The comparison of the Nord Stream and South Stream natural gas pipelines
Table of Contents

1. Introduction.......................................................................................................................... 4
   1.2. Existing literature............................................................................................................. 4
   1.3. World order and the escalation of the Ukrainian crisis ................................................. 5
   1.4. Interdependence............................................................................................................... 7

2. Nord Stream.......................................................................................................................... 8
   2.1. Overview of the German energy market.......................................................................... 8
   2.2. Overview of Russia’s natural gas market ........................................................................ 10
   2.3. Bilateral relations of Germany and Russia ...................................................................... 11
   2.4. Natural gas consumption projections............................................................................. 12
   2.5. The launch of Nord Stream............................................................................................ 12
   2.6. Regulatory and financial obstacles ................................................................................. 13
   2.7. Concerns regarding the construction of Nord Stream ................................................. 14
   2.8. Construction of the pipeline......................................................................................... 14
   2.9. Regulation and compliance............................................................................................ 15
   2.10. The economics of Nord Stream .................................................................................. 17
   2.11. Role in shaping Germany’s energy sector ..................................................................... 18

3. South Stream........................................................................................................................ 19
   3.1. Overview of affected countries (2013) .......................................................................... 19
   3.2. Energy Stress Test 2014 ............................................................................................... 22
   3.3. Projects of Common Interest (PCI) .............................................................................. 24
   3.4. Drivers leading to the South Stream initiative............................................................ 25
   3.5. The beginning of South Stream ..................................................................................... 25
   3.6. The route of South Stream ............................................................................................ 26
   3.7. Specifications of the pipeline......................................................................................... 27
   3.8. The economics of South Stream .................................................................................. 27
   3.9. Feasibility of the project ............................................................................................... 29
   3.10. Effects of South Stream ............................................................................................... 30
   3.11. Energy Union ............................................................................................................... 31
   3.12. Aftermath ................................................................................................................... 32

4. Comparison of Nord Stream and South Stream................................................................. 34
   4.1. Context.......................................................................................................................... 34
   4.2. State of the Russian Economy ....................................................................................... 35
1. Introduction

“If Europe does not want to carry out (South Stream), then it will now be carried out,” - Vladimir Putin, announcing the termination of the South Stream Pipeline in late 2014 during a conference held in Ankara, Turkey. (Anishchuk, (2014)) The step itself came of no surprise considering the geopolitical turmoil arising from Russia’s alleged involvement in the Ukrainian crisis, the European Union’s aim to decrease dependency upon Russian energy imports and South Stream’s questionable value as an investment. Regardless, the announcement from President Putin did cause a stir, as most firms and countries involved or directly affected by the project only heard about the cancellation through the public media. (Reed & Kanter, (2014))

In this study I wish to draw a comparison between Nord Stream and South Stream, two natural gas pipelines of great proportion aimed at decreasing disruption risks linked to Russian gas supplies delivered to Europe, through Ukraine. Both projects (would have) required the cooperation of the EU and Russia, albeit regulatory environment and the geopolitical situation greatly differed in the two cases. Henceforward, I look to thoroughly assess the two pipelines in order to cement an understanding of why Nord Stream was built, whilst South Stream was scrapped, despite the numerous similarities. As a hypothesis I will assume that Nord Stream was constructed, due to its viability as a project and a friendly political climate, alongside which South Stream was cancelled as a result of the political turmoil between Europe and Russia.

1.2. Existing literature

Both Nord Stream and South Stream have been in media spotlight, because of the large initial investment required, their great impact and the controversy surrounding them. There has not yet been – at least publically available – a study focusing on the comparison of these two projects.

To contextualize the circumstances, i.e. global and regional affairs that have impacted both projects, I used (Brzezinski, (2012)), alongside other articles allowing deeper insight into local and regional economics, bilateral and multilateral relations, as well as politics, e.g. (Mearsheimer, (2014)) or (BBC, (2014)). To understand the current situation and transition in the Ukrainian and regional gas sector I looked to (Pirani, Henderson, Honoré, Rogers, & Yafimava, (2014)) and (Boersma, Mitrova, Greving, & Galkina, (2014)).
I primarily used data from (Eurostat, 2014) and (BP, 2014) to attain a basic understanding of the gas markets in the affected countries, alongside which the International Energy Agency’s studies, such as: (IEA, 2013b), (IEA, 2014d), (IEA, 2014a) etc., also gave detailed descriptions of global energy-related tendencies and country-specific characteristics. To understand general EU regulatory environment, directives published by the EC were used (European Parliament & Council of the European Union, 1998), (EC, 2015) etc.

Being initiated earlier than South Stream, multiple studies focusing on Nord Stream are available. I used (Luvsan-Ochiriyin, 2011) to attain a basic understanding of the project, with additional specific information, such as its geopolitical impacts being available in: (Smeenk, 2010) or the analysis of its value in (Chyong, Noel, & Reiner, 2010); a vast amount of relevant information was retrieved from the Nord Stream and Gazprom website pages: (Gazprom, 2015b), (Nord Stream, 2014) etc.

Comprehensive studies for South Stream are much more scarce, thus I used numerous shorter articles and studies linked to a given aspect of the project, for example (Chyong, 2011) analyzed its economic value, (Dieckhoener, 2012) evaluated the project by comparing it to the previously cancelled Nabucco, whilst (Deák, 2012) looked to focus on the costs and the impact of South Stream.

With the analysis of the aforementioned literature, paired with a wide array of articles and publications, I looked to compare Nord Stream and South Stream.

1.3. World order and the escalation of the Ukrainian crisis

In order to briefly understand the current geopolitical situation in Eastern Europe, which highly affected South Stream, it is necessary to contextualize the ongoing shift in international leadership and Russia’s role amongst global superpowers.

The United States of America’s power as the global leader has been declining since the late 20th and early 21st century, as focus has shifted to the eastern hemisphere of the globe. China’s and India’s economies have gained momentum, although domestic conditions still need to be drastically improved to close the margin between their levels of development and that of the USA’s or EU Member States’, thus they are not set to partake a leading role in global governance just yet. The USA’s role therefore is not directly threatened, however alongside the aforementioned far eastern states, numerous other countries also wish to partake a central role in shaping our future.
Amongst these other states, e.g. Germany, Japan etc., is Russia; a country which has primarily earned this status due to a combination of large fossil fuel reserves and the world’s second largest nuclear arsenal. Russia also has strong roots in conveying, both domestically and internationally, its inferior power, a notion that the Soviet Union was based upon and remains to play a large role in President Vladimir Putin’s domestic politics and international relations. However, numerous issues undermine this perception, as widespread poverty, reliance on the exports of oil and natural gas, income inequality, corruption, etc. all hinder economic prosperity and social development. These factors do not only retain growth and question the Russian model’s sustainability, but are central causes of domestic instability, as was the case in-between 2011-2013, when discontent resulted in widespread protests. (Brzezinski, (2012)) (Barry, (2011))

President Putin has silenced most domestic disturbances of such nature, although remains to group a large portion of resources to enable the establishment of quasi-imperial Russia. The Russo-Georgian war over Abkhazia and South Ossetia in 2008, as well as the ongoing Ukrainian crisis shows just how important it is for the Kremlin to extend its power beyond its borders and maintain a strong relation with Post-Soviet states. It is clear that the military intervention in Ukraine, regardless of it being official or denied¹, should not have come as a surprise for Western Leaders after announcing their aim to expand the North Atlantic Treaty Organization (NATO) to include Georgia and Ukraine. This, like previous NATO expansions aimed at eastern European states was highly contested and opposed by Russian leadership, as from their point of view it is seen as a depiction of the West’s direct threat to extend its influence. The same sort of perception was implied when the EU looked to strengthen economic ties with Ukraine, following the ousting of Russia-friendly President Viktor Yanukovych, which ultimately lead to the destabilization of Ukraine. (Mearsheimer, (2014)) (BBC, (2014))

The escalation and deterioration of EU-Russia relations since the annexation of Crimea show just how different the geopolitical context was during the construction of Nord Stream prior to 2010, as opposed to the past year or so, when South Stream’s construction was to be started.

¹ Russia remains to be reluctant in admitting its direct involvement in the Ukraine crisis. Official sources claim that battles are fought between pro-Russian separatists living within Ukraine and Ukrainians, with no Russian troops being deployed or weapons being provided. According to NATO, evidence suggests the involvement of the Russian military. (Croft, (2015))
1.4. Interdependence

The codependence of Russia and the EU, with regards to natural gas supplies, has generally remained unchanged during the past decade, regardless of the 2006 and 2009 supply disruptions being push-factors in developing interconnectivity within Europe; parallel to which EU opposition of energy-reliance on Russia, has motivated Gazprom to seek alternative export markets. Both sides have seen progress, albeit the situation remains unresolved from either perspective. EU Members still import a disproportionately large amount of their natural gas from Russia, with a few countries having practically no alternative import sources, alongside which a dominant portion of Gazprom’s revenue originates from European markets. As a direct result, Gazprom faces substantial losses during disruptions in supplies through Ukraine.

Natural gas is a prominent aspect to take into account when assessing the relation of Russia and Ukraine, i.e. pricing and debt issues constantly hinder their diplomatic ties. The price Ukraine has to pay for its natural gas is currently a central point of dispute, as it was dramatically increased from 2007’s value of 130 $/mcm\(^2\) to 2014’s 414 $/mcm. A price hike of 318.5% in the given amount of time is extremely difficult to manage, in a relatively poor and gas-dependent country as is Ukraine. Therefore it is no surprise that amidst an ongoing war, Kiev is unable to meet the Kremlin’s payment demands. Gazprom claims this is merely a part of a transition to European pricing mechanisms, although it can be considered a form of retaliation, not only to cause further destabilization within Ukrainian governance, but as a direct response to Ukraine’s national gas company, Naftogaz’s, Russian debt.

*Natural gas pricing*

Exact natural gas import prices are rarely disclosed as they are sealed in long-term agreements, with oil indexed pricing or spot pricing varying amongst countries. Most European countries receive imports in the range of 325-500 $/mcm, whilst Post-Soviet states receive discounts driving their import prices under 200 $/mcm, or as was the case with Ukraine, near the 130 $/mcm mark. (Pirani et al., (2014)) (Boersma et al., (2014)) (Luo, (2014))

\(^2\) Million cubic meters
2. Nord Stream

2.1. Overview of the German energy market

Germany’s total primary energy supply (TPES) is the 7th largest on a global scale, amounting to the equivalent of 325.0 million tons of oil equivalent (Mmtoe) per annum, 2.6% of global consumption; this comprised of oil (32.7%), coal (24.8%), natural gas (22.3%) and renewables (11.3%) in 2013, with TPES showing a moderately declining trend during the past three decades. Even prior to the 2011 implementation of Energiewende, Germany’s comprehensive energy strategy, phasing out nuclear energy has been a primary goal, with the current target date being 2022. Additionally, in accordance with the Kyoto treaty, Germany’s ruling government has focused on reducing emissions; therefore retiring coal-fired power plants has also been an ongoing initiative. Based on these policy measures, current consumption and production, projections show that natural gas will play an increasing role in TPES, reaching 25% by 2030. (IEA, 2013a)

Domestic production rates of natural gas, 9.8% of total consumption in 2013, have been decreasing at an average annual rate of 7.35% since 2003, leading to increasing dependency on imports. These are supplied through natural gas pipelines from the Netherlands (23.4%), Norway (35%) and the Russian Federation (41.6%). (BP, 2014)

Imports from Russia to Germany flow through three major pipelines (Figure 1.): Nord Stream (capacity: 55 bcm/a⁴), which directly connects the two countries, the Yamal-Europe pipeline (capacity: 33 bcm/a) running through Belarus and Poland, connected to the German gas market through the Jamal pipeline (capacity: 24 bcm/a) and thirdly, the Urengoy-Pomary-Uzhgorod pipeline, also known as the “Brotherhood” pipeline (capacity: 100 bcm/a at Velke Kapusansky, UA-SK border) running through Ukraine to Slovakia, where it branches out to Germany through the Czech Republic. (Gazprom, 2014d)

---

³ Billion cubic meters per annum.
The German gas market is liberalized and consists of numerous players; based on their role they can be grouped into three tiers. The first market tier consists of five firms that are primarily responsible for domestic production and importation: E.ON Ruhrgas, Verbundnetz Gas, Wingas, RWE Gas and Gasunie. Of these, E.ON covers approximately 50% of Germany’s natural gas demand, whilst the other firms’ market share ranges between 5% and 16%. Natural gas imported by E.ON Ruhrgas is based on four long-term prime contracts agreed with Russia, in force until 2035. The pricing of these contracts is based on spot prices (Figure 2.) determined on the European Energy Exchange (EEX). (IEA, (2013a)) (Gazprom, (2014a))
2.2. Overview of Russia’s natural gas market

Russia’s economic prosperity is heavily reliant on fossil exports, which was perceivable during its recovery after the collapse of the Soviet Union and its economic growth in-between 2000-2010, in both cases, amidst growing commodity prices. On contrary, the economic crisis of 2007-2008, which led to the plummeting of commodity prices, brought severe recession in Russia with a nearly 8% drop in GDP. In 2012 revenues from oil and gas accounted for over half of federal budget revenues and over 70% of total exports. (Paltsev, (2014))

The Russian Federation is the second largest producer of natural gas, with 604.8 bcm extracted in 2013, accounting for 17.9% of global production; it also has the second largest amount of proven natural gas reserves, at 16.8% of total global reserves. With domestic consumption levels at 413.5 bcm in 2013, Russia is by far the largest exporter of natural gas. This surplus is primarily aimed at the EU and the Commonwealth of Independent States (CIS) via pipelines and Russia’s only currently functioning LNG terminal, the Sakhalin LNG plant. (BP, (2014)) (IEA, (2014a))

State-owned Gazprom dominates the Russian natural gas market, producing approximately 74% of total output and controlling 65% of total reserves. (EIA, (2014)) Gazprom’s revenue from the sales of natural gas in 2013-2014 amounted to a total of RUB 1,048,092 million⁴ (US$ 34,936.4 million), of which RUB 611,257 million

---

⁴ EUR/RUB rates were in the 40-50 band and US$/RUB rates near 30 during 2013-2014, with rates severely slipping in late 2014 following the escalation of the Ukrainian crisis. (ECB, (2015))
(US$ 20,375.2 million), 58.3%, came from European and Other Countries\(^5\). Average prices announced were RUB 13,087.3/mcm (US$ 372.4/mcm) in Europe and Other Countries, whilst RUB 8,479.0/mcm (US$ 241.3/mcm) in the Former Soviet Union (FSU) and 3,534.8 RUB/mcm (US$ 117.8/mcm) within the Russian Federation (Gazprom, (2014b)). The large differences in pricing partially stem from the long-term contract system Gazprom has used to determine prices, however the lack of transparency contested by numerous institutions, alongside the European Commission’s initiative to liberalize the market, has led to 45% of prices being linked to spot pricing mechanisms by 2012. (Stern, (2014))

As a part of Russia’s acknowledgement of its export-dependency upon European markets, it has looked to strengthen ties with China through the Power of Siberia pipeline. (Gazprom, (2014c)) This project diversifies Russia’s exports, however as it will carry natural gas from the Sakha Republic it is unlikely to disrupt European exports, mainly originating from the Yamal peninsula. Russia has an LNG plant under construction and another two planned liquefaction facilities aimed at diversifying export destinations. (Global LNG, (2014))

2.3. Bilateral relations of Germany and Russia

“Of all the bilateral relationships between EU member states and Russia, Germany is undeniably the most significant. Both have long been key geostrategic actors in the shaping of the European political environment and while conflict has punctuated their more recent shared history, the two states have extensive economic, social and cultural connections stretching back for several centuries.” (Timmins, (2011), Abstract) Since the end of the Cold War their economic cooperation has further strengthened, with Germany’s imports from Russia reaching a value of $36 267.5 million (3.05% of total imports) and exports aimed towards Russia amounting to $47 883.7 million (3.29% of total exports) (OECD, (2014)). Of the trade conducted, Russia is a key supplier of energy resources, whilst Germany has provided equipment necessary for the economic modernization of the Russian. (Zverev, (2012)) This good relation was undermined by Russia’s aggressive annexation of Crimea and its involvement in destabilizing eastern Ukraine. In retaliation the EU and consequently Germany have implemented economic sanctions, i.e. trade barriers on Russia. The affect of these measures is hard to estimate,

\(^5\) Gazprom refers to Other Countries as those, which are not Russia, Former Soviet Union or European states.
but is likely to be losses of billions of US$ for Russia, and will most likely sour bi- and multilateral relations. (European Parliament, (2014)) (European Council, (2014b))

2.4. Natural gas consumption projections

Around the time of the initial planning of Nord Stream, estimates linked to European gas demand were very different than that of today. Gas consumption in OECD countries within Europe was projected to expand, in a reference scenario, at a rate of 2.8%. (IEA, (2000)) This figure, following the economic crisis of 2007-2008 and the Euro Zone crisis has sharply declined to an annual increase of 0.6%. (IEA, (2013b))

2.5. The launch of Nord Stream

Seeing just how dependent Germany’s economy is on the importation of natural gas from Russia, it was acknowledged that third parties through which pipelines deliver gas pose external risks. German leadership, prior to the 2006 and 2009 disputes between Russia and Ukraine, took action and with the economic, feasibility, technical and route studies, launched the predecessor of Nord Stream in 1997. It was named the North European Gas Pipeline (NEGP).

Following thorough assessment, the forming members of the project, Russian Gazprom and Finnish Neste (later Fortum) started developing the project, shortly after which Ruhrgas (later E.ON) and BASF-Wintershall became shareholders through a joint company with Fortum, called North Transgas Oy. After Gazprom purchased Fortum’s shares and North Transgas was officially dissolved, the joint venture entitled North European Gas Pipeline Company was founded, replacing NEGP. The project’s name was once again changed in 2006, to the Nord Stream AG, which has been used to date. (Luvsan-Ochiriyyn, (2011)) The firm was incorporated in Zug, Switzerland. Ownership has somewhat shifted since, and currently consists of OAO Gazprom (51%), Wintershall Holding GmbH6, a BASF subsidiary (15.5%), E.ON SE (15.5%), N.V. Nederlandse Gasunie (9%) and GDF SUEZ (9%). (Nord Stream, (2014))

Gazprom approved the project’s schedule for construction in 2002 and in the following three years the basis of cooperation, as well as financing was finalized. According to plans it would consist of two 48-inch pipelines laid parallel to one-another, with a capacity of 27.5 bcm/a each (a total of 55 bcm/a). The pipeline system, Figure 1., was

6 Wintershall’s activities are heavily intertwined with Gazprom through joint ventures, such as Wingas or Achimgaz. (Luvsan-Ochiriyyn, (2011))
to consist of a Russian onshore section (917 km), an offshore section running in the Baltic Sea (1,223 km) and a German onshore section of two transmission pipelines, connecting it to the German gas infrastructure. (Kirk & Dobberstein, (2009)) The offshore section, Figure 3., runs through Russian territorial waters, a Russian economic zone, a Finnish economic zone, a Swedish economic zone, Danish territorial waters, a Danish economic zone, a German economic zone and German territorial waters. (Nord Stream, (2014))

Figure 3. - The route of Nord Stream

2.6. Regulatory and financial obstacles

Financially the project did not run into serious difficulties. Initially it was estimated to cost €5 billion; however this increased to €7.4 billion in 2008 without the cost of financing, when included, total costs amounted to €8.8 billion. A 50% increase in the project’s cost is significant, however as stakeholders financed 30% of this, whilst banks and financial institutions funded the remaining 70%, the hurdle was overcome quickly with a strong commitment to building the pipeline already made.

When Nord Stream was initiated, very few compliance issues rose. It met the necessary criteria of United Nations Convention on the Law of Sea (Whist, (2008)), although the project itself was somewhat stalled when multiple countries asked for the
reconsideration of the route, or the possibility of an on-shore pipeline, due to the high-risks in the Baltic Sea. Finland and Sweden were the most reluctant to allow construction, however following the Environmental Impact Assessment (EIA) both states complied. (Andrew, (2009)) (Nord Stream, (2009)) (Luvsan-Ochiriyin, (2011))

Nord Stream was also granted Trans-European Network (TEN) status in 2000, which was re-confirmed in 2006, showing that the project creates cross-border transport capacities, ensures sustainability and provides energy security. (Gazprom, (2014d)) Although, TEN-E status does not necessarily mean that a project will be developed regardless of outcomes, it does show that the Members of the European Parliament generally support it. German Chancellor Angela Merkel, although less pro-Russian, when compared to former-Chancellor Schröder, has also been supportive of Nord Stream. Due to the involvement of Wintershall and E.ON energy lobby in Germany has also promoted the project.

2.7. Concerns regarding the construction of Nord Stream

Numerous points of concern had surfaced regarding Nord Stream on behalf of the EU Members involved. The most highly disputed questions were:

- Growing European energy-dependency and consequently an increase in Russian political influence.
- Nord Stream providing an excuse for increased Russian military presence in the Baltics. (Robert L., (2008))
- The involvement of former German Chancellor Gerhard Schröder as the Chairman of the board of Nord Stream AG; his strong ties and noted friendship with President Vladimir Putin has raised concern about distinguishing public and private affairs, thus the interests of Germany. (BBC, (2005))

2.8. Construction of the pipeline

Following the detailed planning phase, environment impact assessment and approval from affected countries, the construction of the pipeline started in April 2010 and was completed in accordance with the preliminary schedule of 30 months. The first string was commissioned on 8 November 2011, with commercial supplies starting that very day, whilst the second string was completed on 8 October 2012. (Gazprom, (2014d))
2.9. Regulation and compliance

The basis of EU regulation aimed at energy-related matters was put into effect in 1998, through the European Commission’s First Energy Package and with Directive 98/30/EC, guidelines were provided for developing European natural gas markets. This remains to be the foundation of legislation, being repealed first by Directive 2003/55/EC and then by Directive 2009/73/EC. These documents emphasize the necessity of facilitating an environment for a liberal market to develop, to provide the necessary regulatory framework and enhancing the transparency of this formerly very secretive sector, with directives ultimately leading to the development of a fully-integrated European gas and electricity market. (European Parliament & Council of the European Union, (1998)) (European Parliament & Council of the European Union, (2003)) Due to the nature of directives, as opposed to e.g. regulations, results in sluggish implementation of measures on behalf of Member States, have often lead to compliance issues and disputes. (Boersma et al., (2014))

The first steps to transport Russian gas directly to Germany were taken in 1997, prior to either Energy Packages; however as Nord Stream moved forward the First Energy Package was introduced containing the first directives regarding natural gas. Due to the pipeline’s sluggish progress, the Second and Third Energy Packages were both introduced before construction was completed. Because the project was approved prior to the introduction of 2009/73/EC, this Directive had little effect on the construction itself, but does have regulatory functions on current operations of the pipeline.

Directives 98/30/EC & 2003/55/EC

Directive 98/30/EC was aimed to establish the groundwork necessary to gradually liberalize the gas market within the European Union. Prior to this, in the 1990s, most natural gas markets were vertically integrated monopolies. The EC decided to clearly distinguish competitive (e.g. supply to customers) and non-competitive parts of the industry (e.g. operation of the networks), allow third parties to gain access to available infrastructure and introduce independent regulators to monitor the sector. (European Parliament & Council of the European Union, (1998))

Directive 2003/55/EC set to achieve a truly competitive internal gas market within the EU, by liberalizing Member States’ retail natural gas markets. In practice liberalization of markets varied between members, but by 1 July 2007 all industrial clients and
domestic customers had the freedom to choose their supplier. The measures taken by Member States to meet obligations increased competitiveness and transparency in the sector, introduced market-based pricing mechanisms and bolstered security of supply. (European Parliament & Council of the European Union, (2003))

A preeminent initiative of the EC published in the aforementioned directives is the unbundling of transmission system operators, in article 9 of 2003/55/EC: “Where the transmission system operator is part of a vertically integrated undertaking, it shall be independent at least in terms of its legal form, organization and decision making from other activities not relating to transmission. These rules shall not create an obligation to separate the ownership of assets of the transmission system from the vertically integrated undertaking.” (European Parliament & Council of the European Union, (2003), p. 8). Unbundling therefore aims to disable the formation of vertically integrated firms, which lead to monopolies; the reason behind this is that a vertically integrated company, which manages production activities, owns the transit system and sells natural gas, aims to cement its market position by not allowing third parties to use its existing infrastructure. On contrary, if unbundling has been implemented the transmission system operator will look to sell its available capacities without discrimination, in-line with the EC’s aim to promote free trade. This directive goes hand-in-hand with Third Party Access (TPA), another accentuated point of the EC’s directives: “Member States shall ensure the implementation of a system of third party access to the transmission and distribution system…” (European Parliament & Council of the European Union, (2003), p. 11)

**Directive 2009/73/EC**

As a part of the Third Energy Package the European Commission introduced Directive 2009/73/EC, which aimed to enhance the rate measures were implemented to create an internal energy market. The Directive published was primarily based on the underlying concepts and notions of directives 98/30/EC and 2003/55/EC, however it provided stronger guidelines regarding the role national regulatory authorities are to play and how they are to cooperate with the Agency for the Cooperation of Energy Regulators (ACER), as well as requirements linked to Third Party Access, albeit specifics of regulated TPA were to be determined by the domestic regulatory authority and unbundling, with the latter to be executed in Member States by 3 March 2012. (European Parliament & Council of the European Union, (2009))
TPA exemption

The anomaly that has occurred, with respect to TPA and unbundling, is the development of the natural gas grid. Incentives are scarce for a firm like e.g. Gazprom to develop its existing, or build new infrastructure from its own capital, which it would then have to share with competitors. This situation does look to change with the development of the Energy Union, a key initiative of the EC, which would propose EU-funded infrastructure development projects, leveraging financing from the European Central Bank, amongst other EU bodies. (EC, (2015))

Exemptions from TPA may be granted by the EC if a project meets specific criteria stated in the energy packages; this condition is primarily linked to the mitigation of supply disruption risks. This was the case with Nord Stream and Opal pipelines transporting gas from Russia to mainland Germany, following which it branches of to the Czech Republic and Slovakia, through the Gazelle pipeline, enhancing the supply-security of numerous countries in central Europe.

The TPA status of Opal and Gazelle has been under constant scrutiny; Gazprom has lobbied for full exemption status, which was granted temporarily, but has since been revised to allow 50% of its capacities to TPA. Since this measure was taken, only a fraction of freed capacities have been used by third parties, leading to the underutilization of Nord Stream. This decision should be reconsidered amidst the Ukrainian crisis, when Ukraine receives very little or no gas supplies directly from Russia. (Pirani et al., (2014)) (IEA, (2014c))

2.10. The economics of Nord Stream

Primarily three factors have been taken into account when modeling the economic feasibility of Nord Stream. The lower transit costs compared to gas pumped through Ukraine, its effect as leverage regarding Ukrainian transit prices and its role as insurance for supply disruptions in Ukraine. (Chyong et al., (2010)) have modeled scenarios based on the aforementioned factors in addition to the change in natural gas demand in the EU. The conclusion was that even amongst declining consumption in Europe, Nord Stream is a viable project, which is not destined to portray the implementation of political power, but its net present value (NPV) is positive in all scenarios modeled. The underlying reason is that natural gas exported to Europe from Russia is produced on the Yamal peninsula, from where Nord Stream is a shorter route
to Germany, when compared to the Brotherhood-pipeline.

**Figure 4. – The utilization of Nord Stream in-between 2013-2014**

![Utilization of Nord Stream (2013-2014)](image)

Source: (IEA, (2014c))

A central factor in these calculations is the utilization of the pipeline. In the aforementioned model the authors calculated with a utilization rate of approximately 75%. This is much higher than the current value of approximately ~50%; for the project to be economically viable it is crucial for Gazprom to have the Opal pipeline become an exemption of TPA, allowing gas flows to substantially increase. Larger volumes of gas delivered through the pipeline would increase its value according to (Chyong et al., (2010)), as Gazprom would be selling the same quantities to Germany, but would not have to ship supplies through Belarus or Ukraine, reducing transit fees paid to the ruling governments and shipping fees, stemming from the shorter route to Germany.

### 2.11. Role in shaping Germany’s energy sector

From a German perspective, the role of Nord Stream lies in diversifying import routes and decreasing reliance on gas flowing through Ukraine. It did not have a substantial impact on domestic pricing. It has also not provided Germany additional leverage regarding the renegotiation of long-term contracts, as the gas pumped through it does not involve an alternative supplier, i.e. it does not introduce additional competition.

From a Russian perspective Nord Stream has a key role in mitigating losses from halts of, or disruptions in natural gas supplies to Gazprom’s Western European markets, which account for a significant portion of the enterprise’s revenue.
3. South Stream

3.1. Overview of affected countries (2013)

Table 1. – Overview of countries affected by South Stream

<table>
<thead>
<tr>
<th></th>
<th>BG</th>
<th>RS</th>
<th>HU</th>
<th>SI</th>
<th>AT</th>
<th>HR</th>
<th>BA(^7)</th>
<th>GR</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPES (MMTOE)</td>
<td>16.76</td>
<td>15.06</td>
<td>22.74</td>
<td>6.86</td>
<td>33.76</td>
<td>7.83</td>
<td>6.97</td>
<td>24.36</td>
</tr>
<tr>
<td>Gas consumed (MMTOE)</td>
<td>2.39</td>
<td>1.87</td>
<td>7.71</td>
<td>0.69</td>
<td>7.01</td>
<td>2.28</td>
<td>0.23</td>
<td>3.24</td>
</tr>
<tr>
<td>Gas % of TPES</td>
<td>14.26</td>
<td>12.42</td>
<td>33.91</td>
<td>10.06</td>
<td>20.76</td>
<td>29.12</td>
<td>3.30</td>
<td>13.30</td>
</tr>
<tr>
<td>Ingenious Production (MMTOE)</td>
<td>0.22</td>
<td>0.42</td>
<td>1.54</td>
<td>0.003</td>
<td>1.12</td>
<td>1.51</td>
<td>0</td>
<td>0.006</td>
</tr>
<tr>
<td>Imports from RU (MMTOE)</td>
<td>2.61</td>
<td>1.8</td>
<td>5.4</td>
<td>0.45</td>
<td>4.68</td>
<td>0.18</td>
<td>0.27</td>
<td>2.34</td>
</tr>
<tr>
<td>Dependency % on RU gas</td>
<td>~100</td>
<td>96.26</td>
<td>70.04</td>
<td>65.22</td>
<td>66.76</td>
<td>7.89</td>
<td>~100</td>
<td>72.22</td>
</tr>
<tr>
<td>Dependency % on RU gas in TPES</td>
<td>15.57</td>
<td>11.95</td>
<td>23.75</td>
<td>6.56</td>
<td>13.86</td>
<td>2.30</td>
<td>3.87</td>
<td>9.61</td>
</tr>
<tr>
<td>No. of transit pipelines</td>
<td>1</td>
<td>1</td>
<td>4(^8)</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>1(^9)</td>
<td>2</td>
</tr>
<tr>
<td>LNG terminals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>


\(^7\) Data for Bosnia and Herzegovina is from 2012.

\(^8\) Including the SK-HU interconnector set to be fully operational in early 2015.

\(^9\) Additionally a small capacity distribution pipeline delivers gas between RS-BA.
**Bulgaria**

Domestic production of natural gas is negligible, whilst consumption is set to increase, as the ruling government plans to decrease the role of coal and oil in TPES to meet European emission requirements. Bulgargaz, the state-owned company, holds a monopolistic position on the supply-side of the natural gas sector. It imports through long-term contracts signed with Gazprom; the most recent was signed in 2012 regarding the importation of 2.8 bcm/a for 10 years. Bulgaria also plays an important role in transiting Russian gas to Turkey and Southern Europe, with an agreement extended until 2030, involving the transit of 18 bcm/a. As a form of compensation for transits in 2013 Bulgaria received a third of its supplies free and a 20% price discount on gas.

Albeit receiving beneficial conditions from Gazprom, Bulgaria has looked to establish alternative gas import routes. The planned GR-BG and TR-BG interconnectors can play substantial roles in diversifying import sources, by allowing natural gas to flow from Azerbaijan. These projects will not only increase security of supplies, but also provide leverage during the future renegotiation of natural gas import terms. (Enerdata, (2013a))

**Serbia**

Serbian TPES has been constantly growing in the past decade and to meet the strict emission requirements of the EU, Serbia is planning to replace oil and coal power generation facilities with gas power plants. State-owned Srbijagas operates 97% of the gas network in Serbia and 72% of the distribution network. This is set to change, with plans to adapt regulation in-line with the EU’s energy packages. In December 2011, Srbijagas signed a 10-year contract with Gazprom to import up to 5 bcm/a at US $525/tcm, however has received discounts as its consumption was lower. The contract also allows the yearly negotiation of gas prices, which have led to lower US$ 421/mcm prices in 2012 and projected to have further declined in 2013 to a US$ 380-390/mcm range.

The lack of natural gas importation routes has and still can cause severe disruptions in Serbia, as was the case during the 2009 gas crisis. EBRD backed projects are in the works, with a planned interconnector to Bosnia and Herzegovina, Bulgaria and Romania. (Enerdata, (2013b)) (Savic, (2013))
**Hungary**

Consumption has shown a declining trend in the recent past and according to estimates of the government, consumption will stabilize between 8-9 bcm/a. (IEA, (2011)) Domestic production is relatively low (approximately 2 bcm/a), therefore dependency on imports is high. (BP, (2014)) (Eurostat, (2014))

Hungary’s cooperation with Russia, linked to the importation of natural gas began in 1975, Panrusgaz Gas Trading Plc. being the sole proprietary of conducting trade. Gas is delivered through pipelines via Ukraine and Austria, based on a long-term contract signed in 1996. This agreement will expire in 2015, but as Hungary did not consume all the contracted gas, Gazprom has agreed to supply the remaining surplus, which will cover demand until 2018-2019. (Gazprom, (2014a)) (Leifheit, (2015)) Hungary has one of the largest storage capacities in the region totaling 4.4 bcm granting the country a central role in a scenario involving supply-halts. (IEA, (2011))

**Slovenia**

Natural gas plays a relatively minor role in Slovenia’s TPES, with coal, oil and renewables being the main pillars of energy production. (Eurostat, (2014)) Geoplin d.o.o., of which the Republic of Slovenia owns a 39.6% stake is the primary importer of natural gas. It has signed a contract until 2018 with Gazprom, which enables the delivery of a maximum of 830 mcm/a. (Gazprom, (2014a))

International projects aimed to ensure security of supply are a transmission pipeline, from the planned LNG terminal on the Croatian island of Krk to Slovenia and the SI-HU bi-directional interconnector. (EC, (2014))

**Austria, Croatia, Bosnia and Herzegovina and Greece**

These countries would be affected by South Stream to much smaller extent, as they would not be transit countries, but could opt to construct a branch from the main route to deliver natural gas to their domestic markets.

Austria, having bi-directional interconnectors with the Czech Republic, Germany, Hungary, Italy and Slovakia is well integrated into the European gas market. Additionally, the trading hub in Baumgarten plays a key role in forwarding natural gas to Western Europe from Russia, thus regardless of its relative high dependency on gas, the risks linked to supply disruptions are low. (IEA, (2014b)) (IEA, (2014c))
Croatia has managed to maintain natural gas production sufficient to supply most domestic consumers. The LNG regasification terminal in Omisalj county on the island of Krk, with a planned capacity of 10-15 bcm/a, is a key factor in insuring supply-security in not only the country, but the entire region. (Eurostat, (2014)) (EC, (2014))

Bosnia and Herzegovina is in a vulnerable situation, which was highlighted by the consequences of the supply disruptions in 2009. Although natural gas plays a seemingly small role in TPES, consequences of supply-cuts can be devastating, since only one import route is available towards BIH, and some end-consumers do not have other heating methods at their disposal. This issue has not yet been resolved; therefore a branch of South Stream directed towards BIH would have been very beneficial for the country. (EBRD, (2007)) (IEA, (2014c))

Greece, being moderately dependent on natural gas, receives a large portion of its natural gas imports from Russia. An alternative entry point towards the country is the Revithoussa LNG terminal, however it has a very small capacity at about 0.5 bcm/a. (DEPA, (2015)) Additionally Greece will have the opportunity to import natural gas from Azerbaijan, which will be delivered through the Trans-Adriatic Pipeline (TAP). Construction of this project is planned to begin in 2016.

**3.2. Energy Stress Test 2014**

As a response to ongoing military intervention in eastern Ukraine, the EC decided to conduct a stress test amongst Member States and Energy Community Contracting Parties to model the potential effects of supply disruptions. Multiple scenarios were examined, with the rate of cooperation, severity of supply-cuts and winter conditions being the key variables during a 6 month period in the winter of 2014/2015. The outcomes, see *Figure 5.*, in a case of an average winter and cooperation between EU countries, showed that most of the countries potentially involved in South Stream would have to face severe challenges.
Figure 5. - “Maps of likely supply interruptions – before national measures – in February at the end of the 6-mont Russian gas supply disruption scenario in cooperative and non-cooperative scenarios under average winter conditions.” (EC, (2015), p.6)

As seen on the maps, the darker the red, the more severe the disruptions are projected to be. Even under cooperative circumstance Bulgaria, Serbia, Bosnia and Herzegovina and Hungary would have to face disruptions affecting 20%-60% of supplies, with Greece also being affected by a non-negligible ~20%. In the case of a non-cooperative scenario Bulgaria, Serbia, as well as Bosnia and Herzegovina would have to face supply cuts ranging between 40% and 100%, whilst Hungary would be affected to a slightly less extent at approximately 30%. Conditions would be even more drastic with colder-than-average winter conditions.

Supply disruptions would lead to the quick depletion of storage capacities, thus other measures must also be mapped out. Whilst LNG would help subdue effects, it would generate a sharp rise in prices\(^{10}\). An increase in prices would lead to approximately 10% of the market shortly switching to alternative fuels. If disruptions were to continue, market conditions would then force other players to follow. As a last resort, authorities, to protect some consumers would implement non-market-based measures. (EC, (2015))

Although this test was conducted last fall, it remains to be relevant as supply-disruptions affecting supplies through Ukraine or simply cut-offs at the source cannot be out ruled. As we ease out of the 2014/2015 winter without any major disruptions, the focus must be shifted to upcoming winters and how overall risks can be decreased with cooperation and infrastructure developments.

\(^{10}\) The EC did not assess the effects of disruptions on prices.
3.3. Projects of Common Interest (PCI)

The European Commission has determined projects, which play a key role in insuring the security of energy supplies. A substantial portion of these will be executed in the countries directly affected by South Stream, as the eastern and southeastern states of the EU lack interconnectivity, when compared to their western counterparts. The list of PCI’s will be revised and updated on a bi-yearly basis and will also help in developing an Energy Union.

Table 2. - Projects of Common Interest affecting the region

<table>
<thead>
<tr>
<th>Countries</th>
<th>Project</th>
<th>Description</th>
<th>Planned completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG/TR</td>
<td>Interconnector</td>
<td>First phase: 3-5 bcm/a</td>
<td>2014&lt;sup&gt;11&lt;/sup&gt;</td>
</tr>
<tr>
<td>HU</td>
<td>Városföld-Ercsi-Győr pipeline + Southern Corridor</td>
<td>Reverse-flow between HU - AT. New RO-HU route.</td>
<td>2015-2016/2018</td>
</tr>
<tr>
<td>HU/RO</td>
<td>RO - HU reverse flow</td>
<td>-</td>
<td>?</td>
</tr>
<tr>
<td>HU/RO</td>
<td>EU Section of the AGRI project</td>
<td>8 bcm/a pipeline connecting Constanța LNG terminal to HU</td>
<td>?</td>
</tr>
<tr>
<td>HU/SI</td>
<td>HU – SI interconnector</td>
<td>-</td>
<td>2018</td>
</tr>
<tr>
<td>GR/IT</td>
<td>Trans Adriatic Pipeline</td>
<td>TAP pipeline GR-AL-IT</td>
<td>2018</td>
</tr>
<tr>
<td>IT/GR</td>
<td>GR-IT Interconnector</td>
<td>Import to Italy max. 20 bcm/a</td>
<td>2017</td>
</tr>
<tr>
<td>SK/HU</td>
<td>SK - HU interconnector</td>
<td>-</td>
<td>2015</td>
</tr>
</tbody>
</table>

Source: (EC, (2014))

<sup>11</sup> The project is facing major delays, with a final investment decision not yet made.
3.4. **Drivers leading to the South Stream initiative**

It would have been, and remains to be an objective of the EC to ensure supplies from alternative sources, as opposed to Russia, however the next best option is providing alternative routes of natural gas importation in order to mitigate risks related to political or diplomatic hiccups. Actions of great vehemence taken by Russia to eliminate political risks are not unprecedented, as even prior to President Putin’s governance, the Kremlin made a relatively quick transition to transporting oil by sea, instead of delivering it to Europe through pipelines in Belarus or Ukraine. (Dieckhoener, (2012)) (Deák, (2012))

With Nord Stream, aimed at increasing the supply-security of Germany and Western Europe underway, Central and Eastern Europe (CEE), as well as southern European states also looked to decrease risks related to the importation of natural gas.

3.5. **The beginning of South Stream**

The first agreement focusing on South Stream came on 23 June 2007, when the Chief Executive officer of Eni, Paolo Scaroni, and Vice-Chairman of Gazprom, Alexander Medvedev, signed a memorandum of understanding (MOU) for the construction of the pipeline. This was followed by an agreement to establish a joint company and to commission feasibility studies. South Stream AG was incorporated, by Gazprom and Eni in 2008 and was set to be responsible for the offshore (Black Sea) section.

Between 2008 and 2011 Russia signed the necessary intergovernmental agreements with Austria, Bulgaria, Croatia, Greece, Hungary, Serbia and Slovenia. Alongside these, bilateral agreements on cooperation with the authorized national companies were also signed; see Table 3. and Figure 6.

*Table 3. – Firms established to construct South Stream*

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Russian interest</th>
<th>Local interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Stream Bulgaria</td>
<td>BG</td>
<td>Gazprom (50%)</td>
<td>Bulgarian Energy Holding (50%)</td>
</tr>
<tr>
<td>South Stream Serbia</td>
<td>RS</td>
<td>Gazprom (51%)</td>
<td>Srbijagas (49%)</td>
</tr>
<tr>
<td>South Stream Hungary</td>
<td>HU</td>
<td>Gazprom (50%)</td>
<td>(Since 2012) MVM (50%)</td>
</tr>
<tr>
<td>Name</td>
<td>Country</td>
<td>Russian interest</td>
<td>Local interest</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>South Stream Slovenia</td>
<td>SI</td>
<td>Gazprom (50%)</td>
<td>Plinovodi (50%)</td>
</tr>
<tr>
<td>South Stream Austria</td>
<td>AT</td>
<td>Gazprom (50%)</td>
<td>OMV (50%)</td>
</tr>
<tr>
<td>South Stream Greece</td>
<td>GR</td>
<td>Gazprom (50%)</td>
<td>DESFA (50%)</td>
</tr>
</tbody>
</table>

Source: (Gazprom, (2015c))

Figure 6. - The Planned route of South Stream and its shareholders

Source: (Gazprom, (2015c))

In September 2011 the shareholders’ agreement for the offshore section of the pipeline was modified, as Eni gave up 30% of overall shares, allowing French EDF and German Wintershall Holding (a subsidiary of BASF) to acquire a 15%-15% stake.

3.6. The route of South Stream

In order to offset the decline of production in the Volga region and to ensure the additional capacity projected to be delivered through South Stream, Russia looked to develop its gas fields on the Yamal-peninsula and thus construct infrastructure to connect already available pipelines to these production sights. The Russian domestic gas transmission system would have required an additional 2506.2 kilometers of linepipe, alongside 10 compressor stations. The gas was proposed to be pumped south to the Beregovaya Compressor Station on the bank of the Black Sea, where the offshore section of South Stream would have begun. It was planned to span 930 kilometers under
the Black Sea, through the economic zones of Russia, Bulgaria and Turkey. The onshore sections of South Stream were planned to be built through Bulgaria, Serbia, Hungary and Slovenia, ending in Tarvisio, Italy. Branches were also planned to extend to Austria, Croatia, Bosnia and Herzegovina and Greece. (Gazprom, (2015c))

3.7. Specifications of the pipeline

The offshore pipeline system was to consist of four pipelines, with an individual capacity of 15.75 bcm/a, adding up to a total capacity of 63 bcm/a. Their diameter was set to be 32 inches, with 39 mm thick walls, designed for 27.73 MPa working pressure and to be laid in the Black Sea at a maximum depth of 2250 m. Onshore pipelines in Europe were planned to have a minimum capacity of 10 bcm/a, requiring 8 compressor stations. (Deák, (2012)) (Gazprom, (2015c)) (LNG World News, (2011))

The financial specifications of South Stream were modified multiple times as it constantly turned out that forecasts had been too low. Independent estimates published in 2013 suggested that the cost of the project would exceed EUR 50 billion when the Bovanenkovo-Ukhta-Pochinki line, the Southern Corridor and South Stream is included. The latter section was projected to cost approximately EUR 16.5 billion, however this was revised in 2014, with the offshore sections’ expenses surpassing the EUR 10 billion mark. (Natural Gas Europe, (2014)) (East European Gas Analysis, (2013))

3.8. The economics of South Stream

In (Chyong, Noel & Reiner, (2011)) the net present value (NPV) of South Stream is modeled by taking three decisive factors into consideration: gas demand in Europe, the number and the severity of transit interruptions through Ukraine, as well as the price of transit fees. The model assumes the functioning of the pipeline for 25 years.

Three gas demand scenarios were taken into account, with the lowest assuming a decrease of 0.1% in consumption, the highest a growth rate of 2.07%, whilst the base case a rate between 0.7% - 0.8% growth, based on the region. Gas prices were assumed to increase at a yearly rate of 1.4% in the high and base cases, whilst at a rate of 0.3% in the low consumption scenario. Two disruption cases were modeled, with the moderate case implying 5 disruptions per year lasting 3 weeks, whilst the severe case would lead to 10 disruptions lasting 6 weeks. Three transit fee assumptions are also built into the model with the lowest transit fee being US$ 0.5 per tcm/100km, the fee under the current contract US$ 2.7 per tcm/100km, whilst a high transit fee assumed to reach
US$ 5.11 per tcm/100km. Assumptions for the price of the project (excluding the Russian section) ranged between US$ 23 billion and US$ 32 billion, the lower cap of value is slightly higher than the estimates of Gazprom, whilst the maximum cap is much higher.

The findings of this model were that very little justifies the construction of South Stream. Gas demand in Europe would have to grow by over 2% per annum until 2030 in order for the economic value of this investment to be positive, albeit in this case rather marginally (US$ 1.1 billion during the 25 years considered); a context of such, although not unprecedented in the past, as of now does not seem likely. Moreover, transit interruptions do not justify construction either, as the NPV of the project remains to be negative in the scenarios modeled.

The paper concluded that only if Ukraine were to substantially increase its transit fees, would the value of South Stream range between US$ 1 billion and US$ 10 billion, depending on the price hike and other factors affecting outcomes. “Thus, as insurance against future bargaining from Ukraine, South Stream has far greater value than its value as insurance against transit interruptions and/or its value as a demand-driven project. The expert analysis and media commentary concerning Gazprom’s investment in South Stream miss this important dimension. Gazprom’s bypass strategy is not primarily about meeting future demand in Europe while eliminating transit risks. This strategy is about eliminating Ukraine’s transit monopoly while preserving the value of Ukraine’s gas market as high as possible without risking its gas supplies to Europe.” (Chyong et al., (2011), p. 24)

When considering the economics of South Stream the indebtedness and liquidity of Naftogaz, the vertically integrated state-owned firm responsible for natural gas related activities in Ukraine, must also be taken into account. This has been a recurring problem and was ultimately amongst the triggers which led to the disruptions in 2006 and 2009. It was claimed by Gazprom in early 2015 that Naftogaz, operating with a substantial 29.46 billion hryvna deficit in 2012, owed the Russian gas giant a total of US$ 2.196 billion for the gas supplied. (Gazprom, (2015a))

It is unclear how this debt will be settled, as the problem is rooted in the ability to collect payments from consumers deteriorated during the crisis, alongside the general financial instability present in Ukraine, a direct consequence of the 2007-2008 global
financial crisis. The primary options to restructure debt being either including Naftogaz’s liabilities into any ongoing negotiations regarding a loan with western powers and financial institutions, or by borrowing money from Russia. Considering the current political situation, the latter seems unlikely.

An alternative option, already been discussed and weighed into the equation by Alexey Miller, is to transfer the ownership of the Ukrainian natural gas pipeline infrastructure to Gazprom. Kiev estimates the pipelines’ value at approximately US$ 20 billion, with restoration costs in Ukraine ranging between US$ 2-8 billion, albeit some estimates suggest a maximum sum of US$ 10.5 billion. The reconstruction of the Russian part of the pipeline amounts to approximately US$ 4 billion, leading to a total of US$ 14 billion. Even with the substantial investment needed in the Ukraine section of the pipeline, due to the much shorter route it remains to be a cheaper alternative to pumping gas towards central Europe, as opposed to South Stream. The question however remains as to who should be the financier of the reconstruction-related expenses. Considering Naftogaz’s and Ukraine’s financial situation it seems unlikely at this point that either of these parties would be able to provide the necessary funding, leaving the task to their Russian counterparts. If the Ukraine section of the pipeline were to become a Gazprom asset, this question would be resolved and it is likely, although not definitive that natural gas related political confrontation between the two states may ease, improving their overall diplomatic relations.

From a Ukrainian perspective natural gas transits are a key bargaining chip for Kiev when dealing with Russia. Moreover, it increases the EU’s interests in backing Ukraine when supply-disruptions are at risk, therefore handing over the ownership of infrastructure would leave Ukraine in a much more vulnerable position when shaping its bilateral relations with its eastern counterpart. (Pirani et al., (2014)) (Deák, (2012))

3.9. Feasibility of the project

South Stream had to primarily face setbacks linked to the European Commission’s goal to implement the directives published in the Third Energy Package. Third Party Access (TPA) caused the most controversy as Gazprom insisted on TPA exemption status, since the project would have been financed by the Russian firm. The initial cost of the project was revised numerous times, thus the benefit and the rationality behind the investment was a topic of heated debate; most assessments pointing out that South Stream is primarily politically motivated by the Kremlin, aimed to increase Russian
influence in the region, as well as cementing Russian presence and hegemonic status in the European energy sector. This would go against a goal of the EC to decrease dependency on Russia. The perception of the EC was highly contested by numerous countries directly involved in the project, such as Bulgaria, Hungary or Serbia, as they still saw South Stream to be beneficial.

Regardless of the ongoing tug of war between Brussels and Moscow, countries involved proceeded with the project e.g. Bulgaria started the construction of the pipeline in the June 2013. This was contested and ultimately stopped by the European Commission due to breaches with EU energy market rules. (Oliver, Byrne, & Hope, (2014)) Another instance if such was when Austrian OMV’s CEO Gerhard Roiss signed a Memorandum of Understanding with Gazprom’s chief, Alexey Miller in April 2014, regarding the Austrian branch of the pipeline. (EurActive, (2014))

The opposition of the project on behalf of EU institutions peaked with the escalation of the Ukrainian crisis, resulting in the European Parliament’s non-binding resolution on 16 April 2014: “…takes the view that the South Stream pipeline should not be built, and that other sources of supply should be made available…” (European Parliament, (2014), §28). This came as a part of the sanctions aimed at Russia, as retaliation, following its role in the destabilization of eastern Ukraine. (European Council, (2014b)) (Boersma, (2014)) (European Parliament, (2014)) (European Council, (2014a)) (U.S. Department of State, (2014))

3.10. Effects of South Stream

If South Stream were built it would have had an impact on the diversification of import routes for numerous states in eastern and south-eastern Europe, i.e. it would have increased supply-security by providing an alternative route of importation for the countries involved. However, it must be noted that the project would not have insured stability in the near future, as seeing how it progressed, completion would have been unlikely prior to the end of this or the beginning of the next decade. Moreover, by delivering natural gas from Russia, overall reliance would not have decreased.

South Stream’s construction would have had a minimal effect on the pricing of natural gas in the region. Providing gas from the same source, it would not have been additional leverage for most countries, when bargaining contract points with Gazprom. It would have increased Russia’s influence in the region which may have led to opposition
regarding the EC’s aim to introduce transparent spot pricing mechanisms, instead of the oil-indexed pricing Gazprom prefers.

Transit fees are also amongst the factors Bulgaria, Serbia, Hungary and Slovenia would have benefitted from; either in the form of direct payments, ranging between US$ 0.5 per tcm/100km and US$ 5.1 per tcm/100km or through significant discounts in natural gas prices and/or additional volumes. However, as it is likely that the pipeline would have been underutilized revenue losses from transits are negligible.

Its cancellation still caused a stir, as a substantial amount of time and capital had already been invested. The current question leaders in the region have been asking, following the cancellation of Nabucco and shortly afterwards South Stream is: “What alternative option will allow us to diversify energy imports?”

**3.11. Energy Union**

At this point it is key to mention the European Commission`s initiative, announced on 25 February 2015, to create the Energy Union, an entity aimed to “… give EU consumers – households and businesses – secure, sustainable, competitive and affordable energy.” (EC, (2015), p. 2) The initiative came as a response to the arising situation regarding energy dependency, the souring of EU – Russia relations and consequently was influenced by the cancellation of South Stream, amongst numerous other factors. Fifteen action points were published to lay the framework for the Energy Union. From the natural gas markets’ perspective the following points would be of key importance:

- The full implementation of the Third Internal Energy Market Package.
- Diversification of gas supplies. The Commission will propose a resilience and diversification package and a comprehensive LNG strategy will also be prepared. The EC will work with member States to develop access to alternative suppliers.
- Contracts negotiated and signed will be overseen by the EC.
- Infrastructure will be developed. Projects of Common Interest will be constructed through available financial means, e.g. European Structural and Investment Funds and the future Fund for Strategic Investments to leverage necessary funding.
- Regulatory framework will be reinforced.
- EU energy cooperation with third countries will be developed, with the EU
aligning perspectives of Member States and speaking one voice on energy and climate issues.

The Energy Union has set out to achieve the ambitious goal of creating an internal energy market and aligning the energy strategies of Member States. This has been voiced as the most ambitious initiative by the European Union since forming the European Coal and Steel Community in 1951. The initiative would greatly improve the situation of the states most in need of assistance in diversifying energy imports, such as Bulgaria; however as neither Serbia nor Bosnia and Herzegovina are members, they remain to be in a difficult situation. (EC, (2015)) (The Economist, (2015))

3.12. Aftermath

With the cancellation of South Stream first announced by President Vladimir Putin on 1 December 2014, later confirmed by Gazprom on 9 December 2014, the affected countries looked to alternative solutions, most likely be executed under the umbrella of the Energy Union. President Putin however did announce that an MOU was signed with Turkey to strengthen energy-related ties. This would allow Turkey to become an energy-trading hub, with the planned development of a 63 bcm/a pipeline from Russia, an alternative project using many of South Stream’s already manufactured linepipe. The offshore and onshore sections would deliver gas to central-Turkey, with a branch also constructed to the Greece-Turkey border. Alexey Miller has suggested that from there onward European authorities be responsible for constructing the necessary infrastructure to transport Russian gas to Member States, implying the development of the Southern Corridor, a gas pipeline connecting central Europe with countries located on the Balkan peninsula.

Meanwhile the EC is looking to strengthen ties with alternative sources of import: Azerbaijan, Turkmenistan, Kurdistan and possibly Iran. Natural gas produced in these regions would also require transit through Turkey, showing how great a role Turkey will play in the European natural gas market. (Boersma et al., (2014)) (Boersma, (2014))

As an alternative source of natural gas, LNG should not be overlooked either, although due to the high prices present in Asian markets this option is not yet competitive when compared to Russian pipeline gas. It is however a great tool to increase supply-security and a form of leverage when negotiating contracts with Russia. To utilize this option,
not only are LNG regasification terminals necessary, but so is the infrastructure connecting the countries in the region, also highlighting the importance of PCI’s.

Currently only one LNG terminal is fully constructed in the region impacted by the cancellation of South Stream; this is located in Greece with a negligible capacity. The terminal in Omisalj, Croatia is awaiting final investment decision, when approved and constructed, it will boast an initial capacity of 10 bcm/a and is planned to be expanded to 15 bcm/a. Considering Croatia’s low domestic consumption of natural gas, a large portion can be forwarded to eastern and southern European States in need of supplies.
4. Comparison of Nord Stream and South Stream

4.1. Context

Regulatory

The key difference in the regulatory environment was the introduction of the EC’s Third Energy Package in 2009. This accentuated the importance of compulsory regulations on TPA pipelines and unbundling, making the latter mandatory by 2012. With Nord Stream’s preliminary planning already completed at this point and construction set to begin in 2010 it was unlikely to change the course of the project. Additionally, Opal was granted temporary TPA status, which was only recently revoked with the escalation of the Ukraine crisis.

As agreements to construct South Stream were signed from 2007 onwards, it was evident that the pipeline would be under the regulatory force of Directive 2009/73/EC, thus it would also need to file for TPA exemption status. Negotiations were ongoing, with Moscow requesting full exemption status, albeit even the most optimistic experts predicting a maximum exemption level of 50%. This means that 50% of the pipeline’s initial capacity was to be freed up for third parties; considering the investment Gazprom would have to commit to, this would result in substantial losses. (Yafimava, (2013)) (Bochkarev, (2015))

Geopolitical

Germany and Russia have constantly aimed to develop their trade, as both provided strategically important exports to one another; moreover during the chancellorship of Gerhard Schröder diplomatic ties were also very friendly. This did not fundamentally change with Angela Merkel taking office, however did slightly loosen. Minor hiccups did not affect the projects planned; however the holdups and the effect of the Third Energy package upon South Stream did aggravate relations between Brussels and Moscow, influencing bilateral relations between Germany and Russia.

The change for the worse came in 2014 following Russia’s illegal annexation of Crimea and its involvement in the destabilization of eastern Ukraine. Amidst the erupted turmoil the European Union and the USA backed Ukraine, by introducing economic sanctions set to weaken the Russian economy and by providing non-lethal equipment for the Ukrainian military. Although imposing sanctions led to the further deterioration of relations, it was and remains to be a primary aim of the EU to resolve the issue at
hand; in accordance with this, numerous peace talks were held, with a ceasefire agreement signed in Minsk on 12 February 2015. Nonetheless, South Stream had already been cancelled in December 2014.

4.2. State of the Russian Economy

“The Russian Federation controls 50.001% of Gazprom’s shares. The government through its representatives on the company’s board exercises control over its cash flows, financial plan, and the investment program.” (Marketline, (2014), p. 7) This is a two-way street, with revenue, royalties, taxes etc. of Gazprom and other firms in the hydrocarbon industry playing a substantial role in the Russian economy, by generating a large portion of governmental revenues. (Stern, (2014))

*Figure 7. – Europe Brent Spot Prices (2008 – 2015)*

The recent shale boom taking place in the USA, alongside the ramping up of Libyan production has added large volumes of oil on the supply-side of the market, driving prices lower in 2014. A price drop of ~40%, as seen on *Figure 7.*, has played a key role in the contraction and the negative outlook of the Russian economy, with the country’s financing and growth heavily intertwined with commodity prices. The decrease in hydrocarbon-related income, paired with Russia’s involvement in Ukraine has lead to the plummeting of the Rubel, a decline in GDP growth, the ruling government running a structural deficit (*Figure 8.*), stock markets having to take severe hits by investors and the overall credit rating of Russia being cut to junk bond category, an action

Figure 8. – Russia’s GDP Growth and the Government’s Structural Balance

The economy being in such a bad shape, with the full-impact of the sanctions imposed not fully understood and the resolution of the Ukraine crisis still under debate, President Putin had to make decisions on which investments to pursue and which one’s should be scraped. The Kremlin must reconsider its expenses in order to maintain stability within the country and avoiding an economic tailspin, leading domestic dissatisfaction, ultimately escalating to protests and riots. With the planned Power of Siberia pipeline requiring a large initial investment in the natural gas sector, a pipeline spanning 4000 km, with a maximum capacity of 61 bcm/a, is estimated to cost approximately US$ 77 billion, it is unlikely that the Russian budget can afford multiple projects costing tens of billions euros.

During the time of Nord Stream’s construction the overall Russian economy was in much better shape, with positive outlooks. On contrary, current predictions are rather gloomy, making Gazprom and the Kremlin cautious regarding investment decision.
From a Russian perspective a pipeline aiming to diversify export markets and supplying 38 bcm/a to China, an energy-hungry economy looking to shift its coal-dependent TPES to an approach involving a greater percentage of electricity being produced with the use of natural-gas, can cement diversification and prosperity for the Russian gas sector in the near future. Whereas constructing South Stream, a project contested and opposed by Brussels, whilst having a negative value, does not seem to be a rational decision. (Gazprom, (2014c)) (Wishnick, (2014)) (Chyong, (2011))

4.3. Sensibility of the projects

Investment value

Considering the pipelines from a business perspective, the initiative to complete Nord Stream seems like a logical step, whilst in the case of South Stream multiple concerns can be voiced.

Nord Stream, albeit requiring a large sum of CAPEX, greatly decreases the route natural gas has to be pumped through to reach German markets, alongside an initial drop in the amount of transit fees Russia has to pay Ukraine. It also ensures access to Germany in the case of supply disruptions and has a positive value for Gazprom if utilization is increased.

South Stream on the other hand is much more difficult to justify, as the route of the pipeline system is much longer when compared to that of the Brotherhood pipeline. It would primarily be profitable if natural gas consumption would increase by a yearly rate of 2% or more, something highly unlikely as of now. It would play a role in insuring that Ukraine does not increase transit costs and does not use its gas transit infrastructure as a tool of political leverage. Even when considering all aspects the argument remains to be very shaky, as prices for all sections of the pipeline would be high, with the off-shore section being a forerunner in increasing costs with the waters in the Black Sea being very deep, making construction costly and difficult.

With the aforementioned points of argument all valid from an objective perspective, may it be noted that the complexity of the question is difficult to quantify, as Russia looks to prove a principle. This would involve the elimination of a third party, namely Ukraine, with which political confrontation has been ongoing in the past. The love-hate relationship between the two countries, deeply rooted in history, is difficult to overcome and resolve. If the construction of South Stream would not have been blocked it would
not have come as a surprise if the Kremlin would have been willing to pay the extra transit costs linked to the longer route, alongside the large sum of CAPEX the project required simply to eliminate Ukraine from the equation.

Supply-security

Nord Stream was an investment aimed to insure Russia’s direct access to its largest export market in Europe, Germany; whilst allowing Germany to receive natural gas without the threat of Russia-Ukraine disputes causing supply-disruptions. Through the Opal and Gazelle pipelines it also increases the supply-security of the Czech Republic and/or other countries in central Europe.

South Stream would have increased supply security in numerous countries, with its potential role being the most significant in Bulgaria, Serbia and potentially Bosnia and Herzegovina.

4.4. Outcomes

The consequences of Nord Stream’s construction were mostly positive for the countries involved or indirectly affected. The pipeline did not lead to substantial changes in gas prices or economic performance, but it did enable the creation of a more stable environment for economic players. The concerns regarding Nord Stream being a form of Russian leverage over Ukraine are offset due to the EU imposing TPA as a tool to deter supplies to the pipeline systems running through Ukraine. The pipeline did inevitably decrease Ukraine’s income from natural gas transit.

A concern of the EC regarding South Stream has been the growing influence of Russia in the energy sector. When compared to Gazprom’s deal with Germany it must be acknowledged that the states involved are much smaller, making them more vulnerable to growing Russian influence. Considering historical relations, this clearly portrays one of the underlying reasons for the ongoing tug of war between Brussels and Moscow. The construction of the pipeline would have most likely caused substantial transit fee related losses for Ukraine, as Russia has looked to eliminate the transit country’s role.
5. Conclusion

The context present during the construction of Nord Stream and the planned construction of South Stream has changed a great amount, albeit the underlying problem has remained to be the same, namely Europe’s energy dependency upon Russia. In 2010 the diversification of routes, by bringing Nord Stream online, decreased Europe's exposure to risks stemming from Russia-Ukraine conflicts by reducing gas transports through Ukraine from 80% to 50%. (Pirani et al., (2014)) This solved numerous problems for Western Europe, however left the CEE and southern European region vulnerable to shocks. To overcome this, South Stream, a project facing many hurdles before finally being cancelled, was initiated.

In Brussels, aiming to develop the integrated European gas market, decision-makers opposed South Stream as it was seen to be a tool for Russia to increase its influence in the region with a politically motivated project. Be that as it may, it would have provided an alternative import route for Bulgaria, Bosnia and Herzegovina, as well as Serbia, the states most vulnerable to supply-disruptions. However, numerous factors have provided preliminary indication that the project may be destined to fail. The development of regulatory framework in Europe, which looks to cement notions of a free market in sectors previously dominated by monopolies, the escalation of the geopolitical crisis in Ukraine, which despite a ceasefire has not come to an end, and the weak state of the Russian economy have all greatly contributed to Russia backing out of South Stream. Additionally, the investment itself has a contested value, accentuating its underlying purpose, to eliminate Ukraine from the Russian natural gas picture at all costs.

The hypothesis I assumed, “…that Nord Stream was constructed, due to its viability as a project and a friendly political climate, alongside which South Stream was cancelled as a result of the political turmoil between Europe and Russia.” – based on thorough analysis and comparison of the two projects is valid. The political climate has been decisive in determining the outcomes of these projects, which considering the huge amount of necessary investment may not come as a surprise. It is of key importance to emphasize that, albeit highly affected by politics, Nord Stream showed great potential from a business perspective, this, in the case of South Stream, was much smaller making it highly vulnerable to the ongoing tug of war between Brussels and Moscow.

The question that arises at this point is how things will move forward in the light of a protracted Ukraine crisis, the scraping of South Stream and the aim to form a European
Energy Union. The destabilization of Ukraine must be overcome with the use of diplomatic tools in order to stop ongoing battle; when resolved EU-Russia relations can once again normalize and both parties can return to a pragmatic cooperation. The cancellation of South Stream, does cause serious problems in the long-run for multiple states, however by taking mutual ground through and Energy Union the hurdles can be overcome by looking to alternative sources of supplies e.g. Azerbaijan, Iran or Turkmenistan, which can be delivered through Turkey and forward-pointing initiatives like the Azerbaijan-Georgia-Romania-interconnector. Moreover, as stated in some interpretations, South Stream was not cancelled, but deterred to Turkey and by constructing a branch to the Turkey-Greece border and by developing the Southern Corridor in Europe, Russian gas will be available for states directly affected by the cancellation of South Stream.
6. Literature


LNG World News (2011), Gazprom Says Large Diameter Pipe Purchases to Rise 30 Percent in 2011 (Russia), LNG World News. Available at:

Luvsan-Ochiryn, A. (2011), Nord Stream - Economical and geopolitical aspects of the project, Arcada. Available at:

Marketline (2014), OAO Gazprom SWOT Analysis, OAO Gazprom SWOT Analysis, pp.1–8. Available at:

Mearsheimer, J.J. (2014), Why the Ukraine Crisis Is the West’s Fault, Foreign Affairs, 93(5), pp.77–89. Available at:

Natural Gas Europe (2014), South Stream Offshore Cost Rises. Available at:


Oliver, C., Byrne, A. & Hope, K. (2014), Anger and dismay as Russia scraps $50 bn gas plan, Financial Times. Available at: http://www.ft.com/intl/cms/s/0/1a5954f0-7a41-11e4-a8e1-00144feabde0.html#axzz3UNEFC7QK [Accessed March 14, 2015].


Smeenk, T. (2010), Russian Gas for Europe: Creating Access and Choice. Underpinning Russia’s gas export strategy with Gazprom’s infrastructure investments, University of Groningen. Available at:


