EUROPEAN COMMISSION, MARKET OBSERVATORY FOR ENERGY, REGISTRATION OF CRUDE OIL IMPORTS AND DELIVERIES IN THE EUROPEAN UNION EU 27.

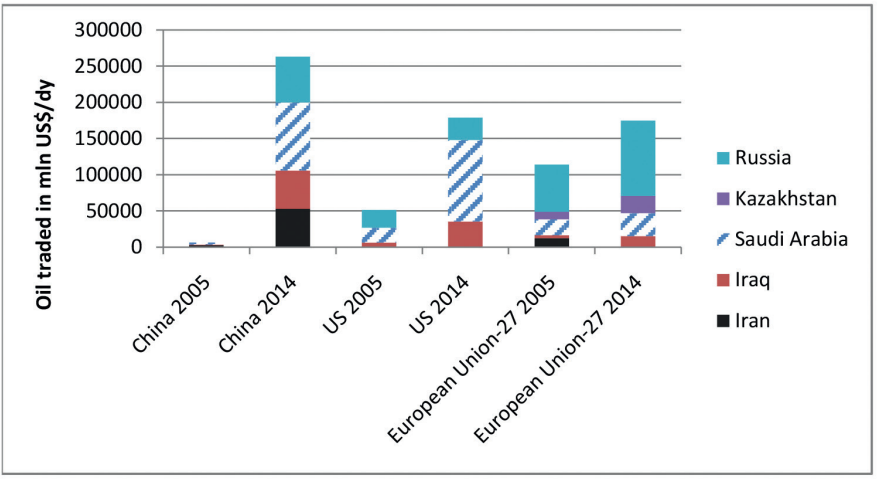

FIGURE 15 *Trend in oil trade relations of Iran, Iraq, Kazakhstan, Saudi-Arabia with China (2005-2014).*

NOTE: SLIGHT DIFFERENCES MIGHT OCCUR BECAUSE OF ROUNDING.

SOURCE: US CENSUS BUREAU: US BUREAU OF THE ECONOMIC ANALYSIS; NATIONAL BUREAU OF STATISTICS OF CHINA; EIA; EUROPEAN COMMISSION, MARKET OBSERVATORY FOR ENERGY, REGISTRATION OF CRUDE OIL IMPORTS AND DELIVERIES IN THE EUROPEAN UNION EU 27.

China's increasing presence in the ME and CEA region through foreign direct investments in the energy sectors is guided by its NOCs, which are the cornerstone of China's economic globalization. Between 2005 and 2014, Chinese investment in the six selected resource-rich countries exceeded over USD $100 billion. Figures 16 and 17 show the total outward FDI from Chinese companies in Kazakhstan, Iran, Russia, Turkmenistan, Iraq, Saudi-Arabia and Qatar.

Kazakhstan (USD $23.49 billion) was the largest recipient of FDI at the end of 2014, followed by Russia (USD $20.88 billion), Saudi Arabia (USD $19.49 billion), Iran (USD $17.17 billion), Iraq (USD$14.84 billion), Turkmenistan (USD $3.73 billion), and Qatar (USD $3.5 billion). Kazakhstan, Russia, and Saudi Arabia are the seventh, eighth, and ninth largest recipients of Chinese Outward FDI (Heritage Foundation 2015). Chinese Outward FDI in these countries (USD $21.61 billion) peaked in the 2009 Global Recession's aftermath from which China emerged relatively unscratched. More than 20 percent of Chinese investments went to abovementioned countries, but in the following years outward FDI decreased, particularly in 2011, 2012 and 2014, as the Chinese government combatted corruption in its national oil companies. The majority of China's outward investment in the abovementioned countries went into their energy

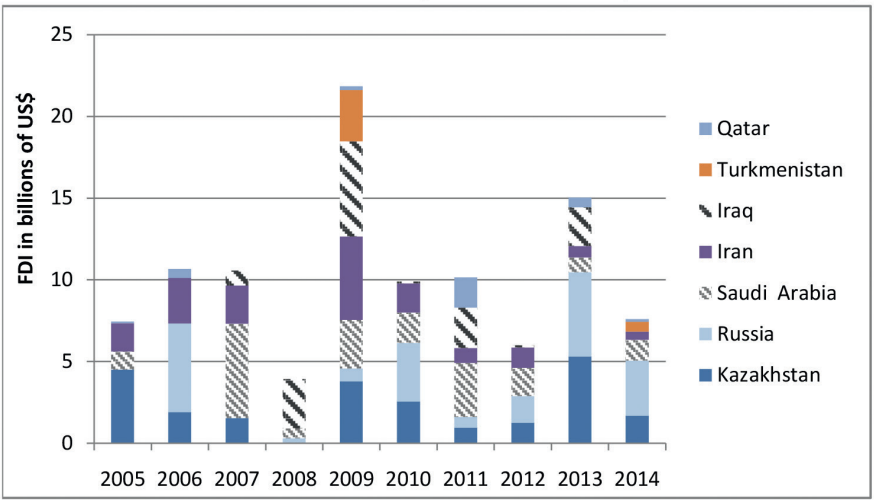

FIGURE 16 *Total Outward FDI from Chinese Companies in Kazakhstan, Iran, Russia, Turkmenistan, Iraq, Saudi Arabia and Qatar (billions of $USD).*
SOURCES: DATA ARE BASED ON HERITAGE FOUNDATION'S CHINA GLOBAL INVESTMENT TRACKER DATABASE 2015 AND CHINA NATIONAL BUREAU OF STATISTICS 2015.

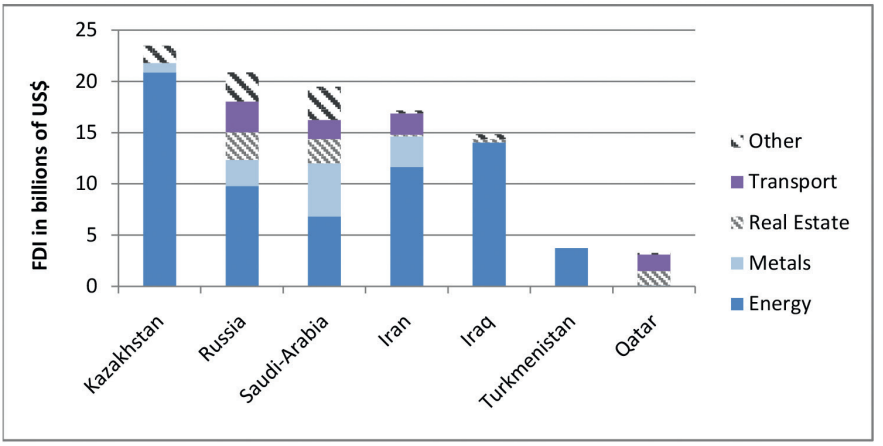

FIGURE 17 *Chinese Outward FDI in Iran, Iraq, Kazakhstan, Russia, Saudi Arabia and Turkmenistan.*
SOURCE: DATA ARE BASED ON THE HERITAGE FOUNDATION'S CHINA GLOBAL INVESTMENT TRACKER DATABASE 2015 AND CHINA NATIONAL BUREAU OF STATISTICS 2015.

sectors. Apart from Turkmenistan, where 100 percent of Chinese FDI is directed toward natural gas production, the lion's share of Chinese FDI in the energy sectors of Iran (USD $11.63 billion), Iraq (USD $14.03 billion), Kazakhstan (USD $20.88 billion), Russia (USD $9.79 billion), and Saudi Arabia (USD $6.82 billion) is allocated to oil production. This mirrors the role oil plays in China's energy consumption, accounting for 20 percent compared to 5 percent for natural gas and 1 percent for hydroelectricity (EIA, China 2015).

The largest upstream projects of Chinese NOCs in the ME and the Caspian region are in Iraq, Iran, and Kazakhstan. The CNPC is the main actor in Iraq's Rumalia oilfields and while Sinopec dominates Chinese investments in Iran's Azadagan oilfields and Kazakhstan's Kashagan oilfield. Both companies also have large investments in Russian and Saudi Arabian oil production projects. Chinese companies such as the CNPC, the CIC, and Huadian have also invested in natural gas projects (primarily production and refineries) in Iran (worth USD $3.35 billion), Kazakhstan (worth USD $5.98 billion) and Russia (worth USD $1.9 billion). Chinese investments in the hydroelectric sectors of Iran, Kazakhstan, Russia, and Saudi Arabia, have mostly been assigned to dam construction and upgrading electric grids. Other energy sector investments in Iraq and Kazakhstan include constructing power plants and nuclear energy projects.

In contrast, upstream activities of Chinese NOCs in Iran have decreased in recent years. Iran suspended CNOOCs contract for developing the North Pars Natural gas-field in 2011 because of lack of progress, and CNPC withdrew from developing Phase II of South Pars gas-field in 2012 for similar reasons. CNPC is behind schedule in developing the Azadegan oilfield, while Sinopec's work on the Yadavaran Oilfield has reportedly suffered delays (see Downs 2013; *International Oil Daily*, 1 April 2013; *International Oil Daily* 24 June 2012; *Platts Oilgram News*, 2 May 2012).

Iran's favorable geographical location between the ME and the Caspian can serve as a geographical bridge for China to secure Central Asia's and the Middle East's energy resources; a situation Kaplan (2012) calls 'the Iranian pivot'. Momentarily, China imports large amounts of energy from the CR as to reduce its dependence from Persian Gulf, using pipelines connecting the Caspian Sea through Central Asia with China (Fazilov & Chen 2013). China's ambition to secure more Central Asian oil was facilitated by the Neka Pipeline in northern Iran, constructed by Chinese oil companies in 2003. Shrinking Chinese presence in Iran was caused by sanctions impeding Chinese oil companies to secure required equipment and technologies to operate in Iran, dissatisfying contract terms, (pre-nuclear deal), Iran's nuclear program and potential military conflicts, and reported instructions from China's leadership to move slowly in Iran.

It seems that China-Iran energy cooperation will improve as a result of the 5+1 nuclear deal. In the 2000s, China's NOCs negotiated project contracts and increasing Chinese crude oil imports from Iran can cause tensions with the US. China-Iran energy relations continued to improve, for instance, in 2012 when the Zhuhai Zhenrong Corp (a state-led Chinese corporation) - sanctioned by Washington in early 2012 for supplying gasoline to Iran – established a supply contract with the National Iranian Oil Company. Since the nuclear deal, Iran has introduced a new type of energy-sector contract, the Iran Petroleum Contract (IPC).[7] According to the NIOC, the IPC combines Iran's desire for foreign investments with clerical opposition to [western-] involvement. The IPC is comparable to a service contract, but has a longer duration. Although details of the deal remain unclear, it remains to be seen if it will fall under the IPC. In November 2016, CNPC, in conjunction with Total, announced a USD $6 billion gas deal with state-owned Petropars to help develop the South Pars gas-field.

6 Conclusion

As one of the world's largest importers of fossil fuel (mainly oil and gas), the EU is a major player in the global energy market. However, as member states keep the upper hand on external policy, it remains a dwarf on the political stage. It has been argued that the energy challenges facing EU need a coherent external policy with related policy-tools to enable Europe to play a more effective international role in tackling common problems with energy partners worldwide. It would certainly allow the EU to speak with one voice in its external (energy) relations.

The last two decades have been marked by decreasing fossil fuel production in the EU (from 27 EJ in 1990 to 13 EJ in 2015) and increasing import dependence (from 43 percent of energy use in 1990 to 54 percent in 2013). Countries from which its main energy sources are obtained are Russia, Norway, Algeria (natural gas), Saudi Arabia (oil), and Colombia (coal). The share of the Middle East and North Africa (MENA) and the Caspian Region (CR) in total imports totaled 63 percent in 2013. The import dependence of the EU is expected to increase in the upcoming two decades, to 57 percent by 2030 and 59 percent by 2050. Proven oil and gas reserves in the EU are very limited. Shale-gas reserves, at least those estimated, could cover about 30 times the natural gas consumption in 2014, and might offer a temporary solution to security of natural gas

7 Official website: http://www.nioc.ir/portal/home/?generaltext/165305/165357/165361/New-contracts-models Last visited on 10-11-16 at 15:04.

supply. However, it is apparent that in the case of oil the outlook of both global reserves and the EU's own reserves looks bleak.

At the same time, global trends show an increasing demand for energy in the coming two decades, concentrated mainly in the late-industrializing countries, specifically in China, which is now the world's largest energy consumer. Fossil fuel reserves and production facilities are concentrated in few countries. The Persian Gulf area and the Caspian region hold some of the world's largest oil and gas reserves, and these will make them increasingly significant in global markets. The combination of increasing oil and gas consumption, diminishing reserves and geopolitical rivalry creates a setting in which the situation of the EU can be characterized as one of demand- and supply-induced and structural scarcity.

As mentioned above, the main strategic energy resources of the EU are the resource-rich counties of the Middle East and the Persian Gulf. Energy supply security from these countries faces several challenges:

(i) The EU energy supply security from the Persian Gulf resource-rich countries are threatened by the persistence of Arab patrimonial rentier states and societies which are a domestic and geopolitical source of permanent political instability, conflict and tension. The Arab' oil based Sovereign Wealth Funds are used by the Arab ruling elites to divert assets from long-term domestic socioeconomic development towards individual profit. It is facilitated by a lack of corruption, clientelism and oppression of any opposition or protest. This phenomenon accompanied with, external support received mainly by the US are main causes for the persistence of Arab patrimonial rentier states and consequently an impediment of EU energy supply security.

(ii) The second factor which creates domestic and regional instability in the Middle East and Central Eurasia is the radicalization of anti-western politicized Islam with corresponded ideologies and social forces. This forms an obstacle for the EU's energy supply security from these countries.

(iii) The third factor is related to the decades of ongoing geopolitical crises, exacerbated by permanent external intervention. Several developments led to the current situation, these being economic globalization, the nationalization of oil companies in resource-rich Middle Eastern countries, the rise and transnational activities of newly industrializing Asian economies accompanied by the decline in American hegemony, the Iranian Revolution of 1979 and the disintegration of the Soviet Union in 1989. Generally, post-Cold War global politics were characterized by unipolar (US) military power. Even though reducing its regional energy imports,

the United States remained the main (military) geopolitical actor in the Middle East and the Persian Gulf, pursuing the strategic, geopolitical, and geo-economic priority of containing emerging contender states, including China, Russia and Iran.

(iv) Emerging Asian economies, especially China, instigate a geopolitical shift by involving themselves in, and exerting an impact on the post-Cold War geopolitical economy of the ME and CEA. The last 10 years, the Middle East has been China's main supplier of oil and gas, and China became a main force competing with the EU for the region's energy supplies. China's ruling class and the State Owned Enterprises (SOEs), mainly National Oil Companies, are involved in the energy reserves of research-rich countries of the ME and CEA. Chinese foreign direct investments in energy sectors guided by its NOCs are a cornerstone of China's economic globalization. Between 2005 and 2014, Chinese investment in the six selected resource-rich countries exceeded over 100 billion US dollars, while regional multilateral pacts such as the Shanghai Cooperation Organization (SCO) and China's 'One Belt One Road' (OBOR) initiative are stepping-stones to increased Chinese influence in the region. The SCO could counterbalance US regional influence while OBOR includes the creation of an alternative sea route to the US-secured oil transport system, as well as an alternative system for geopolitical economic development.

Predicting what happens in the upcoming decades in the ME and CEA is impossible. However, it is certain that emerging Asian economies involved in the ME and the CEA, especially China, will influence the regions' future geopolitical economic reality. China relies on resources for domestic development and the resource-rich Middle Eastern countries have long been a destination from which to acquire them.

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