DEVELOPING A NEW MARKET FOR RUSSIAN GAS
Policy Implications from Studying the Dutch Experience

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# List of Abbreviations

## Notations

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<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Bcm</td>
<td>Billion cubic metres</td>
</tr>
<tr>
<td>Mcm</td>
<td>Million cubic metres</td>
</tr>
<tr>
<td>Tcm</td>
<td>Trillion cubic meters</td>
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<tr>
<td>Mmbtu</td>
<td>Million British thermal units</td>
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<tr>
<td>Mtoe</td>
<td>Million tonnes of oil equivalent</td>
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## Governmental and intergovernmental organisations, ministries

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ARF</td>
<td>ASEAN Regional Forum</td>
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<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<tr>
<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
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<tr>
<td>GECF</td>
<td>Gas Exporting Countries Forum</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>METI</td>
<td>Ministry of Economy, Trade and Industry (Japan)</td>
</tr>
<tr>
<td>MOCIE</td>
<td>Ministry of Commerce, Industry and Energy (Republic of Korea)</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation of Economic Cooperation and Development</td>
</tr>
<tr>
<td>SCO</td>
<td>Shanghai Cooperation Organisation</td>
</tr>
<tr>
<td>UNDP</td>
<td>United National Development Programme</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
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<td>WTO</td>
<td>World Trade Organisation</td>
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## Research institutions and organisations

<table>
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<tbody>
<tr>
<td>ANGI</td>
<td>Agentstvo Neftegazovoi Informacii, Oil and Gas Information Agency</td>
</tr>
<tr>
<td>CERA</td>
<td>Cambridge Energy Research Associates</td>
</tr>
<tr>
<td>CIEP</td>
<td>Clingendael International Energy Programme</td>
</tr>
<tr>
<td>ECT / ECS</td>
<td>Energy Charter Treaty / Energy Charter Secretariat</td>
</tr>
<tr>
<td>EIA</td>
<td>Energy Informational Administration</td>
</tr>
<tr>
<td>ESMAP</td>
<td>Energy Sector Management Assistance Programme</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>IGU</td>
<td>International Gas Union</td>
</tr>
<tr>
<td>KEEI</td>
<td>Korea Energy Economics Institute</td>
</tr>
<tr>
<td>OIES</td>
<td>Oxford Institute for Energy Studies</td>
</tr>
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</table>
RAS  Russian Academy of Science
RIA  Rossiiskoe Informacionnoe Agentstvo, Russian Information Agency
WGI  World Gas Intelligence

**Energy companies**

BP  British Petroleum
CNOOC  China National Offshore Oil Corporation
CNPC  China National Petroleum Corporation
GMT  Gazprom Marketing and Trading
JNOC  Japan National Oil Corporation
KOGAS  Korea Gas Corporation
NAM  Nederlandse Aardolie Maatschappij, Shell/Exxon joint venture for oil and gas production in the Netherlands

**Miscellaneous**

CEO  Chief Executive Officer
CCS  Carbon Capture and Storage
CO₂  Carbon Dioxide
E&P  Exploration and Production
FDI  Foreign Direct Investment
GHG  Greenhouse gas
GMI  Gas Market Integration [model]
H-gas  High calorific gas
JCC  Japan Crude Cocktail
L-gas  Low calorific gas
LNG  Liquefied Natural Gas
LPG  Liquid Petroleum Gas
M&A(s)  Mergers and Acquisitions
NEA  Northeast Asia
NGO  Non-Governmental Organisation
PSA  Product Sharing Agreement
TPA  Third Party Access
TPES  Total Primary Energy Supply
WEO  World Energy Outlook
Chapter 1. Introduction

Russia is the largest natural gas reserves holder in the world, with 43.3 trillion cubic meters (tcm) accounting for 23 percent of world’s proved reserves. Russian gas production consistently exceeds domestic consumption, therefore Russia is a net gas exporter. Until 2009, 100 percent of Russian exports was exported to the west; to Europe (148 billion cubic meters, bcm), Ukraine (55 bcm) and Turkey (26 bcm). 1 Russia plays an exceptional role in supplying the international economy with energy resources. It produces considerably more coal, oil and gas than it needs for domestic consumption – and so large parts of produces resources are exported. 2 Russia produces about 10-11.5 percent of world total primary energy supply (TPES), which is five-times more than its share in world population and GDP. 3 This appears to be indicative of a position of economic strength, but at the same time this means that Russia is susceptible to the overall dependence of its economy on the profits for export of energy resources. There is a general consensus in Russian society that the orientation toward raw resources in the Russian economy should be dealt with in a proactive way. This view was reflected in the new Russian Energy Strategy to 2030. 4

The phenomenon of the dependence on exports of raw materials is well-known. It can be referred to as the Dutch disease, or more narrowly, a resource curse. 5 It can be argued that Russia is now suffering from such a problem. The whole economic system is reliant on the profits brought by one single sector. The purpose of this paper is not to look into history and find inherent reasons for such a state of affairs, and not to provide any cure as this will require a more economic focus that is beyond the scope of this research. What we can do here however is to look at the new trends in Russian energy policy, and particularly export routes diversification efforts, and examine whether some problems that appeared in Europe (both in the European market and concerning Russian exports to Europe in particular) can be avoided on the Asian front. In this respect an interesting analogy can be made with gas exports from the Netherlands in the 1960s and 70s, which marked a start of European gas market integration. We will briefly

3 Ibid.
5 The Dutch disease is a negative effect of strengthening of the national currency on the economy, caused by the rapid development in one sector of the economy. Theoretically, it doesn’t matter which sector is booming and causing such effect. As a matter of fact, it is most often raw materials production sector. Resource curse is therefore only one of the options.
touch upon the formation of the European natural gas market and the role of the Groningen field in order to draw a parallel with the formation of the Northeast Asian market and possible instruments that can be used by Russia as an owner of the largest resources in the region.

The discussion of European security of supply following the Ukrainian gas crises of 2006 and 2009, and policies of diversification activated the discussion of exports diversification in Russia, since Europe is the main destination for Russian gas. However, ideas of exports diversification, and particularly possibilities of Asian export routes have been discussed before. Those routes include pipeline exports primarily to China, but also possibly to Japan and Korea, as well as LNG exports from Far Eastern terminal(s). The discussion of the projects, however, most of the time focuses on energy security issues or general statements about how positive it would be for Russia to play a more prominent role in the Asia-Pacific gas market. Less is said about the actual impact of the projects and the technical side of their implementation. For example: how will the contract structure evolve and what role can Russia play in the formation and integration of the regional market in Northeast Asia? What benefits (rents) can Russia retrieve from cross-border cooperation in energy for the bordering regions and not just turn them into resource adjunct of the importing countries? What can be done to ensure that energy resources export does not create conditions for decline of other sectors of the [regional] economy?

The objective of this paper is to look into these questions, based on the experiences of the Netherlands in establishing the rules of the game in an embryonic market (the contracts for Groningen gas served as a basis for all current long-term contracts) and examine to what extent this experience can logically be used by Russia in the East. Of course, the basic long term contract will continue to play an important role and its principles will remain stable, but what instruments can the state use and what role does the ‘national champion’ play – these are the relevant issues with regard to the Russian case.

Therefore, the analysis of the two cases was involved in this paper:

**Case 1:** Natural gas exports from the Netherlands to Western European countries in 1960s and 1970s.
**Case 2:** Russian [potential] gas exports to countries of Northeast Asian region.

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7 For example, Eastern dimension it is explicitly present in the 2003 Energy Strategy; the work on the Eastern Gas Programme started as early as 1970s and 80s; a decree has been issued by the government in 2002 in order to develop an eastern strategy for gas industry development, including exports; by 2007, such a programme was produced by the Ministry of Industry and Energy and Gazprom.
From this research objective, three questions have been derived:

1. To what extent the comparison of the two cases is relevant?
2. What lessons can be learned from the Netherlands’ natural gas exports to Western Europe in the 1960s and 1970s, including both negative and positive experiences?
3. To what extent the experience of the Netherlands in gas exports in the 1960s and 1970s is applicable in contemporary context of Russian exports to Northeast Asia?
4. What policy implications would it suggest?

In Chapter 2, we will provide an analytical framework for this study (including the principles of gas market; the price formulas and long-term contracts as main principles affecting behaviour of gas exporting and importing states). In chapter 3, the question will be answered whether it is relevant to compare the two markets. In chapter 4, we will in more detail refer to natural gas exports of the Netherlands in the 1960s and 70s, and this will allow us to answer the second research question – what lessons can be learned from this experience. Chapter 5 will contain the analysis relevant to the last two research questions and will provide an outlook for Russian gas exports to the region of Northeast Asia.
Chapter 2. Analytical Framework

2.1. Introduction

There are different aspects of gas chain regulation – the market itself, firms with strong hierarchical structure, and long-term contracts.\(^8\) Basically, markets and companies are the instruments of economic interaction, and together with the long-term contract they determine the character of such interaction in natural gas trade. Therefore it seems reasonable to refer specifically to these three aspects to build up the approach.

Importantly, when dealing with natural gas markets, there exists two distinct ways of developing an analytical framework. These are related to the training of the researcher. The first is prevalent amongst those with a background in political science – a geopolitical approach with a strong focus on political dimension of energy security. Another approach is market modelling, derived from microeconomics. In this section, some basic economic approaches to market analysis are utilised. One of the weaknesses therefore is the fact that complex equations were not applied. Our understanding of Hotelling might be rather simplified. However, it is important that elements of economic theory are applied to an economic topic.

The main objective of this paper is to produce an outlook and policy suggestions concerning the future of Russian exports, and particularly to Northeast Asian market. Section 2.2 of this chapter will be devoted to the discussion of the gas markets, while sections 2.3 and 2.4 will refer to gas pricing Energy Sector mechanisms and contractual principles, respectively. This chapter will mainly draw on works by Coase,\(^9\) the Energy Charter Secretariat,\(^10\) and the World Bank / Energy Sector Management Assistance Programme.\(^11\) The analysis below is not a ‘methodology’ but rather a set of instruments and hypotheses for further research; an analytical framework. This analytical framework serves as a basis for comparison of different regional markets, which will be one of the tasks in the subsequent chapters.

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2.2. Gas markets

Gas is the type of goods that is traded on the market. The market as such is a result of interaction between producers and consumers, therefore the main measurements are supply and demand. The nature of the gas market is similar to the structure of competitive commodity markets – prices reflect the ability of supply to meet the demand at any moment of time. The relationship between changes in the price and in supply and demand dynamics are referred to as natural gas market cycle. According to classical economics (Smith, for example) market always tends toward equilibrium – a balance between supply and demand.\textsuperscript{12}

The economic theory of exhaustible resources is a partial-equilibrium market theory.\textsuperscript{13} Equilibrium means such a condition when the price is determined by the competition when at a certain moment of time the amount of goods produced by sellers is equal to the amount of goods required by buyers. This can be seen from figure 1 (see Annex). For the purpose of our work we should remember therefore that the three key elements are demand, supply and price level – they can be seen in the figure 2. The ‘angle’ of the demand curve can be affected by the following factors:

- economic growth ($\rightarrow$ higher demand for the same period of time, curve 3)
- higher energy efficiency ($\rightarrow$ less volume needed for the same result, curve 1)
- new technology ($\rightarrow$ more elasticity along the price axis, curve 2).

Natural gas is not a typical commodity and therefore the market operates differently. It is important to differentiate first of all between gas markets and oil markets. The first difference between oil and gas (if we talk about oil and gas traded by pipeline) is the rent obtained by the producer and the transit state. Oil allows to retrieve higher rent due to the fact that oil market is easier to influence the price and thus retrieve rent.\textsuperscript{14} Moreover, rent sharing mechanism for oil is more likely to be driven by market mechanisms than that for gas, because there is a global market for oil while the gas market is not global. The volume flexibility for gas is a more acute problem than that for oil.

In a situation of no open market structure for gas, rent sharing along the value chain is determined not by market mechanisms but by contracts. Because of the differences between oil

\textsuperscript{12} Matthew Bishop, Essential Economics (London: The Economist Newspaper, 2004), 88.
\textsuperscript{13} Robert M. Solow, The Economics of Resources or the Resources of Economics, in Journal of Natural Resources Policy Research, Vol. 1, No. 1 (January 2009), 75.
\textsuperscript{14} ESMAP, Cross-Border Oil and Gas Pipelines: Problems and Prospects, 12.
and gas markets rent-sharing is driven by different mechanisms – market for oil and contracts for gas.\textsuperscript{15} It can be argued that gas markets should move toward regulation by market forces and therefore integration. One of the ways to move toward the more global gas market is the development of the worldwide LNG trade. As noted in one of the studies on the role of LNG, the ability of certain players to sell LNG to both Atlantic and Pacific basins adds a moment of competition between the two basins for the supplies from this particular source. Hence this source has an influence on the balancing the prices between the two regional markets. One such player is Qatar (see map 1 in the Annex). However, with the development of unconventional gas which has had a major impact on import patterns to the United States in recent years, with other countries willing to take on the experience of producing from unconventional sources, the prospects for gas market globalisation have become less likely.

Importantly, it is argued that the gas market in its development is following the dynamics of oil market with a delay of several decades. This is illustrated by the Hubbert’s curve (see figure 3). From a historical perspective there were several stages in the development of the oil market, and for all of them except the last period which started in 1986, different oligopolistic forms of price setting prevailed.\textsuperscript{16} Currently, the gas markets are less competitive. However, one can expect that at some point, with the development of technology, and developments of new links between regional gas markets, there will be a movement towards a more integrated global natural gas market.

Currently this seems difficult, however. Firstly, security of supply is more important for gas than for oil because outages involve much greater problems of reconnection.\textsuperscript{17} Secondly, transportation issues and questions of flexibility of supplies in gas markets cause concerns on the demand side: in case of supply disruptions, ability to receive gas from other sources is limited.\textsuperscript{18} Thirdly, there is a tight linkage between gas producers and consumers, so any interruption of the flow would risk devaluing the entire investment – both upstream, and downstream.\textsuperscript{19} Nevertheless, proponents of the gas market integration (GMI) model argue that the movement toward a more globalised gas market is possible.\textsuperscript{20} The model draws on the ‘institutional

\textsuperscript{15} ESMAP, Cross-Border Oil and Gas Pipelines: Problems and Prospects, 13.
\textsuperscript{16} Before the 1970s, the prices were dictated by the international oil companies with the active support of the countries they originated from; between 1970 and 1986 the actors most affecting the prices were the OPEC countries. Only after the collapse of the prices in 1986 the prices began to be determined by the market (supply/demand balance).
\textsuperscript{17} ESMAP, Cross-Border Oil and Gas Pipelines: Problems and Prospects, 13.
\textsuperscript{18} Ibid.
\textsuperscript{19} Ibid., 14.
\textsuperscript{20} Timothy Boon von Ochssée and Irina Mironova, The Prospects for Gas Market Integration between Russia and
equilibrium’ which involves the following aspects of gas trade: regulatory issues; legal and contractual issues; predictability and sustainability.\textsuperscript{21} These aspects do not directly relate to the economic theory, the fulfilment of certain goals in these areas does not mean automatic movement toward a more liquid market. Therefore, the GMI model is a basis for an assessment of general conditions surrounding the gas trade rather than the market itself.

\subsection*{2.3. Gas pricing mechanisms}

Natural gas is an exhaustible resource. Thus the first principle that has to be taken into consideration is the finite availability of this resource, and that as Solow notes ‘a resource deposit draws its market value, ultimately, from the prospect of extraction and sale’.\textsuperscript{22} Price is the main market signal for the allocation of the capital. In the European market and the Russian export case, the price is determined through long-term contracts. The main mechanisms of the price formation are: cost-plus calculation, net-back calculation and competitive stock-market pricing (the latter being used in gas markets in the UK and the USA). The 'cost-plus principle' determines the price paid by the end-user; based on costs of production, transportation and distribution of the resource. The alternative is 'net-back pricing'. Using this principle, the end-user price is determined by the replacement value of competing fuels. As a result the price of gas at the delivery point is the end-user price, less transportation and distribution costs.

What can the exporting state earn from selling its gas? One principle is the Ricardian rent which entails the cost of supply and does not count the finiteness of the resource. Since there are differences in the characteristics and the quality of fields, as well as their geographical proximity to the markets, the rent is differential. Alternatively, using the Hotelling rent, one can count the price of the resource based on the cost of replacement with the competing fuel. Resource rent as such can be counted as a sum of Ricardian rent and Hotelling rent, thus being a result of the different cost of supply from different fields\textsuperscript{23} (see figure 4). In regard to the resource rent another concept has to be mentioned. The essence of the so called ‘social-economic value’ concept of the resource is that the potential value (effect) is determined by various factors, including technical, historical and social conditions. The potential and actual effect of exploration, development and production do not often match, and the reason is the impact of the

\textsuperscript{21} Ibid.
\textsuperscript{22} Robert M. Solow, The Economics of Resources or the Resources of Economics, 70.
\textsuperscript{23} For more information and discussion, see ECS, Putting Price on Energy:International Mechanisms of Oil and Gas Price Formation (Brussels: ECS, 2007), 44-50.
institutional factors. Depending on those institutional factors, a large part of that potential value is realised in the form of rent retrieved by “oligarch groups” and not society.\textsuperscript{24}

The general understanding is that the price for the resources rises with time; this can be explained by the scarcity and finiteness of the resource.\textsuperscript{25} The seriousness of the resource exhaustion problem depends on two aspects of the technology: firstly, on the likelihood of technical progress (especially natural-resource-saving technological progress); secondly, on the ease with which other factors of production, especially labour and reproducible capital, can be substituted for the exhaustible resources in production. If it is easily possible to substitute other factors for natural resources, then there is no problem.\textsuperscript{26} Chetverikov, on the contrary, argues that despite the fact that the prices for exhaustible resources such as aluminium, coal, copper, natural gas and oil did show growth during the period between 1967 and 1995, the growth was not significant compared to the price volatility.\textsuperscript{27} According to the model suggested by Chetverikov, the source of a price increase is not the exhaustibility of the resource but the increase of the costs of finding and developing new sources of the resource.

The governments participate through the application of taxes and other levies on the production scale, as well as from the profits of the companies involved.\textsuperscript{28} In the producing state, the tax is imposed at several stages directly or indirectly – including extraction tax; excise tax; value added tax; export duty; income tax; tax on foreign economic activity. Extraction tax can be either differentiated (based on climate conditions, geological characteristics of gas reserve, volume and quality of gas) or undifferentiated.\textsuperscript{29} Export tax is determined on the basis of the market price for gas and the actual volumes of exported gas on a monthly basis. Thus, there can be two points of direct taxation identified: at the well-head (extraction tax) and at the border (export tax). The state can also be involved in terms of its energy and environment policies, as well as by the effect of gas deals on the balance of payments.\textsuperscript{30} Moreover, the state can be an owner or a partial owner of some of the entities involved in the gas chain; it may also act as a guarantor of loans to

\textsuperscript{26} Robert M. Solow, The Economics of Resources or the Resources of Economics, 78.
\textsuperscript{27} Chetverikov D., Exaustible Non-Renewable Resources Market Modelling: the Case of Oil Market (http://www.iet.ru/files/text/other/referat/017.pdf) [In Russian].
\textsuperscript{29} In Russia: at 147 RUR, or appr. 5 EUR per thousand cubic meters of produced gas. Source: Tax Code of the Russian Federation, Article 342, clause 1, para 12. http://base.garant.ru/10900200/ [In Russian]
\textsuperscript{30} ESMAP, Long-Term Gas Contracts, 28.
companies. Also, the state’s powers to define and grant the legal framework of contracts are crucial.\textsuperscript{31}

There is no obvious way to divide rent along the value chain. An effective way of coordinating risks and rents bilaterally could be to allocate them throughout the gas value chain and assign long-term commitments.\textsuperscript{32} In this context it is possible to make a distinction between the factors that both the seller and the buyer are involved in, and factors that are exclusively assigned to one of the parties. The main instrument to mitigate risks along the value chain in such a way that it gives sufficient and balanced guarantees to all sides is the contract, and the price formula is an essential part of any contract. General issues concerning long-term gas contracts are discussed in the next section.

\textbf{2.4. Contracts}

The gas value chain is a sequence of activities that add value to the product. A typical natural gas value chain includes upstream production (exploration and gas treatment), transportation by high-pressure mainline pipelines, transportation by low pressure local pipelines, storage, and distribution in the end user market. Usually, no single party has control over the entire chain. Sellers and buyers face each other at the delivery point, the former being responsible for the area upstream of the delivery point, the latter for the downstream.

The balance between the parts of the value chain can differ (as can be seen from figure 6, there are various types of regulation along the value chain), which results in the difference between the contracts that have to be signed. It is either only the price (figure 6-a), or the interface between the producer and the consumer (figure 6-b), or two interfaces, producer-trader and consumer-trader (figure 6-c). Every option requires long-term contracts to be signed, but the substance of those contracts differs depending on the subject of regulation. The task in the following chapters will be \textit{inter alia} to determine the type of gas chain regulation and thus the type of contact needed for two cases: Dutch exports to Europe in the 1960s and perspective Russian exports to Northeast Asia.

Long-term contracts are based on the presupposition that the obligations will be fulfilled. This

\textsuperscript{31} ESMAP, \textit{Long-Term Gas Contracts}, 29.
means that there should be legal instruments available both in each country and internationally to enforce such conditions. The following groups of elements are present in all long-term contracts: the parties involved; the rules of handling the contract; the commitments of the parties; and the commercial aspects of the deal. The specifications of these elements are presented in the table below.

### Table 1. Main groups of elements in a gas contract

<table>
<thead>
<tr>
<th>The parties in the contract</th>
<th>The main capacities of a contract partner to fulfill his obligations:</th>
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<tbody>
<tr>
<td></td>
<td>technical capacity</td>
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<tr>
<td></td>
<td>entitlement to the gas / legal access to all instruments to fulfill the contract</td>
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<tr>
<td></td>
<td>financial capability</td>
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<td></td>
<td>adequate manpower</td>
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<tr>
<td></td>
<td>adequate management skills / expertise</td>
</tr>
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<td></td>
<td>ability to act</td>
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</tbody>
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<table>
<thead>
<tr>
<th>The rules of handling the contract</th>
<th>The written contract is indispensable. It should include the following elements:</th>
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<tbody>
<tr>
<td></td>
<td>start date (fulfilment of conditions precedent)</td>
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<tr>
<td></td>
<td>possibilities for changes the rules of contract or part of it (bouleversement / review / hardship clauses)</td>
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<tr>
<td></td>
<td>interpretation of the rules (definitions, language, applicable law); dispute settlement</td>
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<tr>
<td></td>
<td>end of contract (number of years or depletion of the reservoir)</td>
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<thead>
<tr>
<th>The commitments of the partners outside the deal in question</th>
<th>Market increases beyond the scope of the deal</th>
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<tbody>
<tr>
<td></td>
<td>Availability of additional reserves</td>
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<td></td>
<td>Activities upstream or downstream of the delivery point</td>
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<td></td>
<td>Elements to ease the performance of the deal (rights of way, staff training, common R&amp;D etc)</td>
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<td></td>
<td>Elements to find an overall balance (use of material and equipment)</td>
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<thead>
<tr>
<th>Commercial aspects of the deal</th>
<th>Commitments of each side to invest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Balance of commitments in the following aspects: gas flow, money flow, information flow</td>
</tr>
<tr>
<td></td>
<td>Technicalities</td>
</tr>
</tbody>
</table>


The purpose of the contract is to ensure that both parties fulfil their obligations (at least to a certain extent) and that the balance of commitments is preserved over the duration of the contract. There are three elements that influence the balance of commitments: price provisions, specification of commitments and penalties in case commitments are not fulfilled. They are schematically depicted in table 2.

Since we have already discussed pricing mechanisms in the previous section, the focus now will be on the commitments and obligations of the parties to the contract. The commitment of each side follows from the main interest of the other party to the contract. Since the buyer is interested in the availability of sufficient gas to cover demand, the resulting obligation is the seller’s
commitment to make available a given quantity of gas. The seller is interested in a guaranteed flow-back of money and this results in the buyer’s obligation to take a given quantity of gas and pay for it or, alternatively, not to take it but to pay nevertheless. Through such principles as balance of interests and obligations; long-term character of the agreement reflecting long-term character of investment; *pacta sunt servanda*; the ability to make adjustments ensure that the risks and obligations are secured through the contract.

Importantly, the partners should have an instrument to persuade them to abide by the contract hence the dispute settlement provisions in the contract. Very often during the negotiations, the price is the element that achieves the final balance of commitments

<table>
<thead>
<tr>
<th></th>
<th>Seller</th>
<th>Buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pricing Provisions</strong></td>
<td><strong>Gas Availability</strong></td>
<td><strong>Long-Term Minimum Pay</strong></td>
</tr>
<tr>
<td>Commitment</td>
<td>Exceptions: Reservoir risk; Maintenance; Force majeure</td>
<td>Exceptions: Flexibility; Maintenance; Force Majeure</td>
</tr>
<tr>
<td>Penalties</td>
<td>Damages Penalties for Non-Availability</td>
<td>Interest on Overdue Payment; Enforcement</td>
</tr>
</tbody>
</table>


### 2.5. Conclusions

In the next chapters, we compare two different markets of natural gas. Based on the discussion above, the following aspects should be addressed in order to make such comparison:

1. Supply and demand patterns
2. Demand outlook based on economic growth, energy efficiency and new technology
3. Supply outlook, based on available reserves and implications from demand patterns
4. Competing fuels and possibilities for price indexation
5. Existing price formulas in majority of contracts
6. Players: governments and companies; rents and commitments
7. Other considerations and other commitments

33 ESMAP, *Long-Term Gas Contracts*, 34.
34 ESMAP, *Long-Term Gas Contracts*, 32.
Chapter 3. Western European Gas Market in 1960s and 70s versus Northeast Asian Gas Market in 2000s: A Valid Case for Comparison?

3.1. Introduction

In the previous section we identified a set of variables that one should address in order to be able compare conditions in two gas markets. The variables that were identified are summarised in Table 3.

Table 3. Variables to be studied in chapters 3-5

<table>
<thead>
<tr>
<th>Demand patterns and demand outlook, based on:</th>
<th>Independent Variable</th>
<th>Ch.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>- economic growth projections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- energy efficiency policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- technological development</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available resources</th>
<th>Independent Variable</th>
<th>Ch.3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Domestic demand in the Producing state</th>
<th>Independent Variable</th>
<th>Ch.4/5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Supply outlook</th>
<th>Dependent Variable</th>
<th>Ch.4/5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Price formula and contract structure; Commitments</th>
<th>Dependent Variable</th>
<th>Ch.4/5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Competing fuels and possibility for price indexation</th>
<th>Intervening Variable</th>
<th>Ch.3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Players: governments and companies; Rents</th>
<th>Intervening Variable</th>
<th>Ch.4/5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Commitments outside the deal</th>
<th>Intervening Variable</th>
<th>Ch.4/5</th>
</tr>
</thead>
</table>

The division of the items into independent, dependent and intervening variables is not absolute and is determined by the main objective of the paper (to provide a vision of the further development of the Russian Eastern gas export policy). Therefore, the supply outlook and contract structure (including price formula and commitments) are stated as dependent variables; it is important for us to see how other factors influence the policy outcomes of the producer state. Demand can be taken as a dependent variable influenced by intervening factors, such as the ones listed above. However, for the purpose of this paper we will take demand patterns as given and will not study in detail what factors may influence it in different ways.

The sections below will be dealing mostly with independent and intervening variables in two cases: the European gas market in the 1960s and the Northeast Asian gas market in the 2000s, leaving the discussion of policy outcomes (dependent variables) for the chapters which will follow. The purpose of this chapter is to establish whether the comparison of these cases is relevant.
3.2. European market

“The economic significance of natural gas as a primary energy resource for Europe is beyond question. Natural gas in fact conquered number one position among fossil fuels from economic-commercial interest perspective as well as from a climate change perspective. Natural gas steadily increased as fuel in the thermal-based power generation systems in Europe as well.”

In this section we shall discuss the European gas market in the 1960s and 1970s. The first question that has to be answered is why the time frame is from the beginning of 1960s to the end of the 1970s. First of all, before the 60s, only local gas usage was in place, using coal gas and city gases – while the beginning of the 60s marked the era of natural gas use in Europe. Gas production was organised in local factories distributing gases through local distribution networks mainly for residential heating, still drawing on experiences of city gas era. Secondly, from the point of view of demand trend, the period of 1960-70s was a time of gas expansion in Europe. As can be seen from figure 7, until 1979 the market can be characterised by consistent growth of gas consumption – in selected countries cumulative consumption grew eight times in fifteen years. Thirdly, the end of the 1970s marked the change of market from a sellers’ market to a buyers’ market. To a large extent the sellers’ market was driven by a perception of scarcity resulting from underestimates of the Dutch and UK reserves, and security of supply concerns following the oil price shocks of the 1970s. In the 1980s, non-European gas supplies had commenced, and this changed the situation from one in which buyers were competing for resources to a situation when sellers competed for markets. A change in contractual basis toward greater flexibility (more frequent price adjustments to reflect changes of prices of the competing fuels; reduced quantities and take-or-pay levels) has followed the change in the type of market. Only in the mid-1980s did fully commercial contracts emerge, having previously been shaped by security and political considerations.

The question arises whether the increase in cross-border trade in the early and mid-1960s, particularly German, French and Belgian imports from the Netherlands, was initiated by demand. There are several factors at the national level that can increase natural gas demand: economic growth, energy efficiency, technological development. Growth has been sustained by

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36 Ibid., 4.
38 Ibid., 16.
residential and commercial demand with modest growth in the industrial sector, while gas use in port generation declined during the period 1975-85.\(^39\) The discoveries of gas in the Lacq region of France, Bavaria and Lower Saxony in Germany, and the Po Valley in Italy provided a market basis for introduction of the Dutch gas; the Belgian market was created because of its proximity to Dutch resources.\(^40\) Despite the existence of the domestic markets (except the case of Belgium), it appears that the proximity of the gas field and export policies of the Netherlands were the decisive factors in the development of the regional gas market. The Nederlandse Aardolie Maatschappij (NAM)\(^41\)/Gasunie signed export contracts with Germany, Belgium and France and an international network of high-pressure pipelines was constructed to connect the areas of consumption with the Groningen field. Dutch exports commenced in 1964 with 10 bcm supplies to Oldenburg, Germany.\(^42\) In 1971 contracts were also signed with Italy and Switzerland. In 1974, the amount of gas exported was equal to that consumed domestically in the Netherlands – 40 bcm.\(^43\) For our purposes, it will be most interesting to look into demand dynamics of the main importers of gas from the Netherlands, namely Belgium, France, Germany and Italy. Table 4 below summarises some of the data.

### Table 4. Consumption related data for selected Western European countries\(^44\)

(All data are for the year 1973 if not stated otherwise)

<table>
<thead>
<tr>
<th>Country</th>
<th>Structure of TPES(^45) (%) / growth 1973-1979 (%)</th>
<th>Final consumption of gas by sector (%)</th>
<th>Main players (as of 1990)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Coal 24.1 / -1.0 Oil 60.5 / -1.5 Gas 15.4 / 4.5 Comb.Renew.(^46) -- / 41.7 Nuclear -- / 130.2 Hydro -- / 4.9</td>
<td>Industry 68 Residential 25.5 Commercial / public sector / agriculture 6.5</td>
<td>Production: -- Transmission: Distrigas Distribution: municipalities, private companies</td>
</tr>
<tr>
<td>France</td>
<td>Coal 16.6 / 1.7 Oil 70.4 / -1.4 Gas 7.7 / 7.4 Comb.Renew. 1.0 / 7.6 Nuclear 2.2 / 18.1</td>
<td>Industry 53 Residential 29.4 Commercial / public sector / agriculture 17.6</td>
<td>Production: ELF Transmission: GdF, CeFem, SNGSO Distribution: GdF + municipalities</td>
</tr>
</tbody>
</table>


\(^41\) Nederlandse Aardolie Maatschappij is a Shell/Exxon joint venture for oil and gas exploration and production in the Netherlands


\(^43\) Ibid. p. 68.


\(^45\) The percentages might not add up to 100 for some countries due to the omission of geothermal and solar/wind sources of energy in this table.

\(^46\) Combustible Renewables and Waste
Belgium has no indigenous sources of gas, and all gas has to be imported. Distrigas is the main importer. As can be seen from table 4, in 1973 share of oil in total primary energy supply (TPES) constituted 60.5 percent and in 1975 the share of nuclear in energy production started to rapidly increase. In electricity generation, before 1980-81 gas played a noticeable role, having decreased its share in the 1980s. In France TPES is dominated by oil (taken over by nuclear in 1990s but still substantial), followed by coal and gas (gas took over coal and constituted 14 percent of TPES in 2001). In Germany, oil and coal dominate TPES, while electricity generation is coal-based. Domestic production of gas accounts for less than 20 percent of total demand, and a large percent of gas is supplied from Russia. Gas was initially used by the industrial and commercial sectors, with a rapid expansion of residential gas use in the 1980s. Ruhrgas became the agent for the Dutch sales company Gasunie, and in the 1970s began negotiations with perspectives suppliers in Norway and the USSR based on the same contractual principles as were worked out for marketing of the Dutch gas. In Italy, gas played a major role in energy production in the 1970s, whilst coal was also a major fuel in TPES. The share of gas in electricity generation was limited relative to oil and hydro. It is essential to note the fact that the final use of natural gas differs significantly in these countries.

In the Western European market, gas had to compete mainly with oil products, which is also clear from the structure of the total primary energy supply. Especially after the Second World
War oil played an important role in economic development. Hence the oil parity mechanism became the main vehicle of the European gas trade.\textsuperscript{54} In addition to the oil price indexation, the pricing for gas was based on the assumption that the market value of gas at the Dutch border would decline the further the distance away from Groningen, hence the destination clause in the contracts. The mechanisms to ensure security of supply and security of demand were a minimum volume obligation for the producer, and a take-or-pay obligation of the consumer. Gas-to-gas competition was excluded from the Western European market.

Based on the discussion above, we can now draw some tentative conclusions.

1) There were conditions on the demand side for the development of the gas market. Local systems for city gas served as a basis for further development of first national markets, and then their integration to regional gas markets. The perception of scarcity created a good opportunity for gas marketing by the producer state, and did not prevent the regional market from gas expansion in the 1960s and 1970s.

2) The growth of gas trade in Western Europe was supply-led, enforced by proactive position and policies of the Netherlands.

3) Without Dutch gas supplies, there would be no development of a Western European market in the 1960s and 1970s, since there were concerns about security of supply and as a result gas imports from more remote regions would have required even stronger commitments. With limited demand in the beginning of the 1960s these stronger commitments may not have materialised.

3.3. Northeast Asian market

"In Northeast Asia, there is a possibility [...] to establish the Energy Alliance. [...] An international natural gas pipeline [could] become a strong driving force for realizing the Energy Alliance."\textsuperscript{55}

"The Pacific Basin for LNG [has] a completely different market structure than can be discerned from the ones in the US and European gas markets. [...] Traditional gas markets in the Pacific Basin include Japan, Korea and Taiwan, and these three countries have been the driving forces behind LNG trade in the Pacific since the 1960s and 1970s."\textsuperscript{56}

\textsuperscript{54} Aad Correljé, Coby van der Linde and Theo Westerwoudt, \textit{Natural gas in the Netherlands}, 69.


\textsuperscript{56} Timothy Boon von Ochssée, \textit{The Dynamics of Natural Gas Supply Coordination in a New World} (The Hague:
The two quotes above represent two different views of the regional natural gas developments in Northeast Asia. The first, expressed by the participants of the Northeast Asia gas and Pipeline Forum at the beginning of this century, presupposes the leading role of pipelines for natural gas market integration (and from the report it is evident that the establishment of a ‘mutually dependent relationship’ is an objective – a way of describing a common market). The second is a quote from a European think-tank researcher who acknowledges the leading role of LNG in the region, and thus states that the market structure is essentially different from the European gas market which is dominated by pipeline trade. The reason for addressing these two positions is the fact that China is playing an increasingly important role in regional gas relations, having started both LNG imports (therefore entering the Pacific LNG basin) and pipeline imports (therefore entering the more traditional pattern of natural gas trade with Central Asian states).

The purpose of the following analysis will be to see to what extent pipeline trade can play its consolidating role in the Northeast Asian gas market (as either a part of the Pacific LNG basin, or a separate but closely connected market). Despite the fact that Taiwan is one of the major players in the Pacific LNG, in this paper we will omit this actor since otherwise we should also address the issues of China-Taiwan relations, which go beyond the scope of this paper. Thus we shall focus on Japan, Korea and China as consumer states in the region of Northeast Asia.

It is clear at present that Northeast Asian countries do not really operate as participants of the same market. It primarily has to do with the divide between LNG-importing Korea and Japan, and a special case of China. Usually an integrated market results in price arbitrage between different actors. However, it becomes somewhat more complicated when we talk about actors buying most of their gas through long-term contracts (Japan and partially Korea; the latter purchases gas to cover peak demand on the spot market). China is itself a set of several regional markets with different buying capabilities – this is essentially why the (South-) Eastern part imports LNG, and for the North-East it would be a problem to import even pipeline gas which is cheaper than LNG. The key to forming a regional market is to be able to supply both pipeline gas and LNG. For this reason Australia, for instance, cannot play as important a role as Russia.

As we have already mentioned, one of the ‘great dreams’ of Russia is to have a pipeline network in Northeast Asia with Russia as a main supplier.\footnote{Mikheev, V. (ed.), \textit{Northeast Asia: Strategies of Energy Security} (Moscow: Carnegie Endowment, 2004)} Pipeline projects are often considered a viable option from the Russian perspective. The first factor that allows this discussion is simply

\footnote{Clingendael International Energy Programme, 2010), 91.}
the distance from the gas fields in the Russian Far East to Japan and Korea. The length of this means that pipeline construction is feasible – the distance between Sakhalin and Hokkaido, for example, is about 42 kilometres. Secondly, Russia has extensive experience in ‘pipeline politics’ as well as construction and maintenance, so this might be another argument in favour of pipeline gas exports to the eastern neighbours.

It appears that in the current Northeast Asian gas market the situation with LNG and pipeline gas is the opposite to that in Europe: pipelines play a role only in the domestic Chinese market. This means that Russia should establish a coherent policy based on economic research. In that respect, it is understandable that the Kovyykta field is not producing yet (net-back including the large distance, as opposed to the distances to sales points to Northeast Asian countries from Sakhalin, will not leave much for the producer after the construction costs for the pipelines are covered).

Clearly, there is sufficient room for development of a more integrated regional market in Northeast Asia. There is an opportunity for Russia to become an important player and in a sense become a rule-setter in this market, in a similar way as the Netherlands did during the forming time of the European market in the 1960s. This is not the easy task, however, given the lack of infrastructure and larger distances than in Europe.

3.3.1. Japan and Korea: key LNG importing countries

Japan is the world’s largest LNG importer, and all of its imports are delivered in form of LNG. Natural gas demand in Japan in 2008 comprised 93 bcm, which is comparable to the demand of such countries as the UK and Germany.\(^{58}\) The largest share of natural gas is used for electricity and heat production (75 percent). A regasification terminal is built in every area of projected demand growth, rather than a pipeline extension from an existing terminal. In part this can be explained by the fact that the most developed (and thus the largest gas consuming) regions have coastal locations; in part by the fact that the growth in demand is not large enough to justify construction of a pipeline.\(^{59}\)

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\(^{59}\) For financial viability of the pipeline, the factor of size (scale advantages, or economies of scale) plays a major role, when the larger the capacity of the pipeline, the sooner investors recover the costs. The cost of the pipeline rises linearly with the diameter of the pipeline, while the capacity of the pipeline increases more than square of the diameter. This causes cost per cubic meter of transported gas be significantly lower in a pipeline of a larger diameter. For more details, see Aad Correlje, Dick de Jong and Jacques de Jong (eds,), *Crossing Borders in European Gas Networks: The Missing Links* (The Hague: Institute Clingendael / CIEP, 2009), 21-22.
Natural gas demand has been increasing steadily since 1998. However, given current policies on energy efficiency and environmental protection, primary gas demand is set to level out or even decrease. One of such policies is reflected in the Basic Energy Plan and New National Energy Strategy; it aims to promote nuclear power generation, as well as to accelerate the introduction of new sources of energy. Gas appears in strategy documents when security of supplies is mentioned, thus following from the document there are no strategic implications with regards to the predictions that the future level of gas consumption will decrease.

Gas is imported to Japan by various smaller companies which are mainly active in the city electricity and heat generation (residential sector). One would expect a certain level of competition between those companies. Liberalisation of the gas sector in Japan began in 1995, letting larger users to choose the source of their gas; in total, by 2008 a liberalised share of the Japan’s gas market was approximately 60 percent. There are some measures, however, that still limit involvement of actors other than existing gas utility on the regional level. Competition could be increased by interconnection of the regions using trunk pipelines. However, this is not a likely development considering that constructing pipelines is rather expensive in Japan due to technical difficulties and insufficient demand incentives, as well as the unwillingness of the private sector.

Korean natural gas demand has more than doubled over the last decade, from 16 bcm in 1998 to 37 bcm in 2008 (see figure 8). Relative growth in natural gas consumption was driven primarily by demand in the residential sector. Similar to Japan, 100 percent of Korea’s gas imports are delivered as LNG. Gas is used mainly for electricity generation (42 percent), in residential sector (30.6 percent), as well as in industrial production (15.5 percent). Unlike Japan with its nearly thirty regasification terminals, Korea has only four of higher average capacity; country-wide gas distribution is conducted through a pipeline network.

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60 IEA, World Energy Outlook 2009; Energy Policies of IEA Countries: Japan 2008 Review. IEA bases its projections on several scenarios – one of them is Reference scenario, development of world energy if energy use patterns remain unchanged; in that scenario, natural consumption in Japan will grow at 0.4 percent per year on average. Other scenarios refer to the cases when CO₂ emissions reduction policies are implemented. According to 450 scenario (Greenhouse gas emissions at 450 ppm of CO₂ equivalent), the demand will decrease at 0.1 percent every year.
62 Ibid., 112.
63 Ibid., 118-119.
64 Jan-Hein Christoffels, Getting to Grips Again with Dependency: Japan’s Energy Strategy (The Hague: Institute Clinegndael / CIEP, 2007), 49.
Expanded use of natural gas is one of the objectives of the energy policy, together with increasing the share of nuclear energy. Korea addresses the issues of climate change by implementing some voluntary greenhouse gas (GHG) emissions reduction policies.\textsuperscript{65} Those measures, among others, include improving energy efficiency. Natural gas demand in the residential sector will grow at average 5.5 percent up to 2017, but gas demand for power generation will decrease by 2.4 percent, thus total growth will still comprise about 3 percent annually.\textsuperscript{66}

Since 1997, new liberal policies started to appear in the energy strategy of the Republic of Korea (based on the recognition within the government that competition can assist more efficient allocation of resources).\textsuperscript{67} The main actor in Korean gas business is Korea Gas Corporation (KOGAS), a government-owned company set up in 1983 in order to control all aspects of the wholesale natural gas industry. It works under the supervision of the Ministry of Commerce, Industry and Energy (MOCIE). Policies (primarily the Basic Plan for Restructuring of the Gas Industry, 1999) included plans of splitting up KOGAS and allowing competition in the wholesale and, later, the retail sectors.\textsuperscript{68} Later the plans of industry restructuring were postponed indefinitely, allowing KOGAS a monopoly position in Korea’s gas market.

In the table below, the main characteristics concerning gas use in Japan and Korea are summarised.

<table>
<thead>
<tr>
<th>Table 5. Japan and Korea comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Japan</strong></td>
</tr>
<tr>
<td><strong>S.Korea</strong></td>
</tr>
<tr>
<td>Fuel mix (primary energy)</td>
</tr>
<tr>
<td>Oil 46%</td>
</tr>
<tr>
<td>Coal 21%</td>
</tr>
<tr>
<td>Nuclear 15%</td>
</tr>
<tr>
<td>Natural gas 15%</td>
</tr>
<tr>
<td>Hydro 1%</td>
</tr>
<tr>
<td>Combustible renewables / waste 2%</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Oil 48%</td>
</tr>
<tr>
<td>Coal 24%</td>
</tr>
<tr>
<td>Nuclear 13%</td>
</tr>
<tr>
<td>Natural gas 12%</td>
</tr>
<tr>
<td>Combustible renewables / waste 1%</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Annual gas demand\textsuperscript{69}</td>
</tr>
<tr>
<td>Use of natural gas by sector</td>
</tr>
<tr>
<td>Electricity generation (+heat) 60% (75)</td>
</tr>
<tr>
<td>Industrial processes 9%</td>
</tr>
<tr>
<td>Commercial and public services 18%</td>
</tr>
<tr>
<td>Residential 11%</td>
</tr>
<tr>
<td>Other 2%</td>
</tr>
<tr>
<td>Power generation provides the main market for imported gas</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Electricity generation 42%</td>
</tr>
<tr>
<td>Industrial 15.5%</td>
</tr>
<tr>
<td>Transport 0.8%</td>
</tr>
<tr>
<td>Commercial 10.3%</td>
</tr>
<tr>
<td>Residential 30.6%</td>
</tr>
<tr>
<td>Other 0.8%</td>
</tr>
<tr>
<td>Natural gas market development is driven by city-gas use</td>
</tr>
</tbody>
</table>

\textsuperscript{66} Ibid., 101.
\textsuperscript{67} Ibid., 107.
\textsuperscript{68} Ibid.
\textsuperscript{69} In 2008; source: BP, Statistical Review of World Energy 2009, 27.
<table>
<thead>
<tr>
<th>LNG import terminals and domestic pipeline system</th>
<th>Total regasification capacity over 253.6 bcm/year (2009)</th>
<th>Total regasification capacity 107.6 bcm/year (2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmented pipeline connections (total length – 235785 km, trunk pipelines not connected to each other)</td>
<td>Integrated domestic pipeline network (total distribution system 24365 km)</td>
<td></td>
</tr>
<tr>
<td>Prices</td>
<td>Oil price linked formula for imports</td>
<td>Oil price linked formula for imports</td>
</tr>
<tr>
<td>Domestic price: LNG import price + regasification and distribution costs</td>
<td>Domestic price: City Gas Law – prices are regulated by the central government to prevent abuse of monopoly position</td>
<td></td>
</tr>
</tbody>
</table>


At first sight it might seem like the gas sectors in Japan and Korea are quite similar. The fuel mix is comparable, with Japan using somewhat more nuclear energy than Korea (15 and 13 percent respectively) and Korea using more coal (24 versus 21 percent) and oil (48 versus 46 percent). Both countries import 100 percent of their gas in the form of LNG, and are the world’s two largest LNG importers (92 and 37 bcm respectively in 2008; for dynamics over the past 10 years, see figure 8).

At the same time, the end use of the natural gas differs significantly. While both use most of the imported gas for electricity generation, the share in Japan is significantly higher (60 versus 42 in Korea), while Korea uses more gas than Japan in the residential sector (30 percent versus 11) and industrial production (15 percent versus 9). Indeed, as noted in various publications, the development of the natural gas sectors domestically is driven by different factors – primarily power generation sector in Japan, and by the residential sector in Korea. The end use of gas predetermines the difference in demand outlook for Japan and the Republic of Korea. Both countries implement policies of better energy efficiency, but in the case of Korea the reduction in energy intensity will not be large enough to limit overall demand growth. Thus, it is logical that in both the Reference scenario and the 450 scenario presented in the World Energy Outlook, Japan has a lower demand growth outlook than Asia-Pacific average, while Korea has higher demand growth than the Asia-Pacific average demand projection. It is important to mention that long-term contracts cover of demand in the Asia-Pacific region is decreasing.

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70 IEA, *Natural Gas Information 2009*
71 Ibid.
73 For example, Keun-Wook Paik, Natural Gas Expansion in Korea, in Wybrew-Bond, Ian, and Jonathan Stern (eds.) *Natural Gas in Asia: The Challenges of Growth in China, Japan and Korea* (Oxford: Oxford University Press, 2002).
74 There are various drivers of gas demand: relationship between gas demand and economic activity, inter-fuel competition, technological innovation and climate change, government policies and geopolitics. The combination of the factors gives basis to estimate future demand. IEA, *WEO 2009*.
Secondly, there are obvious differences in the organisation of domestic gas markets. In Korea an integrated pipeline network exists, while in Japan fragmented pipelines are not interconnected (the problem is that pipeline costs in Japan are extraordinarily high compared to other countries – so in areas of growing demand a new LNG import terminal is built – and not an extension pipeline from an existing one\textsuperscript{77}). A monopoly of KOGAS can be considered an underdevelopment of Korean gas sector, while at the same time it makes it easier for a supplier to find a counterpart for a strategic large-scale partnership.

3.3.2. China: A new player

China’s natural gas market will continue to grow, fuelled by imports and driven by a need to promote the use of cleaner energy. In 2008, gas demand comprised 78 bcm, or 4 percent of the country’s primary energy use, which remains dominated by coal\textsuperscript{78}. The expansion of gas demand is led by the residential sector (as a result of rapid urbanisation) and industrialisation. A large part of the demand growth is expected to come from the power sector\textsuperscript{79}. The dynamics of Chinese gas demand is shown in figure 9. One important aspect to note is the potential for domestic gas production from unconventional sources. Added to the growing production in western and central parts of the country, these might cover a large part of Chinese gas demand. In total, the Chinese gas production is expected to reach about 125 bcm by 2030, while imports could reach 120 bcm, including Turkmenistani and Russian gas\textsuperscript{80}.

As far as Russian gas import prospects are concerned, there could be two destinations: the west-east pipeline (WEP) connection in the north-west of China and north-eastern provinces in the Far East. The characteristic feature of the three provinces in the north-east of China (Heilongjiang, Liaoning, and Jilin) is the level of industrial development which will be discussed in more detail in section 5.3.1. An important factor is that 46 percent of the gas consumed in China is used in industry. Considering the policy of coal use reduction and projected industrial growth in these provinces, the gas supplies become a central issue.

According to the North-East China regional development plan, the cooperation with the Russian

\textsuperscript{78} IEA, \textit{WEO 2009}, 503.
\textsuperscript{79} Ibid.
\textsuperscript{80} Ibid.
Far Eastern regions is one of the strategic objectives and at the same time one of the conditions of the region’s successful development. Moreover, the general approach of China to its policy towards its neighbours seems to be focusing on development of local cooperation – through trade and other types of economic cooperation, cross-border migration and cultural connections. Thus, it can be said that to an extent through domestic development China manages to promote its foreign political objectives. This contrasts with the Russian situation where international objectives are distinct and it takes extra effort connect domestic/regional and international policies.

The tenth Five Year Plan (FYP, 2001-2005) included several important initiatives in energy sector, including creating strategic oil reserves, promoting development of the resources abroad by the Chinese NOC’s, strengthening environmental protection through technology development and energy sources diversification, introducing energy-saving technologies and promoting international cooperation. These are important aspects of China’s energy policy. Recently another aspect was added to the policy – the decrease of energy intensity of the economy, and this is articulated in the eleventh FYP, as well as some other documents which are summarised in the table below.

<table>
<thead>
<tr>
<th>Document</th>
<th>Content</th>
</tr>
</thead>
</table>
| 10th FYP | * Strategic oil reserves  
* Introduction of cleaner energy sources, energy sources diversification  
* Active participation in development of the fields abroad  
* Strengthening environmental protection  
* Focus on international cooperation  
* Development of energy-saving technologies in order to decrease energy intensity |
| 11th FYP | * Goals – conserving resources and protecting environment  
* GDP per capita should double by 2010 compared to 2000 level  
Energy intensity should decrease by 20 percent by 2010 compared to 2005 level |
* Decrease the share of coal in the fuel mix |

82 An issue of the ‘Chinese threat’ has to be addressed here. Essentially the concept is based on the difference in population density in the Russian Far East and North-East China (62 times) and increasing number of Chinese migrants, both legal and illegal, on Russian territory. The threat is alleged rather than real, since Chinese migration in the Far East is labour-related, temporary and revertible. Labour migrants take vacant positions which the local population is not willing to take. For more detailed discussion see Mariya Teplokhova, Russia and International Structure of the Asia-Pacific Region: Agenda for the Russian Far East. In: Security Index N1 (92), vol. 16 (Spring 2010), 87-104. [In Russian]
China's Energy Conditions and Policies, 2007

* Maximising domestic production of oil and gas
* Further development of hydropower, nuclear power and renewable energy sources.


3.3.3. Implications for a [perspective] supplier

For a gas exporting country which might consider selling gas to Japan and Korea, important factors include:

- Existing LNG receiving infrastructure;
- Stable or rising demand that is not covered by long-term contracts;
- Differences in the domestic organisation of the gas sectors in Japan and Korea.

Based on the first two factors, we can conclude that for a country with existing LNG export facilities it is possible to enter both Japanese and Korean gas markets. It is the third factor, however, that has to be discussed in detail to shed some light on the difficulties that may be encountered by Russia – an exporter that has interests in both countries. The differences between the two markets include the structure of gas end use and the main players in the local gas market. Gas end use in Korea is dominated by a residential sector, which, moreover, is expected to grow faster than all other sectors in the coming decade. This means that the trend of seasonality of Korean gas demand will remain present in a mid-term outlook and has to be taken into consideration. For Russia, the question of the companies to sign LNG deliveries contracts becomes more complicated in the case of Japan. Russia is used to discussing those agreements at the intergovernmental level, while in Japan there could be a strong disagreement between the government and the private sector. The approach to conduct cooperation with smaller privately-owned companies should be present in Russian policy, as far as the Japanese exports are concerned.

Considering the prospects for exports to China, the following factors have to be taken into account: the growing share of LNG imports and thus possibilities for gas-to-gas competition; the existence of certain disparities in paying abilities between the regions and therefore the ability of some to pay for more expensive LNG and others hardly being able to cover for pipeline imports;
potential of growth of domestic production from unconventional sources, which will affect import requirements in the medium term.

Based on the analysis above, the following observations are relevant:

1. On the demand side, there clearly is a possibility for Russia to enter the market;
2. There is sufficient room for development of a more integrated regional market in Northeast Asia due to the following reasons: entrance of a new player, and concerns about the price formula for LNG based on oil products indexation, which together open an opportunity for introduction of new principles on the regional level (eg. gas-to-gas competition and respective price formula).
3. There is not much regional market integration however, and so with a proactive position Russia could play a consolidating role for a regional market;
4. The difficulty might be the different approaches and policies of Japan and Korea on the one side and China on the other.

3.4. Comparison and conclusions

The question that has to be answered in this section is whether the Western European gas market of 1960-70s and Northeast Asian gas market at the present time give a valid case for comparison. Above we have discussed demand patterns, primary energy supply, final consumption structure and policies of consuming states. As discussed in chapter 2, these are the variables that have a key influence on the structure of the market. We have looked at the following countries: in Western Europe of the 1960s and 70s – Belgium, France, Germany and Italy; in Northeast Asia – Japan, Korea and China. Now we can draw some conclusions relating to the main question of this section.

1) Demand projections on the regional level
In Western Europe, there were conditions on the demand side for the development of the gas market. Local systems for city gas served as a basis for further development of first national markets, and then their integration to the regional gas market. In Northeast Asia, there is a possibility for a new supplier to enter the market based on the projected demand growth in China and Korea, and environmental policies particularly in China. Therefore, in this respect we can draw a parallel between the two markets.
2) Differences in demand structure between the consumer states
In both markets under discussion, there are certain differences in the structure of the final energy consumption. There are different drivers for gas demand, and their combination differs per state causing variety in final consumption structure and affecting general demand outlook. However, it seems that the final consumption structure does not have a decisive influence on market development on the regional level directly.

3) Competing fuels and price indexation
It is logical that in Western European market on the 1960s the price was connected to oil products price. As was shown in table 4, despite the differences in final consumption throughout the countries, the most used fuel was oil and therefore gas had to compete with oil. Hence the price formula. In Northeast Asian market, the price is connected to oil products, as well as coal which plays substantial role in the region.\textsuperscript{85} Despite the different sources of price indexation, the principle in both markets is the same.

4) Distance between fields and consuming areas
Distances between fields and consuming areas in Western Europe and Northeast Asia are not really comparable and this essentially is the reason why in Northeast Asia the LNG trade has prevailed over the past decades. However, we should also remember that there is an essential chronological difference between the two cases; LNG is not playing significantly more important role in (inter)regional markets than it was the case in 1960s. In this respect the technology and the nature of existing markets is playing an important role.

5) Nature of the market
In both cases, there is a limited role that market mechanisms could play. Despite the fact that Northeast Asian gas market is essentially a part of the Pacific LNG basin, there is still no price arbitrage (or only on a small scale when seasonal spot purchases are concerned), as well as there is a limited possibility for the so-called market forces. If we refer again to figure 3, then both markets will be found on a less competitive side of the graph. Hence the security of supply and demand is enforced through long-term contracts.

Overall, this discussion allows us to conclude that the European gas market in the 1960s and 70s can to an extent be compared to the current gas market in Northeast Asia. There are some

\textsuperscript{85} Timothy Boon von Ochssée, The Dynamics of Natural Gas Supply Coordination in a New World (The Hague: Clingendael International Energy Programme, 2010), 379.
obvious differences, such as the distance between the fields and the destination markets; the difficulties with development of the fields (as opposed to the relative proximity and availability of the Groningen field) and the geography of supplies. However, the overall dynamics allows for drawing some parallels, especially when it comes to the exporting state policy, since the market development is not solely led by the demand side. The next chapter will look more closely at the Dutch policies concerning natural gas export over the period of 1960-1979, followed by a chapter on more detailed analysis of the gas market dynamics in Northeast Asia and possible implications that can be used by the Russian state concerning exports to that region.
Chapter 4. The Dutch Experience

4.1. Introduction

One of the objectives of this paper is to give a policy advice on how to develop a strategy of entering a new gas market. In light of this objective, it is important to study the experiences of other countries that have faced similar challenges. In how they managed the challenges and what were the outcomes of their policies lies a hint as to how Russia should or should not handle those challenges. There are several reasons for referring to the Dutch gas export experience. First of all, the question of export dependence is relevant for all natural resources exporting states. It was the case in 1960s, and the situation has not changed – there is still no cure for the ‘resource curse’. Secondly, the Dutch government was effective in maximising rents from the Groningen field. Russia needs to find the best way of balancing rents and regional socio-economic objectives in its exports to Northeast Asia.

In the previous chapter we have discussed consumer markets for our two cases: the Western European market in the 1960s and 1970s and the Northeast Asian natural gas demand in the last decade. We have addressed the following issues: demand pattern and outlook; structure of primary energy supply and therefore the competing fuels; availability of resources. In this chapter, we should address the following variables in order to analyse the natural gas export policy of the Netherlands:

- Available resources;
- Domestic demand;
- Export patterns and outlook;
- Price formula and contract structure; commitments;
- Commitments outside the exports to given region.

This list is based on the set of variables identified in the beginning of chapter 3 (section 3.1). The question to be answered in this chapter is: **What can be learned from the Netherlands’ natural gas exports to Western Europe in the 1960s and 1970s, including both negative and positive experiences?** First we will provide an outline of the booming sector model which will

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serve as a basis to study the implications of gas export revenues on the economic situation in the Netherlands. Finally, we will draw some conclusions concerning the lessons to be learned from the Dutch gas export experience.

4.2. A theoretical background: booming sector model

In section 3.2 we have concluded that Dutch gas exports played an essential role in the development of the Western European gas market, which at present allows for pursuing environmental objectives and switching from coal to gas. However, on the national level, there is another side of gas exports. A discovery of a natural reserve and the subsequent start of exports can cause an external shock to a country’s economy. In this section, we will provide a theoretical background for subsequent discussion of such negative effects of gas exports on the Dutch economy.

As Corden notes, there are three sectors: the Booming sector, the Lagging sector and the Non-Tradeable sector.\(^{87}\) The first two sectors produce tradeable goods facing world prices (opened sectors), and the latter does not have a connection to the world price. The model takes into account the factors of production specific to each sector: labour (which is mobile between the three sectors); wages and rents.

There are several consequences of the boom in one sector of the economy – the effects it has on the other sectors. Firstly, expanding exports and windfall profits cause strengthening of the national currency, which in turn causes the increase of export prices for other products. A price increase for the export of products from other sectors makes them less competitive on international markets. Logically, exports decrease and imports might start to grow. Ultimately this could result in a decrease in the national GDP. This is the effect of direct deindustrialisation.\(^{88}\)

Secondly, the sectors that do not export their products, on the contrary, might grow together with the currency and contribute to the GDP. Essentially this means the differentiation of the conditions for development of various sectors of the national economy. One of the examples is active development of services alongside the decay in other [industrial] sectors of economy.

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\(^{88}\) Ibid., 361.
More importantly, this trend does not leave any stimulus for the development of the industrial sector. Therefore resources move from the production sector to services and raw materials export. Needless to say, industrial production has a higher added value for the final products and thus such a development cannot be seen in a positive light. This is referred to as an indirect deindustrialisation and is closely connected to the resource movement effect when labour as a resource of production moves from an initial (lagging or non-tradeable) sector to a booming sector.

On the social level, when currency strengthens this leads to an increase in incomes and thus to the increase in demand for both exchangeable and non-exchangeable goods. (Prices for tradable goods are linked to the international prices and therefore are not influenced easily by the local demand; prices for non-tradable goods, on the contrary, respond to demand growth). This leads to inflation and further strengthening of the national currency, and is referred to as the spending effect.

4.3. Natural gas export policy

In Chapter 3 we have concluded that it is possible to draw parallels between the external conditions for the two cases in question. In this and the subsequent chapters, we will look at gas trade from a producer’s perspective.

The Netherlands possesses the largest gas reserves in the EU and currently supplies nearly 20 percent of the EU’s total gas consumption. The Dutch gas sector can cope with fluctuations in demand and supply in Western Europe as necessary and this essentially is a result of specific policies applied at the national level. They include a combination of policies of preservation of the large Groningen field and the development of small fields; an integrated infrastructure which is adjusted in such a way that it can be used for gas from small fields as well as Groningen gas interchangeably; the main objective is that Groningen gas is used as cover for peak demand while the gas from small fields is used for covering general demand.

89 W. Max Corden, ‘Booming Sector and Dutch Disease Economics’, 361.
90 Ibid., 372.
91 Aad Correljé, Coby van der Linde and Theo Westerwoudt, Natural gas in the Netherlands: From Cooperation to Competition? (Amsterdam: Oranje-Nassau Groep, 2003), 152.
In 1962 the basics of the Dutch gas export policy were outlined in *Nota de Pous*. The policy included the following elements:

- To maximise rents by applying net-back principle instead of cost-plus principle;
- A key consideration was that the market price was based on the compatibility with prices for substitute fuels (the price should not be much higher in order to maintain the compatibility of gas; it should not be much lower in order to retrieve maximum possible rent);
- An important role was assigned to small consumers, hence the policy of gasification in the Netherlands, along with market prices for domestic consumers.\(^{93}\)

Export was limited to the ‘premium’ markets which provided a higher price level.

Export of Dutch gas played a major role in the formation of the regional European gas market. Without the Dutch gas policy the place of gas on European market would have been taken by oil products, and thus the role of the gas exports from the Netherlands to Western Europe is widely acknowledged. Based on the experience of the Netherlands, producers in Great Britain, Germany, Denmark and Norway started exporting their supplies from the North Sea region; the Soviet Union and Algeria also started their exports to Europe given the high market price.\(^ {94}\)

Long-term contracts became the main instrument of managing the risks.

The first suggestion that can be derived from the Dutch gas sector development experience is creation of integrated gas supply system and development of the smaller fields. In Russian case, the former objective seems to be actively pursued, while the latter does not receive sufficient attention.

**4.4. Economic problems and lessons to be learned**

In the 1970s, after the change in the policy of gas exports, it became apparent that the Dutch economy was dependent on those exports; consequently the decision was made to not undertake any new contracts. The term ‘Dutch disease’ refers to the adverse effects on manufacturing of the natural gas discoveries in the 1960s through the subsequent appreciation of the real exchange

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\(^{93}\) Aad Correljé, et.al., *Natural gas in the Netherlands*, 30-34.

rate.\textsuperscript{95} Essentially the problem is when one sector is booming, the national currency strengthens\textsuperscript{96} and other sectors of economy find themselves in less favourable conditions.

Particularly in the case of the Netherlands, after the start of exports from the Groningen field, inflation and unemployment started to increase, while the level of exports decreased. The ‘Dutch disease’ refers to the spending of the state income from gas production and sale directly in the public sector, for an important part of open-ended social welfare policies which had to be redressed later on.\textsuperscript{97}

From Figure 10 it becomes clear that the central problem is the strengthening of the national currency exchange rate, and the subsequent growth of incomes in a booming sector of the economy. This causes production resources movement from the lagging sector into the booming sector, which subsequently leads to the development of an undiversified national economy and the decline in other sectors except the booming sector and the services sector. Suggestions for minimising the effects of the ‘Dutch disease’ are summarised in the table below.

<table>
<thead>
<tr>
<th>Table 7. Policy options for countries experiencing the Dutch disease</th>
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<tbody>
<tr>
<td><strong>Effect</strong></td>
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<tr>
<td>Spending effect</td>
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<td></td>
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<td></td>
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<tr>
<td>Widening income gap</td>
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<td>Resource movement effect</td>
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<td></td>
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<tr>
<td>Unemployment</td>
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<tr>
<td><strong>Targeted sector</strong></td>
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These suggestions are of a symptomatic nature, however. They can (to a different extent) be helpful in the situation when the windfall profits from natural resources exports have affected national economy. One of the ways to prevent this from taking place is keeping revenues from natural resources sales separate from the national budget. In fact, the attempt was undertaken in

\textsuperscript{95} W.Max Corden, ‘Booming Sector and Dutch Disease Economics’, 359.

\textsuperscript{96} Growth of incomes from gas exports led to inflow of foreign capital to the country which in its turn led to the increase in nominal exchange rate of the national currency and decrease of the nominal exchange rate of the foreign currency and thus the real exchange rate increases which means the strengthening of the national currency.

\textsuperscript{97} Aad Correljé, et.al., *Natural gas in the Netherlands*, 153.
the Netherlands in the beginning of the 1960s to create a special fund into which all or the greater part of income from gas production would be put. This was initiated by the Minister of Economic Affairs, de Pous, who thought that the revenues could be used for investments to strengthen the Dutch economy, rather than treated as general government revenue. De Pous’ plan was opposed and subsequently vetoed by the Minister of Finance. The consequences were an expansion in government spending and a rise of the fiscal deficit and state debt in the 1970s, which had to be corrected in the 1980s and the first half of 90s when it became clear that public spending had become unsustainable.

Ultimately, there was indeed a certain impact on the other sectors of economy in the Dutch case – particularly, the lagging sectors (coal production in Limburg, in particular) were affected. However, the positive effects of the booming sector, the Dutch natural gas sector, cannot be disregarded. This leads to the conclusion that the windfall revenues should be carefully managed by the government, and strict and strategic policies must be implemented in order to safeguard against the negative effects of the Dutch disease. Those policies should be directed at the sectors which are most likely to be affected by the development in the booming sector; this could include subsidies and other measures.

The advantages that gas brought to the Dutch economy and society cannot be disregarded or lost in the discussion of the impact of the booming sector on the economic situation. Overall, one can conclude that the discovery of the Groningen gas field played a major role for the development of the European energy market, as well as for the development of the gas sector in the Netherlands. The following paragraph summarises the impact of Groningen field production:

*Without the gas revenues, the Netherlands would not have suffered from the ‘Dutch disease’. [...] On the other hand, without the Aardgasbaten, investments in the very capital intense waterworks (the Deltaplan) to protect the country from flooding, and expensive infrastructure works, such as railways, would have been completely financed out of the government budget*.

To sum up, in order to minimise the impact from the Dutch disease, the countries should employ measures targeted at (1) limiting windfall revenues in the Booming sector by raising taxes and interest rates; (2) limiting the extent to which the national currency exchange rate is affected by the windfall revenues, in order to prevent the deindustrialisation effect; (3) limiting the wages in the booming sector while simultaneously subsidising wages in the lagging sector in order to

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98 Aad Correljé, et.al., *Natural gas in the Netherlands*, 154.
99 Ibid.
100 Ibid., 156.
101 The state income from gas production and sale
minimise the spending effect and the resource movement effect. Most importantly, the revenues from natural resource sale should *not* be treated as regular government revenues.

4.5. Conclusions

To what extent is Russia affected by its resource export dependency? As can be seen from figure 12, there is a direct correlation between the oil price and the exchange rate, which undermines domestic production and raises unemployment. This seems to be the classic case for the Dutch disease. This makes it relevant to refer to the case of Dutch gas exports and their consequences.

There are a set of measures which can be used in order to minimise the effects of the windfall profits from natural gas exports on national economy, which were summarised in section 4.4. The extent of their applicability differs but the general advice would be to consider the measures outlined in table 7; it is essential however to also address the possibilities to *avoid* the Dutch disease. The main policy advice that can be given at this point is to not treat incomes from natural gas sales as general government revenues. Another lesson to be learned from the case of the Netherlands is that the domestic market *can* be equally profitable as exports; and that the gasification (installation of natural gas distribution and consumption infrastructure) *can* be conducted. These are the issues that Russian government should address when dealing with the development of the gas sector in Eastern regions.
Chapter 5. Russian Energy Policy in the East: Outlook and Recommendations

5.1. Introduction

Russia is the largest gas reserves holder in the world; Russian gas production consistently exceeds domestic consumption; therefore Russia is a net gas exporter. Total proved reserves are estimated at 43.3 trillion cubic meters\(^{103}\) and are the world’s largest at 23.4 percent (see table below). This makes Russia a significant player in international energy markets, as well as predetermining a high dependence on natural gas domestically.

Table 8. World’s largest natural gas producers: reserves, production and exports

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<tr>
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<tbody>
<tr>
<td>Algeria</td>
<td>4.50</td>
<td>2.43</td>
<td>86.50</td>
<td>2.82</td>
<td>59.37</td>
<td>7.30</td>
</tr>
<tr>
<td>Australia</td>
<td>2.51</td>
<td>1.36</td>
<td>38.30</td>
<td>1.25</td>
<td>20.24</td>
<td>2.49</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3.18</td>
<td>1.72</td>
<td>69.70</td>
<td>2.27</td>
<td>33.50</td>
<td>4.12</td>
</tr>
<tr>
<td>Iran</td>
<td>29.61</td>
<td>16.00</td>
<td>116.30</td>
<td>3.79</td>
<td>5.80</td>
<td>0.71</td>
</tr>
<tr>
<td>Nigeria</td>
<td>5.22</td>
<td>2.82</td>
<td>35.00</td>
<td>1.14</td>
<td>20.54</td>
<td>2.52</td>
</tr>
<tr>
<td>Norway</td>
<td>2.91</td>
<td>1.57</td>
<td>99.20</td>
<td>3.24</td>
<td>94.97</td>
<td>11.67</td>
</tr>
<tr>
<td>Qatar</td>
<td>25.46</td>
<td>13.76</td>
<td>76.60</td>
<td>2.50</td>
<td>56.78</td>
<td>6.98</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>43.30</td>
<td>23.40</td>
<td>601.70</td>
<td>19.63</td>
<td>154.71</td>
<td>19.01</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>7.57</td>
<td>4.09</td>
<td>78.10</td>
<td>2.55</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>7.94</td>
<td>4.29</td>
<td>66.10</td>
<td>2.16</td>
<td>6.50</td>
<td>0.80</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>6.43</td>
<td>3.48</td>
<td>50.20</td>
<td>1.64</td>
<td>7.54</td>
<td>0.93</td>
</tr>
<tr>
<td>US**</td>
<td>6.73</td>
<td>3.64</td>
<td>582.20</td>
<td>18.99</td>
<td>27.15</td>
<td>3.34</td>
</tr>
<tr>
<td>Total world</td>
<td>185.02</td>
<td>100</td>
<td>3065.6</td>
<td>100</td>
<td>813.77</td>
<td>100</td>
</tr>
</tbody>
</table>

* Pipeline + LNG
** Note that while exporting some amounts of gas, the US imported 114.35 bcm in 2008


The main Russian producing fields are situated in West Siberia and natural gas from those areas is brought by pipeline to domestic and European markets. However, according to the Russian Energy Strategy, as much as 140 bcm, or about 16 percent of Russia’s total output, will be

produced in East Siberia and the Far East by 2030\textsuperscript{104} (in 2008, the level of production was at 602 bcm, while by 2030 it is expected to grow to 885-940 bcm).\textsuperscript{105} Production schedules for the fields in East Siberia and the Far East are beyond 2015,\textsuperscript{106} despite the fact that these areas are a priority for Gazprom.

As can be seen from figure 11 (see Annex), natural gas constitutes the largest part of Russia’s primary energy consumption (350.7 million tonnes of oil equivalent (mtoe) in 2009, or approximately 55 percent of total primary energy supply), followed by oil (19.7 percent), coal (13 percent), nuclear and hydro (appr. 6 percent each).\textsuperscript{107} About 54 percent of produced gas is consumed domestically.\textsuperscript{108}

Table 9. Documents on Russian energy policy

<table>
<thead>
<tr>
<th>Document</th>
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<tbody>
<tr>
<td>Law on Subsoil Resources, 1992</td>
<td>The subsoil resources, including energy resources, belong to the Russian state (article 1.2) and the state is in charge of regulation of the use of subsoil resources (articles 35-38).</td>
</tr>
<tr>
<td>Law on Gas Supplies, 1999</td>
<td>Introduced the Unified System of Gas Supplies which can be owned by an organisation as a result of privatisation or purchase. Division of the Unified System of Gas Supplies in not permissible.</td>
</tr>
<tr>
<td>Energy strategy to 2020, 2003</td>
<td>Asian (eastern) direction is acknowledged as increasingly important for gas export. Thus the strategic priority is the development of transport infrastructure. Principles: (1) Priority of gas supply for domestic consumers; (2) Extention of Unified System of Gas Supplies to the Far East; (3) Increased economic effectiveness of the projects; (4) Supplies to the East are ensured by means of East Siberian and Far Eastern fields.</td>
</tr>
<tr>
<td>Law on Gas Exports, 2006</td>
<td>The owner of the Unified System of Gas Supplies (Gazprom) attained the exclusive rights of gas export (article 3).</td>
</tr>
<tr>
<td>Gazprom: East Gas Programme, 2007</td>
<td>Gas production centers in Krasnoyarsk krai, Irkutsk oblast, Sakha republic and Sakhalin. Simultaneously to the transportation and distribution facilities gas processing and chemical plants should be built, including LNG facilities.</td>
</tr>
<tr>
<td>Energy Strategy to 2030, 2009</td>
<td>General goals. Production: development of the new territories; efficiency; investments. Market: development of more effective system of tariffs and price mechanisms. In respect to gas the objective is to decrease its share in the fuel mix, while the share of clear/renewable energy sources should increase (through state support to nuclear and coal fired electricity production). Regions: regional approach through regional programmes and focus on the use of locally available resources. Diversification of exports</td>
</tr>
</tbody>
</table>

Sources: Federal Law on Gas Exports N 117-FZ of July 18, 2006. \url{http://www.rg.ru/2006/07/20/gaz-export-dok.html} (15.05.2009); Federal Law on Gas Supply in Russian Federation N 69-FZ of March 31, 1999. \url{http://base.garant.ru/180285.htm#doc} (15.05.2009); Law on Subsoil Resources N 2395-1 of


\textsuperscript{105} Ibid.


\textsuperscript{107} BP, \textit{Statistical Review of World Energy}

The main objective of this chapter is to answer the following questions: To what extent the experience of the Netherlands in gas exports in 1960s and 1970s is applicable in contemporary context of Russian exports to Northeast Asia? What policy implications would it suggest? We will be drawing on section 4.2 for a theoretical background; energy security issues will play a major role in this chapter as well. The following sections will address existing projects and provide policy recommendations.

5.2. Export ambitions in the Northeast Asian market

5.2.1. Volumes

Until 2009, 100 percent of Russian exports were to the West, to Europe (148 bcm), Ukraine (55 bcm) and Turkey (26 bcm). The discussion of European security of supply following the Ukrainian gas crises of 2006 and 2009, and policies of diversification activated the discussion of exports diversification in Russia, since Europe is the main destination for Russian gas. However, ideas of exports diversification, and particularly possibilities of Asian export routes had already been discussed at earlier stages at high levels in Russia. Proposed routes included pipeline exports primarily to China, but also possibly to Japan and Korea, as well as LNG exports from Far Eastern terminal(s).

Given Russian general objective of exports diversification one can conclude that Northeast Asian states provide a good prospective market. This is due to the following reasons: stable or growing demand, expiry of long-term contracts of Japan and Korea, policies of diversification (especially diversification away from coal in the Chinese case). A strategic decision to be made is the choice between pipeline or LNG exports. Pipeline projects not only to China, but also to Japan and Korea could be considered a viable option from the Russian perspective. The first factor that allows this discussion is simply the distance from the gas fields in the Russian Far East.

109 BP, Statistical Review of World Energy
110 See, for example, Alexandr Medvedev, Gazprom’s View on the New EU Initiatives and Russia’s Gas Exports, in European Energy Review http://www.europeanenergyreview.eu/index.php?id=392 (18.03.2009)
111 For example, Eastern dimension it is explicitly present in the 2003 Energy Strategy; the work on the Eastern Gas Programme started as early as 1970s and 80s; a decree has been issued by the government in 2002 in order to develop an eastern strategy for gas industry development, including exports; by 2007, such a programme was produced by the Ministry of Industry and Energy and Gazprom.
Secondly, Russia has extensive experience in ‘pipeline politics’ as well as construction and maintenance, so this might be another argument in favour of pipeline gas exports to Russia’s eastern neighbours.

There are gas export pipeline projects from Russia involving both Japan and Korea. The Japanese project involves the same reserves as are used for the Sakhalin II LNG plant; the pipeline would connect the southern end of Sakhalin and northern end of Hokkaido, then continuing to the island of Honshu and splitting into two trunk lines along the eastern (toward Niigata) and western (toward Tokyo) coasts of Honshu. The Korean project involves East Siberian gas fields, the pipeline would go through either China and the Yellow sea, or through the territory of North Korea. Both options obviously add transit risk which would be especially acute in case the transit country is North Korea.

From the Russian perspective, exports to China are essential. Firstly and [geo]politically, this will allow Russia to diversify its sources of export – an objective that has been present in policy documents for the past several years. Besides, economically, for Russian regions of the Far East and East Siberia, this might be an opportunity. Of all the possibilities in Northeast Asia, the option of cooperation with China is the most attractive for Russia. Primarily this is related to the fact that Russia and China have a common border – which is not the case with South Korea. Pipelines built on the surface are technologically less complex and financially more viable than undersea pipelines, and it is the latter that would connect Russia and Japan, and Russia and South Korea (via China). Finally, the issue of export incomes is highly important for Russia, since 80 percent of its exports are natural resources, and oil and natural gas exports make 20 percent of total export incomes. According to the Energy Strategy, the share of the Asia-Pacific region is expected to constitute 20 percent in total Russian exports by 2030.

5.2.2. Rents

Governments are not the only participants that receive rents from natural gas production and export. Companies that are in charge of production and export are also able to receive part of the rent. According to the net-back principle, the average export price could be determined by the

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113 www.ruseconomy.ru
following formula:\textsuperscript{115}

\[ P_e = P_i + C_{tr} + T \]

Where:
- \( P_e \) is export price;
- \( P_i \) is internal price;
- \( C_{tr} \) is cost of transportation;
- \( T \) is export tax.

Knowing the market condition in Russia as of 2009 (export price is appr. $300 per thousand cubic meters,\textsuperscript{116} average internal price is 2391 roubles,\textsuperscript{117} or appr. $79, and the transportation costs are appr. $40), it follows from the equation that the export tax could have been $181, or 60.3 percent of the export price. However, the export tax is set at 30 percent, or $90 for this set of conditions, leaving $91 as Gazprom’s profit. Although it used to be higher (appr. $165 in 2007\textsuperscript{118}), this is still a significant amount, giving a rent of $16.016 bln in 2009. The rent is spent on investment with the approval of the Russian government, which has a 51 percent share in the company.

As a result, the rents are shared between the government and the company. Consequently, the risks are shared too. In table 10, the major risks concerning cross-border gas trade are presented.

\textbf{Table 10. Risks associated with cross-border gas trade}

| Risk of interrupted gas flow | Contract |
| Risk of interrupted gas flow / case of monopolistic pipeline | Supranational Regulation |
| Risk of non-payment upon delivery | Contract / \textit{Pacta sunt servanda} |
| Environmental threat | National regulation |
| Risk of non-performance of companies | Government shares |
| Risk of project non-performance | Contracts + supranational dispute settlement |


Gazprom shows some interests in vertical integration (maintaining control over all parts of the

\textsuperscript{115} Formula as used by Kuzovkin, Assessment of the Export Tax In Conditions of Equal Profitability of Exports and Internal Sales, in \textit{Microeconomics}, 2008, N6, 39. [In Russian]

\textsuperscript{116} BP, \textit{Statistical Review of World Energy}.

\textsuperscript{117} Federal Tariff Service of the Russian Federation, quoted by RIA Novosti

\textsuperscript{118} Kuzovkin, Assessment of the Export Tax In Conditions of Equal Profitability of Exports and Internal Sales, in \textit{Microeconomics}, 2008, N6, 39. [In Russian]
value chain). Control over the entire value chain would result in a monopoly and power over the consuming market, and in the European case Gazprom has attempted to integrate into the downstream market as far as possible – however full vertical integration of the value chain neither by seller, nor by buyer, is not possible given the liberalisation policies in the European Union. As far as Northeast Asia is concerned, it is seen as a strategic objective for Gazprom to directly participate in infrastructure development in such countries as China, Mongolia, Korea, and Japan.\textsuperscript{119} China has attempted to secure supplies by moving upstream and securing certain oil and gas fields; Korean KOGAS has indicated certain interest in upstream involvement at the Kovykta field in Russian East Siberia.\textsuperscript{120} As far as Japan is concerned, gas supplies are secured through long-term contracts, but in the oil sector Japan does have projects abroad, which include concessions (or attempts to receive ones) in Saudi Arabia, Iran and the Caspian Sea region.\textsuperscript{121} We can assume that if a more competitive gas market develops in Northeast Asia, a similar policy can be used to secure gas deliveries.

By vertical integration, consumer states can pursue the objective of security of supply, by managing risks of volumes and project or company non-performance. Additionally, this allows a buyer company to receive part of the rent from natural gas production. Vertical integration in this case is a measure of risk settlement; it is conducted through respective provisions in the contracts and not through ownership.

Some tentative conclusions can be made at this stage:

1. When referring to Russian eastern pipeline exports, one should focus on the Chinese direction; while in respect to the LNG the destination would be Japan and Korea.

2. For both pipeline and LNG gas flows, risks are allocated along the value chain, which is divided by the delivery point on upstream (area of responsibility of the supplier) and downstream (the responsibility of the consumer). On both producing and consuming sides, there are several actors involved. The rents are shared between those actors.

3. There are attempts from both Gazprom and the companies downstream to secure gas flow through vertical integration; it is to be conducted through respective provisions in the contracts and not through ownership.

\textsuperscript{119} Dobretsov et. al., The Altai Pipeline and the Perspectives for Russian Exports to the Asia-Pacific Region and Transit Regions Development, in \textit{Far Eastern Affairs} N3, 2007, 95.
\textsuperscript{120} ANGI [Oil and Gas Information Agency] Samotlor-Express, \textit{Threat of KOGASification of the Russian Far East}, 4 February, 2010.\texttt{www.angi.ru} [In Russian]
5.3. Existing projects

5.3.1. Pipeline projects and pipeline economics

There are two pipeline projects from Russia to China – one to North-West China, and one to North-East China (see Maps 2, 3 and 4 in the Annex). The Altai pipeline is planned to go through Barnaul, Biysk and Gornoaltaisk toward Urumqi in Xingjian province along the automobile road, without crossing territories of any other countries. The pipeline could pass the Utok plateau, and there are no technical complications related to either the construction of the road, or to the construction of the pipeline (according to geologists from the Russian Academy of Science).\(^\text{122}\) The proposed size of the pipeline is 1420 mm, and proposed capacity is 30 bcm per annum.\(^\text{123}\) With regard to the strategic importance of the pipeline for Russia and particularly the Altai region, assuming that the plans for affiliated local distribution network will be pursued, the project has the potential to play a large role in reforming the pattern of consumption in a region which is currently dominated by coal. Development of gas use accompanying the export pipeline project will contribute to improvement of the general ecological situation in Altai region, allowing for cuts in CO\(_2\) emissions. The above mentioned Utok plateau, however, is a valuable field for archaeologists\(^\text{124}\) – so there could be some difficulties with actual construction of the pipeline due to cultural considerations.

The second project is the pipeline to connect the Russian Far East with China’s North-Eastern provinces. The priority within the Eastern Gas programme was given to the Western Route, i.e. the Altai project,\(^\text{125}\) and there are no technical specifications available concerning the Eastern Route. Despite this priority, the following factors highlight the importance of the Eastern Route to Russia. Firstly, there is currently demand for Russian gas in China’s west after the opening of Turkmenistan-Uzbekistan-Kazakhstan-China pipeline with projected capacity of 60 bcm in December 2009. The pipeline connects to China’s West-East Pipeline (WEP). Local consumption in the North-West is not large enough to absorb another 30 bcm of Russian gas; the capacity of the WEP is 17 bcm annually. Although a second 30 BCM/a West-East Pipeline (to Guangdong province) is currently under construction, its capacity has already been reserved for the distribution of Central Asian imports. Therefore, if Russia wants to pursue gas exports to

China, it has to consider the Eastern Route. Secondly, there is demand growth potential in North-East China, which would receive natural gas from the Russian Far East. The characteristic feature of the three provinces in the North-East of China (Heilongjiang, Liaoning, and Jilin) is the level of industrial development. Historically, it is these three provinces that used to be the industrial cradle of the ‘New China’ – they played a major role in industrial development in the 1960s and 1970s. According to the 2003 region development plan, the purpose is to further develop the industry in the region, and energy will play an essential role in achieving this objective. These two reasons suggest that it would be more promising in current circumstances to focus on the eastern route. However, this is not the case at present.

Both Russian and Chinese markets on the national level employ the *cost-plus principle*. In Russia, planned regulation of prices is still fixed by the law. The Russian Government controls the wholesale price for natural gas on the domestic market through Gazprom; however, the volumes and structure of distribution are not determined by the Government. Despite the introduction of the transport tariff, the general structure of the domestic market remained unchanged since Soviet times. State regulation of prices is based on the cost-plus principle. In China, the price paid by the consumer includes the following elements: ex-plant price (controlled by the central government and determined for each gas field and differentiated depending on the final customer); transportation tariff (controlled by the central government and principally determined by the distance); end-user price (controlled by the local government). Thus, the essence is cost-plus basis. Overall, the end-user price paid by consumers in China does not provide sufficient incentive for exporting states to build pipelines to supply the Chinese market, despite its fast economic growth.

For exporters, it is more attractive to use the principle of determining the price level based on the price of competing fuels in consuming market. This will allow Russia to receive maximum rent from gas sales in this particular market. This could further be developed if there is a competitive market for Russian gas in the region. Since Russia wants to maximize its rents, it is logical to

129 The ‘cost-plus principle’ determines the price paid by the end-user; based on costs of production, transportation and distribution of the resource. The alternative is ‘net-back pricing’. Using this principle, the end-user price is determined by the replacement value of competing fuels. As a result the price of gas at the delivery point is the end-user price, less transportation and distribution costs.
130 Hwy-tak Yoon, China’s Northeast Project, 28.
use the net-back principle based on the price for competing fuels in the consuming market. And it is the consuming market where the problem lies in this particular situation. As has been noted before, the competing fuel in China is usually coal (except for some industries which are using oil). Given domestic supplies and lower prices for coal, gas import prices have to be low to make gas competitive on the Chinese market. There is a possibility that following the development of unconventional gas production, the internal price will increase due to more complex exploration and production processes; however, this is unlikely, with the possibility of large scale production of unconventional gas beyond 2020.\textsuperscript{132} This is the essence of a problem which has impeded the negotiations on gas supplies between Russia and China in recent years.

As for pipeline projects to Japan and Korea, despite projects and think-tanks working on an integrated pipeline network in Northeast Asia,\textsuperscript{133} it seems highly unlikely that pipelines will reach those two countries. In case of Japan, the reason is the absence of an integrated pipeline network on the territory of the country; moreover, the incentives for creating one, except the prospect of building an import pipeline, are very weak. In the Korean case, there is an integrated domestic pipeline network; the problem is geographic (or geopolitical): if the pipeline is constructed over land, it would pass through North Korea territory, which would pose a major security of supply threat.

\subsection*{5.3.2. LNG projects}

For pipeline projects connecting Russia with Japan and with South Korea, there are certain inhibitors. If we compare those pipeline projects and LNG deliveries, it becomes clear why no pipelines have been constructed. Costs would play a major role if onshore pipelines were discussed. But since both projects would involve offshore pipelines, the costs will increase. Considering that both countries already have LNG receiving terminals, LNG transport seems a viable option. Moreover, from a Russian perspective building a liquefaction terminal means not only strengthening ties with Japan and Korea, but in the longer run a possibility to play a more significant role in the Asian natural gas market by supplying China and India. However, the Energy Strategy states that pipeline transport is a priority.\textsuperscript{134}

\textsuperscript{132} Carola Hoyos, China Gas Growth to Hit West, in \textit{Financial Times}, July 26, 2010.


\textsuperscript{134} Russia’s Energy Strategy to 2030, \url{http://www.energystrategy.ru/projects/es-2030.htm} (25.11.2009); note also that on the western side, the Shtokman LNG plant operation start is delayed, while the pipeline projects of North Stream and South Stream seem to be moving ahead. This indicates overall priorities from the Russian side.
None of the pipeline projects have entered an active phase. Christoffels argues that “Japan’s diversification policy […] became a victim to the broader political goal of turning th[e] long-standing territorial dispute into Japanese favour”. On contrary, it can also be argued that pipelines are not economically viable in the absence of a domestic pipeline distribution system. In the case of Korea, the geopolitical factor plays a major role. Given current conditions and in the foreseeable future, the objective of a Northeast Asian pipeline network with centre in Sakhalin are set to remain ‘great eastern pipe-dreams’.

It is important to mention at this stage that the necessary condition of Russian gas to compete with other sources of gas supplies (LNG in case of Japan and Korea, and pipeline imports from Central Asia in case of China) is an essential difference between the first case (Dutch gas exports to Western Europe) and the second case (Russian exports to Northeast Asia).

### 5.3.3. Pipeline versus LNG

For pipeline projects with destination markets in Japan and Korea referred to in section 5.2, there are certain inhibitors. If we compare those pipeline projects and LNG deliveries (table 11), it becomes clear why no pipelines have been constructed. Costs would play a major role if onshore pipelines were discussed. But since both projects would involve offshore pipelines, the costs will increase. Considering that both countries already have LNG receiving terminals, LNG transport seems a viable option. However, according to the Energy Strategy, pipeline transport is still a priority.

<table>
<thead>
<tr>
<th>Table 11. LNG / international pipeline comparison</th>
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<tr>
<td><strong>LNG</strong></td>
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<td>Costs</td>
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<td>Transit and policy issues</td>
</tr>
</tbody>
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138 Russia’s Energy Strategy to 2030, [http://www.energystrategy.ru/projects/es-2030.htm](http://www.energystrategy.ru/projects/es-2030.htm) (25.11.2009); note also that on the western side, the Shtokman LNG plant operation start is delayed, while the pipeline projects of North Stream and South Stream seem to be moving ahead. This indicates overall priorities from the Russian side.
To conclude this section, some observations are relevant:

1. The entrance of Russia into the Asian gas market through LNG rather than pipeline is more a necessity than a result of a strategic choice between the two options.

2. There is a lot stronger competition from LNG supplies, as far as pipeline export projects from Russia to Northeast Asia are concerned. This is an essential difference between the two cases under discussion – in Northeast Asia, there are preconditions for gas-to-gas competition, while there were no such conditions in Western European market at the time when the Netherlands started to export natural gas.

3. It seems that the supplier(s) in the Northeast Asian market will not play as important role as in Western European market, since the developments will most likely be demand-led, particularly from the Chinese side. In Western Europe, the development of the market was rather regulation-led, with initiative, again, deriving from the Netherlands.\(^{139}\)

4. In the Russian-Chinese case, there will certainly be some government involvement as far as the cross-border gas pipelines are concerned. For Russia, the Eastern Gas Programme represents a project of strategic importance. For China, increasing the share of natural gas in total primary energy supply is a strategic objective, according to the Eleventh Five-Year Plan.\(^{140}\) This means a higher level of commitment of the parties to a cross-border project.

5. With prospective pipelines built and LNG exports commenced on a large scale, can we refer to the case of gas market integration in the region of Northeast Asia? To answer this question we have to focus on two levels: the regional level and the level of bilateral relations. On a regional level, the pipeline system cannot serve as an integrating factor due to the physical unfeasibility of a regional pipeline network. In the Russia-Chinese context, when both countries domestically employ cost-plus principles for gas price, there could hardly be any discussion of competition.

\(^{139}\) The main regulatory initiative is the European Energy Charter, the idea of which was initiated by the Dutch Prime Minister Ruud Lubbers in 1990. Aad Correljé, et.al., *Natural Gas in the Netherlands*, 124.

5.4. Policy adjustments based on the Dutch experience

In section 4.5 we concluded that there is a set of measures which can be used in order to minimise the effects of the windfall profits from natural gas exports on national economy. Russia, as a country susceptible to the Dutch disease, should employ measures targeted at (1) limiting windfall revenues in the Booming sector by raising taxes and interest rates; (2) limiting the extent to which the national currency exchange rate is affected by the windfall revenues, in order to prevent the deindustrialisation effect; (3) limiting the wages in the booming sector while simultaneously subsidising wages in the lagging sector in order to minimise the spending effect and the resource movement effect. Most importantly, the revenues from natural resource sale should not be treated as regular government revenues. Additionally, we have found out that it could be useful to create an integrated gas supply system and invest more actively in smaller fields exploration and development. The following subsections will focus on the degree of applicability of these policy suggestions.

5.4.1. Domestic level: a necessary reform

In the case of the Netherlands, the oil-induced recessions exposed the unsustainability of the trends in the country’s economy. A parallel can be drawn between conditions in the Netherlands in the 1970s and in Russia currently, in the context of the world economic crisis. From figure 11 it is evident that the oil price, exchange rate and unemployment rate are indeed related. The connection between the export price for Russian URALS oil and the exchange rate seems quite straightforward: the fall in oil prices in autumn 2008 caused a weakening of the Russian rouble. As we have seen from the analysis in section 3.2, the strengthening of the exchange rate of the national currency leads to resource movement effect and spending effect, as well as effects of direct and indirect deindustrialisation – which become acute problems in a situation where windfall profits cease. The situation with unemployment, despite adhering to the booming sector model, besides resource movement effect, could also have been worsened by perceptions of employers concerning the crisis dynamics that forced them to discharge some of their employees.

Without going into detail, it is still possible to conclude nevertheless that since the economic situation is strongly affected by the volatilities in oil (and hence gas) price, there should be some change made to the existing policies. First of all, there should not be a single dependency on
revenues from export. The domestic price reform projects in this light seem a reasonable initiative, although the exact measures (the pace of the reform; the formulas) are causing some critical discussion. Secondly, we believe it should have been possible for the government to raise taxes for the corporations in times of high prices. Currently, there is a proposal under discussion to increase the extraction tax; in the absence of an adequate price reform this could cause a problem. The extraction tax currently is established at 147 roubles, or approximately 5 Eur per thousand cubic meters of produced gas. There is a proposal to increase this tax five-fold, which would mean that the tax will be nearly as large as the cost of production. For Gazprom, having access to export revenues, this will not pose a major problem; for the independent producers, who are only authorized to supply the domestic market, in the absence of the accompanying domestic price reform this would mean much harder business conditions.

Besides the difficulties mentioned above, there are some general problems in Russian energy sector:

1. Reliance on the export profits of the whole economic system. In this regard the fact that oil prices decreased, and are now more or less stable at an average level, is ultimately the reason for the modernisation discussion. Russia has to modernise its energy sector and stimulate innovative development (and not only because of the recent polemics of the president; the publications from the specialists and researchers pointing at the necessity of the innovative development path were there throughout the whole decade).

2. Rents are received by the ‘wrong’ addressee (insufficient rents to the social welfare) – and that is why the policy of maximising rent might not make a significance difference to the regional development in the Russian Far East, for example.

Some solutions can be found nevertheless:

1. Assess the competitiveness of the technical, technological, social and economic-organisational approaches to the development of key projects;

2. Create conditions for stable demand for production of mechanical engineering and machinery construction as a means for modernisation of these sectors;

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141 Kuzovkin A., Assessment of the Export Tax In Conditions of Equal Profitability of Exports and Internal Sales, in Microeconomics, 2008, N6, 39-42.
142 Ibid., 40.
144 Kuzovkin A., Assessment of the Export Tax, 40.
145 For example, Anna Bessonova of Carnegie Center Moscow (Oil production in Russia: State Policy and Innovation Perspectives, Moscow: Carnegie Endowment, 2009), Valeriy Kryukov of State University – Higher School of Economics and others (‘State Regulation of the Oil and Gas Sector: Necessity and Prudence of Using the Evolution Approach’ in Mineral Resources in Russia: Economics and Management 2003, No.3-4)
3. Scientific and technical policy should be analysed in the context of the changing relations between power and business;

4. Opportunity to use opinion and initiatives of ‘clusters’ (groupings of companies closely connected by their field of activity) in policy-making should be given proper attention. Clusters appear only under conditions of horizontal contacts.

5. Stabilisation fund was a positive development, Without the fund the consequences of the crisis would have been much more severe – when the oil price started to fall, the reserves from the Stabilisation fund were used to support the falling exchange rate of the rouble, which in case of sharp decline would have caused much harder consequences.

The last two policy suggestions are not so easily implementable. The small fields policy is not high on the agenda of the Russian government and Gazprom; from the latest projects it becomes evident that the priority is given to mega-projects (Yamal), while smaller fields within reach from the infrastructure (eg. in Nadym-Pur-Taz region) are not developed. There are problems with the Unified System of Supply as well. Competing fuels (coal) are cheap while the cost of the required infrastructure is very high; since independent suppliers have no export opportunities and thus do not have the export revenues, they cannot often afford the infrastructure and therefore Gazprom enjoys monopoly both in exports and in supplying the domestic market; the development of the domestic market is not a priority however and this leads to the principal-agent problem. The government as a principal is interested in the realisation of the social-economic benefits derived from the gas resources, but the agent, Gazprom, has its own interests (profit maximisation), and this is the main inhibitor in the implementation of this policy initiative.

5.4.2. The International level: an overarching regime

A general regime is needed because currently there is no obvious mechanism of conflict resolution in situations where there is a natural conflict of interests between a buyer and a seller. The potential consequences of the lack of such a regime include: reconciling different legal and regulatory regimes results in increasing transaction costs for building and operating the pipeline; importers become vulnerable to the decision by supplier to stop supplies, while

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148 ESMAP, Cross Border Oil and Gas Pipelines, 20.
suppliers become vulnerable to consumers refusing the supplies; in a situation when there is not enough competition, the allocation role is transferred to the jurisdiction of a supranational regulatory agency, and in absence of such there is of the potential for misallocation of resources.\textsuperscript{149} Generally (as a matter of common understanding) such a regime should concern itself with three main areas: cross-border trade; transit issues and investment. In our case the areas of reference will be cross-border trade and investment. Concerning cross-border trade, the main aspect must be a conflict resolution mechanism; concerning investment, an investment protection mechanism is required. Importantly, these risks are equally presented for pipeline projects and LNG projects in the case under discussion, because in the Northeast Asian gas market, LNG trade is still conducted under long-term take-or-pay agreements, while ability to sell untaken LNG elsewhere is uncertain.

This brings us to the idea that the Energy Charter Treaty (ECT, signed in 1994) could be an option for an overarching jurisdiction in case of Northeast Asian gas market because it does contain provisions on a dispute settlement mechanism, as well as an extensive system of investment protection. Moreover, the ECT is the only document which regulates international trade in energy. It uses the World Trade Organisation (WTO) provisions by reference,\textsuperscript{150} the main aspects of those are non-discriminatory access to resources and infrastructure, which translate into a right of access to available capacity (no free third party access is required according to the ECT provisions).\textsuperscript{151} The general understanding is that ‘all like forms of energy and energy products, whether imported or domestic, must be given equivalent treatment and equal competitive opportunities in the importing country in accordance with the requirements of the GATT and the WTO Agreement’.\textsuperscript{152} The reason why a specific framework is needed for energy trade is because of national sovereignty over natural resources, including energy resources.\textsuperscript{153} The legally binding basis is what makes the ECT attractive as a possible framework (at least a framework of reference).

Despite the fact that the ECT does provide a certain ‘minimum standard’ for security in energy

\textsuperscript{149} Ibid., 20-21.
\textsuperscript{150} Yulia Selivanova, Trade in Energy: Challenges for International Trade Regulation. http://www.wto.org/english/res_e/publications_e/wtr10_11june10_e.htm (20.06.2010)
\textsuperscript{151} André Mernier, Debating the Charter at the Energy Committee of the Russian State Duma (A speech at the Russian State Duma, December 7, 2006), http://www.encharter.org/index.php?id=59&id_article=16&L=0 (05.07.2010) [In Russian]
\textsuperscript{153} General Assembly resolution 1803 (XVII) of 14 December 1962, "Permanent sovereignty over natural resources". http://www2.ohchr.org/english/law/resources.htm (05.07.2010); Energy Charter Treaty Art.18.
trade, it is not very feasible that it will actually be used by China and Russia (Japan and Korea are signatories to the Treaty)—because China is an observer state and Russia terminated the provisional application of the Treaty in summer 2009, following the Ukrainian gas crisis, the consequences of which were not prevented by the Treaty’s dispute settlement mechanism. Added to the previous problems Russia had with the ECT are the long-lasting difficulties related to the Transit Protocol (the absence of which was the official reason for postponing ratification in 2001), and the disagreements with European policy concerning trade in nuclear materials (which became more acute with the EU enlargements of 2004 and 2007).  

It has also been suggested that, ‘the existing energy sector governance system is tilted towards one group of energy import dependent consumer interests’. Problems of the ECT, on the conceptual basis, might also include the following elements:

1) The Charter was created as a tool for fostering trade between former Eastern bloc states and Western Europe. As conditions have changed, the Treaty should change too. (With regard to investment, it has to be mentioned, however, that investment protection has two dimensions—it could also protect Russian investment in Europe, so in that sense the provisions are responsive to the reality).  

2) After Russia stopped provisional application it may not make sense to other countries, in particular Central Asia, to be a part of the treaty as well; they are seeking ways to find a common ground with Russia, and the ECT is no longer a feasible option. (However, it is important thing to consider that Russia did not fully withdraw from the EC process all together—it just decided to not be a party to a legally binding agreement, while still remaining in the discussions).

An interesting idea in light of these difficulties is the suggestion that ‘Russia’s vital economic interest now appears to accord more with those of the growth economies in Asia, such as China which it has gathered in the Shanghai Cooperation Organisation (SCO), than with those of the OECD’. There is a de facto development of the SCO common energy market, however any

154 André Mernier, Debating the Charter at the Energy Committee of the Russian State Duma (A speech at the Russian State Duma, December 7, 2006), http://www.encharter.org/index.php?id=59&id_article=16&L=0 (05.07.2010) [In Russian]  
structured framework is lacking.

The SCO framework, however, includes only one of the consumer states. There are other organisations that involve all three Northeast Asian countries and Russia (at least at the level of general interest and participation in the discussions): ASEAN Regional Forum, ASEAN + 3 framework. For those organisations, the problem is the lack of energy focus, and therefore they cannot serve as authority in energy related disputes.

There is no alternative to the ECT as a legally binding framework. It seems essential, however, to still have the framework worked out on a regional basis. Given the fact that there is no global natural gas market, there can be no global gas market regulating treaty. Moreover, the Energy Charter was once called the European Energy Charter underlining the regional meaning of the initiative. It seems that while stretching the limits to the Treaty, the character has to become more general, and more holistic, thus limiting the number of provisions that could potentially be legally binding – thus losing prominence of the most important feature inherent to the document.

In conclusion, the following observations can be made:

1. As it has been discussed earlier, there is a lack of the price formula in the negotiations between Russia and China concerning the possibility of building a pipeline. Behind the lack of a price formula there could well be difference in the perception of risks – or the lack of agreement about the costs for securing those risks. In this light, it seems essential to have a mechanism that would structure certain risk management principles; in other words, an ‘overarching regime’ that would simplify the establishment of common starting ground.

2. LNG price formula settled at the moment, but concerns remain regarding the logic of price indexation to oil product prices.\textsuperscript{159}

3. The question then arises, whether the ECT can serve as such an overarching mechanism, or whether it could provide the basic principles for a natural gas trade regime in Northeast Asia? This is a relevant question because to date the ECT is the only legally binding document in the sphere of trade in energy resources. At the same time it could be argued that unless the Treaty incorporates the new developments in the European gas market (and the increasing role of the former ‘Eastern Bloc’) into consideration, there is no future for this agreement as a basis for a legal framework in international energy trade. This conclusion is premature, however. The ECT is still the only legally binding treaty in energy trade, and within

\textsuperscript{159} For more details, see Akira Miyamoto, and Chikako Ishiguro, \textit{A New Paradigm for Natural Gas Pricing on Asia: A Perspective on Market Value} (Oxford: Oxford Institute for Energy Studies, 2009).
the SCO there is no mechanism to enhance energy security, while ARF and ASEAN + 3 frameworks lack energy focus altogether. The provisions are not as ‘outdated’ as they may seem. The solution in the Russia-China case could be to use some provisions from the ECT in order to establish a regional framework of cooperation, possibly including the Central Asian states as far as pipeline trade is concerned.

5.5. Conclusions

The first important conclusion is that LNG and pipeline gas flows, particularly in the case of Northeast Asia, are not much different. One could expect a higher level of flexibility from LNG supplies and hence more liquid market; however, since most gas trade is conducted under long-term contracts (the structure and price indexation of which is derived from a traditional long-term contract introduced in Western Europe in 1960s), we can talk about traditional risks and hence traditional risk management (allocation along the value chain) when exports to Northeast Asian are concerned.

Secondly, there are some important differences between the two cases we have studied in the previous chapters. There is stronger competition from LNG supplies, as far as pipeline export projects from Russia to Northeast Asia are concerned. This is an essential difference between the two cases under discussion – in Northeast Asia, there are preconditions for gas-to-gas competition, while there were no such conditions in the Western European market at the time when the Netherlands started to export natural gas. It seems that the supplier in the Northeast Asian market will not play as important a role as in Western European market, since the developments will most likely be demand-led, particularly from the Chinese side. In Western Europe, the development of the market was predominantly regulation-led, with the initiative deriving from the Netherlands.160

Now we can answer the research question that was asked at the beginning of this chapter: To what extent the experience of the Netherlands in gas exports in 1960s and 1970s is applicable in contemporary context of Russian exports to Northeast Asia? Despite the differences between the markets, there are some clear similarities in the development of national economies, especially affected by external economic difficulties (the oil price shocks in the 1970s and the economic recession in 2008-2009). This leads to the conclusion that as the causes

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160 The main regulatory initiative is the European Energy Charter, the idea of which was initiated by the Dutch Prime Minister Ruud Lubbers in 1990. Aad Correlj, et.al., Natural Gas in the Netherlands, 124.
and the outcomes can be compared, so can be the measures. **What policy implications would the Dutch experience suggest?** This is where we see the limit for comparison, because the economies are essentially different, and so is the international economic situation. We could try to give some suggestions nevertheless. First, the revenues to the booming sector should be limited by means of tax increases. This measure must be coordinated with the domestic price reform. Secondly, it seems reasonable to use measures to prevent resource movement effect – namely, to artificially keep the wages in different sectors comparable. Thirdly, in order to prevent spending effect, an important policy implication is that windfall revenues from natural resources export should not be treated as regular government revenues. These measures are different in their degree of applicability; with tax and price reform being more complicated ones, and latter having been implemented in the past already.
Chapter 6. Conclusion

Several observations can be made with regard to Russia’s (prospective) role in the Asia-Pacific gas market. In relation to Japan and South Korea, LNG is the most logical option for Russia to pursue its policy of exports diversification. There are separate projects of pipeline connections with Japan and South Korea, as well as a ‘dream’ of an integrated pipeline network in Northeast Asia. However, due to different constraints those projects remain unrealistic. Secondly, LNG exports in general are of a greater importance to Russia than just trade with Northeast Asian countries. Distance in the LNG trade plays a far less important role because the price increase that follows distance increase is not as sharp as in the case of pipeline deliveries. With gaining more experience in LNG technology and better knowledge of the market, Russia might become a part of an increasingly globalised LNG market, potentially being the link that influences price compatibility in both Atlantic and Pacific LNG trading basins. Once the LNG price formula is settled, there are some concerns about the logic of price indexation to oil product prices.

In the Russia-China case, there will certainly be some government involvement as far as the cross-border gas pipelines are concerned. For Russia, the Eastern Gas Programme represents a project of strategic importance – it appears in the Russian Energy Strategy to 2030 as one of the vectors of the development of the Russian energy sector, including both internal and international dimensions.\(^{161}\) For China, increasing the share of natural gas in total primary energy supply is a strategic objective, according to the Eleventh Five-Year Plan.\(^{162}\) This means a higher level of commitment of the parties to a cross-border project. As has been discussed earlier, there is a lack of price formula in the negotiations between Russia and China concerning the possibility of building a pipeline. Behind the lack of the price formula there could well be a difference in the perception of risks – or the lack of agreement about the costs for securing those risks. In this light, it seems essential to have a mechanism that would give certain principles to risk management; in other words, an ‘overarching regime’ that would simplify finding the common starting ground.

With prospective pipelines built and LNG exports commenced on a large scale, can we refer to the case of gas market integration in the region of Northeast Asia? To answer this question we


have to focus on two levels: the regional level and the level of bilateral relations. On the regional level, a pipeline system cannot serve as an integrating factor due to the physical unfeasibility of a regional pipeline network. In the Russia-Chinese context, when both countries domestically employ cost-plus principles for gas price, there could hardly be any discussion of competition. On the other hand, the cost-plus price formula did not prevent Russia from becoming an essential player on the European gas market, where competition can only be seen at the point of final investment decisions for new pipelines, while there is no real gas-to-gas competition. This could be the case with the Chinese market, too: the competition of pipelines to supply the Chinese market is already a reality (the prospective Altai pipeline versus the already active Turkmenistan-China pipeline). This leads us to the conclusion that LNG will continue to play an essential role in Northeast Asian regional market providing another source of gas-to-gas competition, particularly in the Chinese gas market which seems to be the key of the regional gas market integration.

The research objective of this paper was identified as being: **Based on the experiences of the Netherlands in establishing the rules of the game in an embryonic market, we had to examine to what extent this experience can logically be used by Russia in the Northeast Asian gas market.** The analysis of the two cases has been involved in this paper:

<table>
<thead>
<tr>
<th>Case 1</th>
<th>Case 2</th>
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<tr>
<td>Natural gas exports from the Netherlands to Western European countries in 1960s and 1970s.</td>
<td>Russian [potential] gas exports to countries of Northeast Asian region.</td>
</tr>
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From the research objective, three questions have been derived:

1. To what extent the comparison of the two cases is relevant? (Chapter 3)
2. What lessons can be learned from the Netherlands’ natural gas exports to Western Europe in the 1960s and 1970s, including both negative and positive experiences? (Chapter 4)
3. To what extent the experience of the Netherlands in gas exports in the 1960s and 1970s is applicable in contemporary context of Russian exports to Northeast Asia? What policy implications would it suggest? (Chapter 5)

In **Chapter 2** we have provided an analytical framework for this study and identified the main variables to be applied to the cases in order to meet the research objective and answer the research questions in subsequent chapters. Independent variables for this study included demand patterns and demand outlook in the studied regions; available resources; and domestic consumption patterns in the producing state. Dependent variables (and thus subjects of the study) included supply outlook, and price formula and contract structure. Intervening variables, or factors that affect the dependent variables, included: competing fuels and possibilities for
price indexation; different players and rents; commitments of the parties outside the ‘deal’ – or external factors.

The purpose of the chapter 3 was to answer the question whether the comparison of the two cases is relevant. In this chapter, we have focused on the market level and thus have addressed the following issues: demand patterns and demand outlook; available resources; competing fuels and price indexation. The analysis allowed us to conclude that the European gas market in the 1960s and 70s can to an extent be compared to the current gas market in Northeast Asia. There are some obvious differences, like the distance between the fields and the destination markets; the difficulties with development of the fields (as opposed to the relative proximity and availability of the Groningen field) and the geography of supplies. However, the overall dynamics allows for drawing some parallels, especially when it comes to the exporting state policy since the market development is not solely led by the demand side.

In chapter 4, the question about the lessons that can be learned from the Dutch export experience had to be answered. We have concluded that one of the negative effects from gas exports is the so-called Dutch disease. In order to minimise the impact from the Dutch disease, the countries should employ measures targeted at (1) limiting windfall revenues in the booming sector; (2) preventing the deindustrialisation effect; (3) minimising the spending effect and the resource movement effect. A general policy advice can be given to not treat incomes from natural gas sales as general government revenues. A positive lesson to be learned from the case of the Netherlands is that the domestic market can be equally profitable as exports; and that the gasification (installation of natural gas distribution and consumption infrastructure) can be conducted. These are the issues that Russian government should look into while dealing with the development of the gas sector in Eastern regions.

Chapter 5, in fact, had two questions: To what extent the experience of the Netherlands in gas exports in 1960s and 1970s is applicable in contemporary context of Russian exports to Northeast Asia, and What policy implications it would suggest. Addressing the former, we have found that despite the differences between the markets, there are some clear similarities in the development of national economies, especially affected by external economic difficulties (the oil price shocks in the 1970s and the economic recession in 2008-2009). This led to the conclusion that since the reasons and the outcomes can be compared, so can be the measures. The following can be suggested in the Russian context. First, the revenues to the booming sector should be limited by means of tax increases. This measure must be coordinated with the domestic price
reform. Secondly, it seems reasonable to use measures to prevent resource movement effect – namely, to artificially keep the wages in different sectors comparable. Thirdly, in order to prevent spending effect, an important policy implication is that windfall revenues from natural resources export should not be treated as regular government revenues. These measures will not only assist the pipeline exports to Northeast Asia, but also have an impact on LNG exports which are the key role that can be played by Russia in the regional gas market.
Annex: Maps and Figures

Map 1. LNG trading basins

Note: This figure does not include all (planned) LNG plants. Source: based on Wood MacKenzie (information has not been published).
Map 2. Eastern Gas Programme

Map 3. Altai pipeline

Map 4. Sakhalin-Khabarovsk-Vladivostok pipeline
Figure 1. Market Equilibrium

S: supply
D: demand
P: price
Q: quantity

Figure 2. Factors affecting demand
Source: ECS, Putting Price on Energy.
**Figure 3. Hubbert’s curve**

![Hubbert's curve diagram](image)

1. conventional oil and gas resources
2. unconventional oil and gas resources

→ movement of the Hubbert’s curve caused by economic and technological factors

**Figure 4. Resource rents**

![Resource rents diagram](image)
Figure 5. Gas value chain
Source: ECS, Putting Price on Energy, 40.
Figure 6. Gas chain regulation
Figure 7. Gas Consumption in Western Europe, 1965-1990
Source: BP, *Statistical Review of World Energy*

![Gas Consumption in Western Europe, 1965-1990](image)

Figure 8. Natural gas demand: Japan and South Korea (1998-2008, bcm)
Source: BP, *Statistical Review of World Energy*

![Natural gas demand: Japan and Korea compared (1998-2008, bcm)](image)

Figure 9. China: natural gas consumption and production
Source: BP, *Statistical Review of World Energy*

![China: Natural Gas production and consumption, bcm](image)
Figure 10. The logic of the ‘Dutch disease’

Figure 11. Russian primary energy consumption by fuel in 2008 and 2009
Source: BP, *Statistical Review of World Energy*
Figure 12. URALS oil price, exchange rate and unemployment rate 2006-2010
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