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An Economic Analysis of The Impact of EU Accession Upon Crude Oil and Oil Production Policy in Lithuania

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University of Plymouth

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This copy of the thesis has been supplied on condition that anyone who consults it is understood to recognize that its copyright rests with its author and that no quotation from the thesis and no information derived from it may be published without author's prior consent.
ABSTRACT

AN ECONOMIC ANALYSIS OF THE IMPACT OF EU ACCESSION UPON CRUDE OIL AND OIL PRODUCTION POLICY IN LITHUANIA

IRMA PASUKEVICIUTE

This thesis presents a two-stage economic and policy analysis of the impact of European Union (EU) accession upon crude oil production and transportation policy in Lithuania.

The first stage provides the theoretical framework for the research. The analysis begins with the overview of the Russian oil industry, as for over 50 years Lithuania was part of the Soviet Union and thus its oil industry was largely controlled by Russian interests. Although Lithuania became independent in 1991, the dependency on Russia in terms of energy remains until today. The following chapters introduce Lithuania's development since its independence, outline the relationship with the EU and present Lithuania's intentions to become a member of the European Union. More specific issues discussed include the interdependence between Russia and the European Union in terms of crude oil and natural gas supplies and the impact of this phenomenon upon the Lithuanian oil industry. Particular emphasis is placed upon the political significance of oil in Lithuania including the ramifications of the sale of the state-owned oil transit and refining interest to USA investors and the consequences in terms of reaction from Russian crude oil suppliers.

The second stage centers upon two techniques – content analysis and a scaling approach. The former was used to derive a set of the important issues within the Lithuanian oil industry, whilst the latter employed these issues in order to construct a scale for assessing the opinion of the industry's leading experts. The results of the Likert scale questionnaire were analyzed using a number of techniques and this identified a series of policies relating to crude oil and oil production in Lithuania. These policies take into account the experts' opinion, the process of EU accession and the politico-economic context of the research period, which places particular emphasis on relations between Lithuania and Russia.

The final part of this thesis concludes the analysis, presents the implications as well as provides a number of suggestions for further research possibilities in this field.
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AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

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“This research was undertaken with support from the European Community’s Phare ACE Programme 1998. The content of the publication is the sole responsibility of the author and it in no way represents the views of the Commission or its services”

During the course of the study, relevant conferences were attended, where a number of valuable contacts were established with the expert’s within the industry; external institutions were visited for consultation purposes and two papers prepared for publication.

Publications:


Conferences attended:


10th Moscow International Oil and Gas Conference, MIOGE, (2001), 20-21 June, Moscow, Russia

01/10/2003
Date

............................
Signature
CHAPTER 1

INTRODUCTION

1.1 OBJECTIVES

The main objectives of this research are:

✓ To analyze the politically and economically significant Russian oil export/transit market

✓ To assess the oil infrastructure development in the region, with particular emphasis on the development of Baltic Sea oil terminals

✓ To outline Lithuania’s progress in the process of complying with the EU requirements for its oil industry

✓ To collect the opinion of experts of the industry in order to derive a set of composite oil policies and recommendations for Lithuania

1.2 OUTLINE OF THE PROJECT

This research presents a strategic policy analysis of the crude oil and oil products industry in Lithuania with the primary objective to analyse the economically and politically significant Russian oil transit market. Ultimately, policy pointers will be derived for the industry in the context of impending EU accession, overseas privatisation of the sector and competition from neighbouring transit routes through Russia, Latvia and elsewhere. In order to derive the policy pointers, a scaling technique, in a form of Likert scale questionnaire, will be applied to assess the opinion of the experts in the Lithuanian oil...
industry. The findings of the survey will form a basis for the construction of policy pointers and therefore to ensure the quality of the results, the questionnaires will be addressed only to a carefully selected sample of participants from the region, who could be regarded as experts, as inclusion of incompetent participants could result in misleading results.

The first stage of the research includes the extensive background analysis of the region, including the most important sectors.

It begins with an overview of the Russian oil industry, because in the post Second World War period Lithuania was one of the Soviet Union republics and the entire economy was structured along Soviet lines, with collectivisation of agriculture, Soviet style industrialisation and central planning from Moscow. Since Lithuania regained independence in 1991, one of the major problems that country had to face was the fact that it was heavily dependent upon external energy, mainly Russian oil and gas.

Although Lithuania has made significant progress since then, a considerable degree of dependence remains. At the same time it is important to mention that the loss of the facilities on the Baltic Sea coast meant that Russia also became partially dependent on the Baltic States – Lithuania, Latvia and Estonia – for its oil transit. Therefore chapter 2 presents the Russian oil industry in many aspects, emphasizing those, that are related to the Baltic States. The information for this chapter was derived from a wide range of publications including academic journals, papers from conferences, newspapers and internet sites. Although a substantial amount of material was found in academic publications, it was also essential to gather information from the newspapers and the internet, which provided required up to date data about the industry.

Next, it was necessary to present an introductory chapter about Lithuania, as it provides a context for further analysis. In 1991 Lithuania became independent and since then has
faced a number of fundamental changes. The Government adopted comprehensive stabilisation and reform programs, which have led to the rapid development of a market economy. Thus chapter 3 presents the most important facts and figures about Lithuania's economy as well as its potential as a developing transit country in terms of road rail and sea transportation. This chapter sets the scenario for the next topic – EU accession, because since Lithuania became independent one of the ultimate aims for the country was to become a member of the European Union. The most important information for this chapter was found in books, company brochures and commercial and academic publications as well as in the official websites of various organizations in Lithuania, which provide an overview of the most recent events and changes in the country and allow assessment of the country's progress over the years.

Furthermore chapter 4 provides an insight into the formation and principles of the EU, its enlargement policies and presents detailed analysis of membership negotiations with Lithuania. It introduces the EU energy sector and its legislation, because during the negotiations for accession Lithuania will have to comply with the acquis communautaire in the energy sector, however when they are concluded and Lithuania becomes a member, full legislation will apply. The EU requirements have already influenced Lithuanian oil policy to a large extent and will have further consequences in the future. The main sources of information for this chapter were official publications by various institutions of the European Union, in particular those concerned with the enlargement policy. Other sources include books, which provided valuable analysis of EU structure and its institutions and publications found on the internet. From the point of view of academic research this chapter has very strong background material.

Chapter 5 introduces Lithuania's energy sector including heat, gas, electricity and oil sectors. It provides a general overview, regulatory framework, legislation and EU requirements placed upon each one of them. The required information for this chapter was
mainly derived from various legal texts including the Lithuanian National Energy Strategy and laws applicable to each sector of the energy industry. A substantial amount of data was also found in the official reports concerning the EU accession and Lithuania’s progress in terms of liberalization and restructuring of the energy sector.

Chapter 6 presents detailed analysis of the Lithuanian oil industry, which is still dependent on Russian oil and at the same time has been reorganized in order to comply with EU requirements. It begins with a short historical overview, then examines oil exploration in the country, introduces oil industry facilities and finally provides a detailed analysis of the reorganization and privatisation process. This chapter is dealing with relatively recent events, and therefore the main information sources were newspapers, commercial journals, Internet sites and company brochures. It would have been useful to include a body of traditional academic discussion, however very few articles have been published yet. Nonetheless every attempt was made to ensure that only major Internet sites, well known journals and leading newspapers in Lithuania, Russia and United Kingdom were included in this research to provide a satisfactory level of information reliability. This chapter concluded the general background overview and the next one presents the conceptual model for this project.

The conceptual model in chapter 7 summarizes the collected information, identifies the links between major issues and forms a strategy for the second stage of this project – additional data collection and its analysis.

The second stage begins with the analysis of research methods, in order to select the most appropriate one for this study. Chapter 8 introduces advantages and disadvantages of quantitative and qualitative approaches, outlines the possibilities of using a combined method and presents the reasons for selection of two techniques in order to collect the required data for this project.
Chapter 9 provides a comprehensive review of academic, commercial and industrial literature both within and external to Lithuania, to identify the major policy themes in the country's oil industry. These are structured through a quantitative as well as qualitative content analysis to produce identifiable trends that are widely felt to direct the sector. This chapter presents a detailed overview of content analysis theory, its application and results.

Chapter 10 presents a scaling technique, which was employed in order to derive a set of correlated statements, which could be presented to the experts within the Lithuanian oil industry to assess their opinion. The scale will provide a number of response options, ranging from 'strongly agree' to 'strongly disagree', and each one will be assigned a numerical value. In addition to that, experts will be asked to comment on each statement, as quantitative data does not always represent the essence of the findings. Nonetheless, such an approach will provide the option to quantify the survey results, and use them for further analysis.

In the chapter 11, quantified opinions will be used as input to the Statistical Package for Social Sciences (SPSS) programme, which provides a variety of statistical tests and was applied in a wide range of studies. Usually it is used for identification of individual differences between the participants and in this case it will be employed in order to assess the opinion of the experts on the set of statements, derived using a scaling technique. The results will provide important statistical data, which then will be combined with qualitative data (comments from the experts) gathered in the questionnaires, to derive composite policies for the oil industry in Lithuania and assess the impact of EU accession on this sector.

The last chapter 12 presents conclusions to this research, outlines the implications as well as ways of dealing with them and contains a number of proposals for future research.
1.2 MEASUREMENT CONCEPTS

During the process of data collection for this project, there were some instances where various sources provided information in different metric units or in different currencies. Therefore at this point it is important to explain, which measures were used for this study.

The main instances, where such decision had to be made, were found when dealing with Russian oil reserves and production and the Lithuanian oil industry, because some sources presented the figures in terms of barrels, and others in terms of tons; or in barrels per day (bbl/d) rather than in tons per year. Similar circumstances were also encountered during the analysis of Lithuanian energy sector where natural gas supply was stated in both – cubic feet and cubic meters.

Due to the fact that conversion of such figures could result in misinterpretation of data to some extent, the decision was taken to state the figures in a measure provided by the source. However, because most commonly used measures in Lithuania are tons and cubic meters, every effort will be made to convert barrels and cubic feet and present an approximate value next to the original figure. For example in the text the conversion would appear as: 48.6 Million barrels (approx 975 Million tons) of oil; or 53 Billion cubic feet (approx 1.5 Million m³) of natural gas.

The conversion will be made using these formulas (Lietuvos Rytas, 2001a):

1 cubic foot = 0.0283 cubic meter (m³)
1 metric ton = 6.825 barrel

Further more there were four types of currency found in the information sources:

Litas (Lithuania)
Rouble (Russia)
U.S. Dollar (United States of America)
Euro (European Union)
During the period of research, Lithuanian currency Litas was pegged to U.S. Dollar at the rate of

4 Litas = 1 U.S. Dollar

At the same time, the Russian currency Rouble was rather unstable and many information sources presented figures in U.S. Dollars when referring to the Russian economy. Therefore the most appropriate solution was considered to be the use of U.S. Dollar as a base currency. However in 2002 the EU introduced Euro as their official currency and Lithuanian Government took a strategic decision to re-peg Litas to Euro at the rate of

3.45 Litas : 1 Euro

Despite this change, it would have been extremely difficult to re-calculate all figures (due to rate fluctuations) and therefore the U.S. Dollar will remain a constant currency throughout the project.
CHAPTER 2

THE RUSSIAN OIL INDUSTRY

2.1 INTRODUCTION

This chapter provides an extensive overview of the Russian oil industry in terms of organization, legislation, production, exports, and refining. This overview was required because Lithuania remained dependent upon oil and gas imports, since regaining independence in 1991. It would not be possible to provide adequate analysis of the Lithuanian oil industry without first presenting all relevant information about the Russian oil industry.

In order to show the significance of Russia's influence in the Lithuanian oil industry, this chapter places a particular emphasis upon certain specific issues, such as Russian export routes via the Baltic region and the main companies - 'LUKoil' and 'Yukos' which are the key players in the Lithuanian oil industry.

2.2 RESERVES

This chapter presents the Russian oil industry in terms of many different aspects. However first it was necessary to identify the importance the of country's oil reserves as it is one of the most important players in the world energy market holding

'\textit{the world's largest natural gas reserves, the second largest coal reserves and eighth largest oil reserves}' (Energy Information Administration, 2002b).

In 2001 it was estimated that Russia has at least 50 Billion barrels (approx 7.3 Billion tonnes) of proven crude oil reserves (Energy Information Administration, 2002c), which
are eighth largest in the world and constitute 13% of the overall world deposits (http://www.lei.lt, see figure 2.1).

![World Oil Reserves by region](http://www.lei.lt)

**Figure 2.1** Source: Lithuanian Institute of Energy, 1998, [http://www.lei.lt](http://www.lei.lt)

![Location of West Siberian Basin](http://www.eia.doe.gov)

**Figure 2.2** Location of West Siberian Basin
The main oilfields are located in the West Siberian basin and approximately 70% of Russian oil is produced in this region (Figure 2.2 indicates the location of West Siberian Basin). Russian oil is extracted from relatively few, large oilfields and as time is passing by, they are getting old and therefore it is more difficult to produce economically; because the older the field becomes, the less efficient is production (Energy Information Administration, 1997).

A good example could be the reduction of oil exploration in the giant Samotlor field, which has noted a 35% decline of overall oil production since 1989 (Considine and Kerr, 2002). Table 2.1, presents all the major oil fields of West Siberia, their size in terms of barrels and tonnes, and year of discovery.

It is also important to mention, that oil production could be substantially reduced during the next decade, due to the fact that its rate is already exceeding the rate of discovery of new reserves by a significant margin (Energy Information Administration, 2002b). Very large investments will be required in the future in order to extend the life of old exhausted fields and develop new ones, if the production rate is to be sustained.

In 2002 most Russian crude oil was produced from these West Siberian basin fields including: Samotlor, Fedorovskoye, Lyantorskoye, Arlanskoye, Sutorminskoye, Vat’yeganskoye, Mamontovskoye and Krasnoleninskoye as well as from Romashkino oil field, also located within Russian territory (Energy Industry Administration, 2002b).

All of the Russian oil reserves are situated strictly within Russian territory and a large number are government owned, including those that are being exploited by international companies. Usually the company gains access to reserves only after obtaining a license for exploration and/or production of a specific amount of crude oil over a specified period (RinacoPlus Research, 1997).
<table>
<thead>
<tr>
<th>FIELD</th>
<th>CRUDE OIL</th>
<th>DISCOVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MILLION BARRES</td>
<td>MILLION TONNES (approx. value)</td>
</tr>
<tr>
<td>Aganskoye</td>
<td>1792.72</td>
<td>262.67</td>
</tr>
<tr>
<td>Bystrinskoye (Bystrin)</td>
<td>1261.34</td>
<td>184.81</td>
</tr>
<tr>
<td>Druzhnnoye</td>
<td>1354.11</td>
<td>198.40</td>
</tr>
<tr>
<td>Fedorovskoye</td>
<td>1792.45</td>
<td>262.63</td>
</tr>
<tr>
<td>Lyantorskoye (Taibynskoye)</td>
<td>2321.63</td>
<td>340.17</td>
</tr>
<tr>
<td>Nivagalskoye (Pokachev-Ur'yev)</td>
<td>1487.92</td>
<td>218.01</td>
</tr>
<tr>
<td>Nong'yeganskoye</td>
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<td>196.04</td>
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<td>Olen'yevskoye</td>
<td>1089.17</td>
<td>159.59</td>
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<tr>
<td><strong>Pokachev Yuzhnaya, Ur'yevskoye</strong></td>
<td>5281.87</td>
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</tr>
<tr>
<td>Povkhovskoye</td>
<td>2100.71</td>
<td>307.80</td>
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<td>Pravdinka-Salimskoye</td>
<td>2255.19</td>
<td>330.43</td>
</tr>
<tr>
<td><strong>Priobskoye</strong></td>
<td>4219.82</td>
<td>618.29</td>
</tr>
<tr>
<td>Rogozhnikov</td>
<td>1388.21</td>
<td>203.40</td>
</tr>
<tr>
<td>Russkoye</td>
<td>2702.07</td>
<td>395.91</td>
</tr>
<tr>
<td><strong>Samotlor (Vata, Megion, Pokur Sev., Mykhpay, Oreikhovo Sev.)</strong></td>
<td>244660.99</td>
<td>358448.54</td>
</tr>
<tr>
<td>Sovetskoye</td>
<td>6050.59</td>
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</tr>
<tr>
<td>Sugmutskoye</td>
<td>3327.14</td>
<td>487.49</td>
</tr>
<tr>
<td>Surgut Yuzhny (Federovo)</td>
<td>1540.86</td>
<td>225.77</td>
</tr>
<tr>
<td>Surtominskoye</td>
<td>2479.98</td>
<td>363.37</td>
</tr>
<tr>
<td>Tarasovskoye (Ayvasedopurskoye)</td>
<td>4117.24</td>
<td>603.26</td>
</tr>
<tr>
<td>Tyanovskoye</td>
<td>1237.75</td>
<td>181.36</td>
</tr>
<tr>
<td><strong>Urengoy (Samburg, Yevo-Yakhta, Yen-Yakhta, Urengoy Sev., Pestosovskoye)</strong></td>
<td>6617.30</td>
<td>969.57</td>
</tr>
<tr>
<td>Van'yeganskoye</td>
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<tr>
<td>Var'yeganskoye</td>
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<td>Var'yegan Severnoye</td>
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<td>Vartovskoye-Sosino</td>
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</tr>
<tr>
<td>Yagunskoye Yuzhnaya</td>
<td>1151.14</td>
<td>168.67</td>
</tr>
</tbody>
</table>

*Source: Energy Information Administration, (1997), 'Oil and Gas resources of the West Siberian Basin, Russia', November, Office of Oil and Gas U.S. Department of energy, Washington DC, [http://www.eia.doe.gov](http://www.eia.doe.gov)*
2.3 INDUSTRY ORGANISATION

The Russian oil industry has been analysed in many different ways, since the break-up of the Soviet Union, mainly because it opened many new investment opportunities for the established oil and gas companies such as Amoco, Arco, British Gas, British Petroleum, Chevron, Statoil, Conoco, Exxon, Mobil, Neste Oy, Agip, Norsk Hydro, Marathon, McDermott, Mitsubishi, Mitsui, Royal Dutch/Shell, Texaco and Total (Energy Information Administration, 1998).

However it is also very interesting in itself as one of the major oil markets in the world. In 1995 Locatelli focused on the

\[ \textit{economic conditions concerning the constitution of Russian oil companies in an uncertain environment} \] (Locatelli, 1995, p809).

Other good examples of a renewed interest in the Russian oil sector are Balabanov (1998) and Locatelli (1999), the latter identifying that the

\[ \textit{...fall in international oil prices, has clearly shown the structural weaknesses in an oil industry that is still conspicuously beset by heavy production costs...} \] (p435).

Therefore the most important aspects of the Russian oil industry organization are presented next.

2.4 DEVELOPMENT OF RUSSIAN OIL INDUSTRY LEGISLATION

From 1991 to 1993, following Russian independence, some very important decisions were taken in order to prepare Russian comprehensive oil and gas legislation. After many discussions, several drafts were rejected, however in 1992 the Russian Government approved the Subsoil law, later amended in 1995 (Russian Oil and Gas Law Journal, 1995). The law was based on the concept of
"the State as owner of the resource, giving an administrative-law permit to operators to explore and exploit mineral deposits" (Waelde and Friedrich, 1997).

On the 30 December 1995, the President of the Russian Federation, Boris Yeltsin signed the Russian Production Sharing Law, which came into force on 11 January 1996. It became one of the major legal changes leading Russia to the market economy. The Production Sharing Law allowed foreign investments into Russia’s major industrial and foreign exchange earning sector – the oil and gas industry (Waelde and Friedrich, 1997). However, despite the new legislation, most of the foreign companies expressed their concerns about the law providing ‘inadequate investment guarantees’ (Petroleum Economist, 2000a, p 30) and contradicting other legislation. Therefore in 1999 several important amendments were made to the Production Sharing Law in order to provide a ‘reasonable working base’ (Petroleum Economist, 2000a, p 30) for foreign investors.

All foreign investments in the Russian oil industry are based on Production Sharing Agreements (PSAs), which can be defined as contracts where the

‘investor/operator provides capital, assumes exploration risk, manages development and operation under the broad supervision of a state enterprise holding the mineral right; it gets compensated, after recovery of cost, by a share of production’ (Waelde and Friedrich, 1997).

There are three oil and gas PSAs activated in Russia (Petroleum Economist, 2000a, p 30), which include:

1. **Sakhalin-1** where ExxonMobil, Sodeco (Japan), Rosneft (Russia) and Sakhalinmorneftegas (Russia) are appraising oil and gas reserves;

2. Sakhalin Energy’s **Sakhalin-2** Block, where oil has already been produced since 1999, form Piltun Astokhskoye field; and

3. The only on-shore operating PSA - **The Kharyaga** field, in Timan-Pechora basin, where oil production began in 1999, by TotalFinaElf and Norsk Hydro.
Before any Russian oil field can be developed under a PSA, it has to be approved by the Duma (Russian Parliament) and included in the ‘Law of Lists’ (Petroleum Economist, 2000a). Until 2000, 21 projects were approved as eligible for PSAs, which are listed in table 2.2. Under Russian Law, no more than 30% of oil reserves can be developed under PSAs and the twenty-one projects mentioned before already account for approximately 28% of all Russian oil reserves. Therefore it is very likely that the Russian Government will have to reconsider the quota, or remove some projects from the list, making the approval of some future projects possible.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>FIELDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sakhalin Island</td>
<td>North Sakhalin, Sakhalin-1, Sakhalin-2 and Kirinsky</td>
</tr>
<tr>
<td>Western Siberia</td>
<td>Samotlor, Salym group of fields, Fedorov, Lugenskoye, Krasnolenin, north Priobsk and Uvats</td>
</tr>
<tr>
<td>Tatarstan</td>
<td>Romashkino field</td>
</tr>
<tr>
<td>Komi Republic</td>
<td>Usinsk</td>
</tr>
<tr>
<td>Archangelsk region</td>
<td>Northern territories</td>
</tr>
<tr>
<td>Udmurtia</td>
<td>Udmurt Block</td>
</tr>
<tr>
<td>Krasnoyarsk</td>
<td>Vankor Project</td>
</tr>
<tr>
<td>Eastern Siberia</td>
<td>Yurubchenskoye field</td>
</tr>
<tr>
<td>Barents sea (offshore)</td>
<td>Shtokman gas and condensates field</td>
</tr>
<tr>
<td>Pechora Sea</td>
<td>Prirazlomnoye deposit</td>
</tr>
<tr>
<td>Caspian Sea (North shore)</td>
<td>Astrakhan Block</td>
</tr>
<tr>
<td><strong>EXPECTED for approval:</strong></td>
<td><strong>Kharampurskoye and Tyanskoye fields</strong></td>
</tr>
</tbody>
</table>

**Source:** Petroleum Economist, ‘High-level backing for the PSAs’, p 30, October 2000

There are various reasons why foreign investors are not entirely satisfied with their investment conditions. First of all is the uncertainty of the conditions imposed and the very high Government involvement, mainly because in most countries PSAs are signed between two companies, whilst in Russia the foreign investor has to deal directly with the Government (Waelde and Friedrich, 1997). Secondly the reason for creating the Production Sharing Law was to
'create a flexible mechanism of allowing access to exploration/production rights, where major variables of the investment – in particular tax, tax stabilization, work programs, arbitration – can be negotiated' (Waelde, 1998).

However in Russia there were many occasions when the companies had to face increasing taxes and pipeline tariffs (http://www.about.com). For example, state owned crude oil pipeline operator Transneft has raised their tariffs three times during 2000 (Petroleum Economist, 2000a).

Although the drafting of legislation for the PSA Agreements was a very long and complicated process, it is necessary to mention that in 2001 the PSA projects produced a very small amount of oil (Energy Information Administration, 2002a), only 44,000 bbl/d (approx 2 Million tonnes per year), compared to the overall Russian oil production of 7.29 Million bbl/d (approx 363 Million tonnes per year).

2.5 RESTRUCTURING THE OIL SECTOR

The process of reorganisation and privatisation in Russia started in 1993 (Petroleum Economist, 1999) with the initiation of a two-step privatisation process. The first phase was complete in 1994 when most state owned enterprises were re-organized into joint-stock companies (Energy Information Administration, 2002a). The second phase started in 1995 and involved auctioning of Government owned shares in these companies. The recent examples could be the 200 Million USD sale of 9% of LUKoil shares and 90 Million USD sale of 48.7% of Tyumen Oil Company (TNK) in 1999, as well as the biggest sale in privatisation history of a 85% federal stake in the Orenburg Oil Company (Onako) where the bids rose up to double the asking price and the shares were sold for 1.08 Billion USD (Energy Information Administration, 2002a).

The restructuring process resulted in the Russian oil sector being divided between vertically integrated companies and a smaller number of regional independent producers,
mainly foreign Joint Ventures operating under the Production Sharing Agreements (Locatelli, 1999), which are presented in the next section.

2.5.1 Vertically Integrated Companies

Each Vertically Integrated Company (VIC) usually includes up to five upstream units, up to three refineries and a marketing chain encompassing multiple regions. The state owned stakes in a number of these companies, although a lot of them were sold in 1998 because the 1992 decree that limited foreign ownership of privatised oil companies to 15% was removed (see table 2.3).

Twelve VICs were established, which are as follows: LUKoil, Yukos, Surgutneftgas, Sibneft, Sidanko, Slavneft, Orenburg Oil Company (Onako), Eastern Oil Company, Tyumen Oil Company (TNK), Chechen State Oil Company, Komitek and Rosneft.

In 2002 the largest company in terms of production was LUKoil, with crude oil output of 75.49 Million tonnes per year (News and Trends in CIS/Russia, 2003). Yukos was the second largest producer that year with the output of 69.88 Million tonnes; other significant producers in 2002 included Surgutneftegas – 49.2 Million tonnes, Tyumen Oil Company – 37.5 Million tonnes, Sibneft – 26.32 Million tonnes and Tatneft – 24.61 Million tonnes (News and Trends in CIS/Russia, 2003).
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>SHAREHOLDER</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUKoil</td>
<td>LUKoil</td>
<td>32,10</td>
</tr>
<tr>
<td></td>
<td>International Investors</td>
<td>20,38</td>
</tr>
<tr>
<td></td>
<td>State Property Fund</td>
<td>16,50</td>
</tr>
<tr>
<td></td>
<td>Russian Investors</td>
<td>15,38</td>
</tr>
<tr>
<td></td>
<td>Russian State</td>
<td>11,57</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>4,07</td>
</tr>
<tr>
<td>Sibneft</td>
<td>Finansovaja Neftenaja Kompanya</td>
<td>51,00</td>
</tr>
<tr>
<td></td>
<td>SINS</td>
<td>19,00</td>
</tr>
<tr>
<td></td>
<td>REFINEOIL</td>
<td>15,00</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>15,00</td>
</tr>
<tr>
<td>Sidanko</td>
<td>INTERROS, subsidiary of</td>
<td>85,00</td>
</tr>
<tr>
<td></td>
<td>UNEXIMBANK</td>
<td>4,00</td>
</tr>
<tr>
<td></td>
<td>MENATEP</td>
<td>11,00</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Slavneft</td>
<td>Russian State</td>
<td>65,00</td>
</tr>
<tr>
<td></td>
<td>Belarus State</td>
<td>11,00</td>
</tr>
<tr>
<td></td>
<td>Employees</td>
<td>10,20</td>
</tr>
<tr>
<td></td>
<td>Mozyr Refinery</td>
<td>6,00</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>7,80</td>
</tr>
<tr>
<td>Surgutneftgas</td>
<td>Pension fund of Surgutneftgas</td>
<td>40,00</td>
</tr>
<tr>
<td></td>
<td>Neft-Invest</td>
<td>40,00</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>20,00</td>
</tr>
<tr>
<td>Tyumen Oil Company (TNK)</td>
<td>Russian State</td>
<td>51,00</td>
</tr>
<tr>
<td></td>
<td>Alfa Groupe</td>
<td>40,00</td>
</tr>
<tr>
<td></td>
<td>CADET</td>
<td>9,00</td>
</tr>
<tr>
<td>Yukos</td>
<td>MENATEP</td>
<td>85,00</td>
</tr>
<tr>
<td></td>
<td>Employees</td>
<td>7,00</td>
</tr>
<tr>
<td></td>
<td>Yukos</td>
<td>7,00</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1,00</td>
</tr>
<tr>
<td>Orenburg Oil Company (Onako)</td>
<td>Russian State</td>
<td>51,00</td>
</tr>
<tr>
<td></td>
<td>Russian Investors</td>
<td>44,00</td>
</tr>
<tr>
<td></td>
<td>International Investors</td>
<td>5,00</td>
</tr>
<tr>
<td>Eastern Oil Company</td>
<td>Russian State</td>
<td>85,00</td>
</tr>
<tr>
<td></td>
<td>Private Investors</td>
<td>15,00</td>
</tr>
<tr>
<td>Rosneft</td>
<td>Russian State</td>
<td>100,00</td>
</tr>
<tr>
<td>Komitek</td>
<td>State Committee for State Property</td>
<td>21,00</td>
</tr>
<tr>
<td></td>
<td>Yevroseverneft</td>
<td>38,00</td>
</tr>
<tr>
<td></td>
<td>SB TRUST</td>
<td>29,30</td>
</tr>
<tr>
<td></td>
<td>MENATEP</td>
<td>3,90</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>7,80</td>
</tr>
<tr>
<td>Yunko</td>
<td>Local Authorities</td>
<td>100,00</td>
</tr>
<tr>
<td>Tatneft</td>
<td>Tatarstann Authorities</td>
<td>46,60</td>
</tr>
<tr>
<td></td>
<td>Employees</td>
<td>41,30</td>
</tr>
<tr>
<td></td>
<td>Private Investors</td>
<td>12,10</td>
</tr>
</tbody>
</table>

2.5.2 Joint Ventures

Furthermore the second principal entities created during the oil industry's restructuring and responsible for 6% of aggregate crude oil output are the foreign Joint Ventures (JVs). The major JVs are as follows: Vanyoganneft (producing approx 2.9 Million tonnes per year), Vatoil (approx 2.6 Million tonnes per year) and LUKoil-Aik, Polar Lights, Komiarcticoil and Nobel Oil producing over 990 thousand tonnes per year together (Energy Information Administration 1998).


The main activities of JVs include new field developments, rehabilitation and technical activities at existing fields, however the key to the JVs' profitability is pipeline access to the export markets. During 1997 only 30% of JV total output was exported and sold at world prices (Energy Information Administration, 1998).

2.6 Oil Production

During the 1980's Russian oil production reached its peak at 11.4 Million bbl/d, (approx 568 Million tonnes per year); however it has declined sharply since then. This tremendous decline started in 1989, when oil prices dropped in the international market (Lloyd's Shipping Economist, 1993). The industry came under extraordinary pressure, because each additional tonne of oil produced required more and more investment while at the same time, less and less cash was received from exports (Russian Oil Industry Analysis, 1997).

During the 1990's, natural reservoir depletion, stalled implementation of tax reform and production sharing agreements, insufficient investment, poor technical management and eventually the Russian economic crisis led to even higher decline in production
During the period of 1992-1998 the production fell by 23%, from 7.86 Million bbl/d (approx 391.5 Million tonnes per year) to 6.07 Million bbl/d (approx 302.3 Million tonnes per year) (Energy Information Administration, 2002b). In 1998 the Russian financial and economic crisis struck and although the it had a very negative impact upon the country’s economy, devaluation of the national currency – the Rubble, had a somewhat positive effect upon the oil industry, to the extent that oil production costs of Russian oil were significantly reduced when compared to the international price of crude oil (Energy Information Administration, 2002b).

A sharp increase in the world oil price from $10 to $25 (USD) per barrel during 1999 led to the considerable growth of revenue for Russia (The Moscow Times, 1999). Considering that energy exports bring approximately 40% of overall hard currency earnings for the nation, as well as around 25% of the federal budget’s income (Energy Information Administration, 2002c), such an increase in oil price had a very positive effect upon country’s economic recovery. Crude oil production rose by 16% during the period of 1999-2001, from 6.07 Million bbl/d (approx 302.3 Million tonnes per year) to 7.05 Million bbl/day (approx 351.1 Million tonnes per year) generating very high profits for Russian oil producers (The Moscow Times, 1999) and consequently a lot higher tax income for the Government.

In 2001 with the production output of 348.13 Million tonnes per year Russia became the second largest crude oil producer in the world, after Saudi Arabia (Energy Information Administration, 2002b). In 2002 Russian production further increased by 9% and amounted to 379.63 Million tonnes (News and Trends in CIS/Russia, 2003). Nonetheless, some Government officials stated that the output growth should be reduced and the resources saved for the future (Petroleum Economist, 2003).
Russia has 42 oil refineries with the capacity of processing 6.9m bbl/d (approx 343.7m tonnes per year) of crude oil (see map in the appendix 1 for the location of major refineries). However the refining business in Russia is not profitable, for a number of reasons.

First of all, the distances are very long and railway transportation costs are very high (RinacoPlus Research, 1997). Secondly, oil refineries are old and inefficient as well as most of them are orientated towards heavier products and operating well below capacity. However, despite that during 1999, many Russian refineries were concentrating on developing cleaner products. LUKoil, TNK (owner of Ryazan refinery) and Sibneft (owner of the Omsk refinery) are all attempting to increase output of high-quality and more environmentally friendly fuels (News and Trends in CIS/Russia, 1999a).

Crude oil is delivered to the refineries based upon sulphur content. Eastern, Krasnodar, Tuapse and Volgograd refineries are processing low-sulphur oil (less than 0.6%), while high sulphur (more than 1.8%) oil is being processed in Novo-Ufa, Ufa, Ufa-Neftehhim, Nizhnekamsk, Salavat and Omsk refineries (Energy Information Administration, 1998). The remaining oil (0.6%-1.8% sulphur content) is processed by refineries close to the producing fields and central refineries such as Moscow, Ryazan and Yaroslav (Energy Information Administration, 1998).

2.8 RUSSIAN OIL EXPORTS AND TRANSPORTATION

While aggregate crude oil exports declined between 1989 and 1998 due to various reasons outlined previously in the oil production section, Russia’s overall export structure underwent significant changes.
First of all, there was a major change in the crude oil export destinations. Net oil exports to the countries outside the FSU, mainly to Western Europe, increased by a 36% from 1.85 Million bbl/d (approx 92 Million tonnes per year) in 1992 to 3.1 Million bbl/d (approx 155 Million tonnes per year) in 1998, while at the same time exports to FSU countries declined considerably (Energy Information Administration, 2000).

The change of export destinations was mainly due to strong oil demand, limited supply and payment in cash by the Western Europe countries, if compared to the FSU countries, which were heavily in debt to Russian oil suppliers (Energy Information Administration, 2000). The fact that the Government put a lot of pressure on companies to increase oil exports in order to generate the cash for tax payments and raise the hard currency earnings was also an important factor (Locatelli, 1999).

Oil exports to Western Europe countries continued to grow and in 2000 reached 3.8 Million bbl/d (189 Million tonnes per year). The main importers that year were EU countries – United Kingdom, France, Italy, Germany and Spain (Energy Information Administration, 2002c). During recent years the EU became a very important export destination for Russian oil. The share of oil exports to the EU grew significantly, and therefore the relations between Russia and the EU will be presented in detail in chapter 5.

Russia is not a member of the Organization of Petroleum Exporting Countries (OPEC), but nonetheless is a major oil exporter. Since 1998 Russia has been negotiating oil export quotas with OPEC, in order to maintain the high world oil price, and has agreed to reduce its oil exports by 100,000 bbl/d from 1 July 1998 (Energy Information Administration, 1998). Nonetheless, Russian exports were rising every year since then (see figure 2.3), despite numerous promises for reduction (Energy Information Administration, 2002c). The main reason for such non-compliance was that energy exports constitute approximately 40% of overall Russia's exports, and accounts for 13% of the real Gross Domestic Product (GDP), which makes the country's economy 'extremely sensitive to global energy price
fluctuations' (Energy Information Administration, 2002b). Therefore the Russian Government could not reduce exports, while the oil price was rising.

For example due to high oil prices in 2000 the Russian GDP grew by 9% that year and at the same time stimulated growth and development in other industrial sectors (Energy Information Administration, 2002b).

![Russian Net Oil Exports, 1992-2002, in bbl/d](http://www.eia.doe.gov)

**Figure 2.3** *Source:* Energy Information Administration, 2002, ‘Russia: Oil and Natural Gas exports, April, http://www.eia.doe.gov

Even though the Russian economy has benefited from very high oil prices during that period it was a stated priority of the President Vladimir Putin and the Russian Government to make the economy significantly less dependent upon energy exports (Energy Information Administration, 2002b). The main reason for this decision was the uncertainty brought by crude oil price fluctuations. For example, due to oil price decline in late 2001 the GDP growth was only 5% that year, which consequently slowed the country’s economic recovery from the financial and economic crisis (Energy Information Administration, 2002b).
In addition to the above, the Russian Government introduced new export duties in 1999, which at the time stood at $7.5 for each tonne of crude oil and between $10 and $20 for each tonne of petroleum products exported (The Moscow Times, 1999). It became another major source of income for the federal budget of the country. However at the same time this resulted in surplus of crude oil available in the Russian market, which consequently caused the price collapse. Most oil producers sent their crude to Russian oil refineries hence overloading the market with excess production (Energy Information Administration, 2002c). In order to reduce the amount of oil in the domestic market, 'Russian officials have called for the creation of a strategic Russian oil reserve' (Energy Information Administration, 2002c, p1).

2.9 EXPORT ROUTES

In 2000 about 53% of Russia's crude oil exports were shipped by tankers and nearly 56% of these shipments departed from the Novorossiisk terminal (Black Sea). The rest went via other two Black Sea ports at Tuapse (Russia) and Odessa (Ukraine) and the Baltic Sea ports of Ventspils (Latvia) and Klaipeda (Lithuania). The other 47% of the crude oil was exported via 1.2-Million bbl/d (59.8 Million tonnes per year) capacity Druzhba pipeline, which passes through Ukraine on the way to Slovakia, the Czech Republic, Poland, Hungary and Germany. Table 2.4 presents Russian crude oil export figures by selected export points (the map of Russian pipelines and export points is provided in the appendix 1).
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>DRUZHBA PIPELINE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>327</td>
<td>300</td>
<td>325</td>
<td>315</td>
<td>371</td>
<td>383</td>
<td>415</td>
</tr>
<tr>
<td>Poland</td>
<td>122</td>
<td>147</td>
<td>184</td>
<td>205</td>
<td>271</td>
<td>290</td>
<td>351</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>127</td>
<td>139</td>
<td>114</td>
<td>116</td>
<td>106</td>
<td>97</td>
<td>69</td>
</tr>
<tr>
<td>Slovakia</td>
<td>98</td>
<td>100</td>
<td>104</td>
<td>103</td>
<td>106</td>
<td>112</td>
<td>110</td>
</tr>
<tr>
<td>Hungary</td>
<td>106</td>
<td>111</td>
<td>104</td>
<td>122</td>
<td>132</td>
<td>122</td>
<td>111</td>
</tr>
<tr>
<td><strong>TOTAL (pipeline)</strong></td>
<td>780</td>
<td>797</td>
<td>831</td>
<td>861</td>
<td>986</td>
<td>1,003</td>
<td>1,055</td>
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<tr>
<td></td>
<td>(38.9)</td>
<td>(39.7)</td>
<td>(41.4)</td>
<td>(42.9)</td>
<td>(49.1)</td>
<td>(50)</td>
<td>(52.5)</td>
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<td><strong>SEA PORTS</strong></td>
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<td>Novorossiisk (Russia)</td>
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<td>565</td>
<td>602</td>
<td>608</td>
<td>600</td>
<td>603</td>
<td>670</td>
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<tr>
<td>Tuapse (Russia)</td>
<td>89</td>
<td>89</td>
<td>92</td>
<td>95</td>
<td>123</td>
<td>103</td>
<td>113</td>
</tr>
<tr>
<td>Odessa (Ukraine)</td>
<td>125</td>
<td>148</td>
<td>164</td>
<td>174</td>
<td>165</td>
<td>111</td>
<td>65</td>
</tr>
<tr>
<td><strong>Butinge (Lithuania)</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>66</td>
</tr>
<tr>
<td>Ventspils (Latvia)</td>
<td>220</td>
<td>232</td>
<td>286</td>
<td>293</td>
<td>292</td>
<td>262</td>
<td>283</td>
</tr>
<tr>
<td><strong>TOTAL (sea ports)</strong></td>
<td>1023</td>
<td>1043</td>
<td>1144</td>
<td>1170</td>
<td>1180</td>
<td>1090</td>
<td>1197</td>
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<tr>
<td></td>
<td>(50.6)</td>
<td>(51.6)</td>
<td>(57)</td>
<td>(58.3)</td>
<td>(58.8)</td>
<td>(54.3)</td>
<td>(59.6)</td>
</tr>
</tbody>
</table>


### 2.10 Export Terminals in Russia

Since 1991, after the break up of Soviet Union, one of the major concerns for Russia was the loss of oil export terminals on the Baltic Sea coast. Therefore Russian oil companies were forced, to some extent, to use the facilities of the oil terminals in Latvia, Lithuania and Estonia.

The first plans to build an oil export terminal on the Baltic Sea coast date back to 1993 when the Russian Government decided to restore exports via the Gulf of Finland, as all the Soviet Union’s export terminals were in the Baltic States.

In 1997 the Russian Transport Minister Nikolai Tsakh stated that every year Russia lost approximately $600 Million (USD dollars) by exporting its cargoes through the foreign...
ports of the Baltic States (News and Trends in CIS/Russia, 1997a). He also suggested that it would be beneficial for Russia to build its own oil export terminal on the coast of the Baltic Sea.

2.10.1 Buchta Batareinaya Terminal

There were some projects started in 1996, for example the small oil export terminal at Buchta Batareinaya (about 80 kilometres west from St. Petersburg). On 17 of May 1996 Russian government signed a resolution allowing Surgutneftegaz (The Moscow Times, 1996) to build a new oil product export terminal. The company was ranked as the third largest Russian oil company in terms of exports in 1996, as they accounted for 20.8% of total Russian oil exports (The Moscow Times, 1996).

The project included the terminal with an export capacity of 7.5 Million tones of oil products annually and an oil product pipeline connecting Surgutnefteorgsintez refinery (owned by Surgutneftegaz) and a new terminal on the coast of Baltic Sea. Surgutneftegaz stated that the a new pipeline would reduce transportation costs, because instead of transporting their products by rail to the ports in the Baltic States and then shipping them to Western Europe (The Moscow Times, 1997), they could use the new pipeline, which was expected to be considerably cheaper (News and Trends in CIS/Russia, 1997b).

In addition, Surgutneftegaz would also benefit by receiving an extra 10 Million tonnes a year in its quota for Russia’s export pipelines, because the new terminal would open a new export route for other Russian oil companies (The Moscow Times, 1997) as an alternative to existing routes, which were close to their full capacity (The Moscow Times, 1996). There was no further information found concerning the progress of terminal construction.

2.10.2 Primorsk Terminal and Baltic Pipeline System
Since 1997, the Russian state owned pipeline operator 'Transneft' has decided to build a new port on the Baltic Sea at Primorsk (News and Trends in CIS/Russia, 1997c), in the Gulf of Finland, which would handle crude oil, oil products, gas and liquid chemical cargoes within the limits of 45 Million tones a year. Primorsk would be the third largest Russian port on the Baltic Sea.

There have been many obstacles since 1997, which delayed the terminal construction works. But nevertheless, in 1999 the Russian government announced that they were determined to build the new oil terminal. The government was convinced that Russia needs its own oil terminal, because it was heavily dependent on exports for budget revenues and the only access to the Baltic Sea was through the ports of Lithuania, Latvia and Estonia (News and Trends in CIS/Russia, 1999). In addition to the above the government took another decision – to create a new Baltic pipeline system, which would deliver oil to the Primorsk terminal.

The original agreement to build the Baltic Pipeline System (BPS) was signed in 1996 by Russia's state owned oil pipeline operator 'Transneft', two Russian oil companies ('Komitek' and 'Rosneft'), Russian-Byelorussia oil company 'Slavneft' and five foreign companies: British Gas, Conoco, USA company 'Williams', Finnish company 'Neste' and French company 'Total' (Petroleum Economist Special Report, 1998). However, the interest of foreign companies declined following the collapse of the Russian economy and oil prices in 1998 (The Moscow Times, 1998b) and it was decided that state monopoly pipeline operator 'Transneft' will be a sole owner and operator of BPS (Moscow Times, 2003).

BPS would be a 2,700 kilometres long network of pipelines connecting Kharyaga in the Far North of Russia and the new terminal at Primorsk. The major Russian oil exporting company 'Lukoil' is also supporting the BPS, despite the fact that a big share of 'Lukoil's' exports are moving through the Baltic ports (The Russia Journal, 1999).
'Transneft' has already offered to use the existing Usa-Ukhta-Yaroslav-Kirishi pipeline as well as new lines from Kharyaga to Usa and from Kirishi to the new terminal. The remaining pipelines were to be constructed in two stages.

The first stage involved construction of new pipelines from Kharyaga to Usa (Timan Pechora Region) and from Kirishi to Primorsk terminal (see figure 2.4 and map in appendix 1) as well as reconstruction of Usa-Ukhta-Yaroslav-Kirishi pipeline segments (Energy Information Administration, 2002d). It was completed in December 2001 and has the capacity of 12 Million tonnes per year. The first tanker was loaded at Primorsk on the 24 December 2001 (RusEnergy, 2003).

The estimated cost of the first construction stage was US$ 460 Million. The second stage was approved in November 2001 and entails expansion of the pipeline network capacity to 360,000 bbl/d (approx 18m tonnes per year), construction of eight storage tanks and three pump stations. The estimated cost for the second stage was approximately US$ 400 Million (Energy Information Administration, 2002d) and it should be completed by December 2003.
2.10.3 FINANCING THE BPS PROJECT

In June 1999, the Russian Government accepted a proposal to finance the construction of the BPS. Shareholders of ‘Transneft’ and the Federal Energy Commission proposed to cover the $100 Million (USD dollars) construction bill, by introducing an additional tariff on exported oil (Lloyd’s List, 2000). After the project is finished, the state would have at least 75% stake in a joint stock society, which would operate the project (The Moscow Times, 2000).

Furthermore, the ERBD (European Bank for Reconstruction and Development) offered its cooperation as well (News and Trends in CIS/Russia, 1997c) and it is possible that in return the bank will acquire a stake in the BPS.

In 2000 the Russian Government was very determined to start construction, but according to an article in the Lloyd’s List
‘despite fund-raising tariffs imposed from Moscow to finance the project, ... it was far from a done deal’ (Lloyd’s List, 2000).

However despite the financial difficulties state owned pipeline operator ‘Transneft’ found ways to finance the first construction stage, which was complete in the end of 2001 and was planning to start the second stage in 2002, however there were no announcements published, which could confirm the start of second stage construction until 2003.

Next section introduces two major Russian oil companies – Yukos and LUKoil, as they are the key players in the crude oil exports market, as well as main companies dealing with exports to the Baltic Region. Both of these companies had a major influence over the Lithuanian oil industry, which will be analysed in detail in further chapters.

2.11 LUKOIL COMPANY

LUKoil is the biggest oil company in Russia (Reuters, 2001), which is very likely to increase its share of Russian oil production market up to 35% until 2010. From 1993 until 1999 its market share grew from 13.8% to 22% (The Russia Journal, 2000).

The ‘LUKoil’ concern was established in 1993, after the Russian Government issued a resolution ordering ‘the merger of several oil producing and oil processing concerns’ (The Russia Journal, 1999). These concerns were located in the west Siberian cities of Langenpas, Ural and Kogalym.

In the beginning of 1992 a list of companies that were chosen to form LUKoil was produced. In November president Yeltsin signed the decree, confirming the list and setting deadlines for their privatisation. Finally in April 1993 Russian Government signed a resolution confirming the formal establishment of LUKoil concern (The Russia Journal, 1999).
Since 1993 LUKoil has been involved in a number of projects. The most significant projects are described in table 2.5.

<table>
<thead>
<tr>
<th>Country</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>In 1994 LUKoil became one of the stakeholders of Timan-Pechora Company (TPC) together with Amoco, Exxon, Texaco, Norsk Hydro and Rosneft. It has been determined that Timan-Pechora oil field contains approximately 274 Million tonnes of oil.</td>
</tr>
<tr>
<td>Russia</td>
<td>Since 1999 LUKoil and Conoco are negotiating the agreement for developing the Northern Territories project, in the Arkhangelsk region, where at least five significant deposits will be exploited. LUKoil will own 60% and Conoco 40% of Northern Territories.</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>LUKoil owns 60% in the D-222 project, which is estimated to contain between 70 and 100 Million tonnes of oil; LUKoil also holds 10% stake in AIOC, which is exploiting three large fields of oil and natural gas.</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>LUKoil’s investments in Kazakhstan include 50% stake in Kumkol deposit (88.5 Million tonnes of oil); 15% in the Karachagansk project (800 m tonnes of oil and 800 Billion cubic meters of natural gas); 5% in Tengiz oil consortium (700-800 m tonnes of oil); and 12.5% in the Caspian Pipeline Consortium (pipeline which will connect Tengiz in Kazakhstan and Novorossiisk in Russia).</td>
</tr>
<tr>
<td>Iraq</td>
<td>In 1998 LUKoil acquired 68.5% in the Quarnah-2 project, which is estimated to contain 2 Billion tonnes of oil.</td>
</tr>
</tbody>
</table>

**FUTURE PLANS:**

**Greece**

Future plans of LUKoil investment could include Greek companies EKO and ELDA, which are subsidiaries of Hellenic Petroleum as well as construction of pipeline for crude oil transportation from Bulgaria (Black Sea port of Bourgas) to Greece (northern Aegean port of Alexandroupolis).


LUKoil owns three refineries in Russia (Perm, Volgograd and Ukhta), and a number of refineries in other FSU countries, such as Romania, Ukraine and Bulgaria. This enables the company to produce a very broad range of petroleum products, which meet the world standards.

In 1999 LUKoil was the only Russian company, which had the financial means and management capacity to expand not only in Russia, but also in the European market (The
Russia Journal, 1999). It can be seen in table 3.6, that LUKoil was a very active company in terms of international privatisation in 2000-2001.

<table>
<thead>
<tr>
<th>REFINERY</th>
<th>LOCATION</th>
<th>CAPACITY</th>
<th>PRESENT SITUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perm-nefte-orgsintez</td>
<td>Russia, Perm</td>
<td>279,000 bbl/d (Approx 13.8 m tonnes per year)</td>
<td>Owned by LUKoil, under the second stage of an upgrade, which would increase the depth of refining by 83% and consequently the output of gasoline by 70% and diesel by 40%.</td>
</tr>
<tr>
<td>Volgograd-nefte-pererabotka</td>
<td>Russia, Volgograd</td>
<td>189,000 bbl/d (Approx 9.4 m tonnes per year)</td>
<td>There are plans to invest $85 Million to modernize the refinery, by 2010. The first stage (until 2005) includes commissioning of seven new processing units. The first unit was already launched in December 2000.</td>
</tr>
<tr>
<td>LUKoil-Ukhta-nefte-pererabotka</td>
<td>Komi Republic, Ukhta</td>
<td>127,000 bbl/d (Approx 6.3 m tonnes per year)</td>
<td>Since 2000 the refinery is under the upgrade program, which should be completed by 2005. In December 2000 a new railway overpass for light oil products was launched, as a first stage of the program.</td>
</tr>
<tr>
<td>Petrotel</td>
<td>Romania, Ploiesti oilfield, north of Bucharest</td>
<td>96,500 bbl/d (Approx 4.8 m tonnes per year)</td>
<td>In 1998 ‘LUKoil Europe’, a subsidiary of LUKoil, acquired 51% stake in Romanian Petrotel refinery. They have obligations to invest $360 Million into the refinery. The first project was to increase the plant’s aviation kerosene production.</td>
</tr>
<tr>
<td>Odessa</td>
<td>Ukraine, Odessa</td>
<td>78,000 bbl/d (Approx 3.9 m tonnes per year)</td>
<td>Odessa refinery is owned by the joint-stock company LUKSintez oil, where LUKoil has 60% of shares and British Sintez 40%.</td>
</tr>
<tr>
<td>Neftokhim</td>
<td>Bulgaria, Black Sea port of Burgas</td>
<td>215,500 bbl/d (Approx 10.7 m tonnes per year)</td>
<td>‘LUKoil Petrol’, a subsidiary of LUKoil, privatised Neftokhim in 1999, by obtaining a 58% stake. The company is under obligation to invest $400 Million by 2005 into the refinery, of which $70 Million will be used to switch to production of lead-free petrol.</td>
</tr>
</tbody>
</table>

2.12 YUKOS

‘Yukos’ is the second biggest Russian oil company, after LUKoil, established in 1993 (Locatelli, 1999). It is a vertically integrated company involved in oil production, refining and marketing of petroleum-based products within Russia and abroad. Yukos has three subsidiaries – Yuganskneftgas, Samaranefntgas and Eastern Oil Company and owns 214 oil fields, 151 of which are under development. The company owns four refineries and in 1998 processed 183 Million barrels (approx 24.9m tonnes) of oil; however it has the capacity for processing 247 Million barrels (approx 33.6m tonnes) per year (see table 3.7).

<table>
<thead>
<tr>
<th>TABLE 2.7 YUKOS REFINERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REFINERY</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Novo-Kuibyshev</td>
</tr>
<tr>
<td>Syzran</td>
</tr>
<tr>
<td>Samara-Kuibyshev</td>
</tr>
<tr>
<td>Achinsk</td>
</tr>
</tbody>
</table>


2.11.1 PRODUCTION AND EXPORTS

In 1998 ‘Yukos’ accounted for 12.5% of overall Russian oil exports, when the company exported 123.47 Million bbl (approx 16.8m tonnes) of oil, 92% of which were sold outside the FSU.

Almost 90% of the oil fields owned by ‘Yukos’ are located in the West Siberian region, including one of largest Russian fields – Priobskoye, with proven oil reserves of 4.2 Billion
barrels (see table 2.3). However, despite having very large reserves in West Siberia, the company is heavily investing into development of new oil fields in Eastern Siberia, which seems to be 'set to play an increasingly important role' in the future production (Petroleum Economist, 2001).

2.12.2 REORGANIZATION

Since the beginning of 1998 ‘Yukos’ was experiencing financial difficulties mainly due to very low global crude oil price. The majority of the shareholders were not satisfied with the company’s attitude while at the same time the price of the company’s shares fell tremendously (Petroleum Economist, 2001).

In July 1998 the Yukos Oil Company started a two-part reorganization programme and adopted a different approach to business, by ‘using accepted international accounting procedures, raising investment and making shareholder value its mantra’ (Petroleum Economist, 2001, p 44).

The first step was to realign the company into three main entities based on ‘upstream, downstream and corporate business activities’ (Oil and Gas Journal, 1999). The upstream operations were realigned into a Yukos Exploration and Production entity, whilst downstream operations went into a Refining and Marketing entity. All the corporate business activities became the management entity Yukos-Moskva, responsible for 'strategic planning and finances' (Oil and Gas Journal, 1999).

The first stage was completed in about two months and therefore in December 1998 the second phase commenced, which involved focusing on inter and intra-company relationships.
The restructuring programme resulted in numerous advantages for Yukos, such as a 20% reduction of production cost per barrel of crude oil and 70% reduction of capital expenditures (Oil and Gas Journal, 1999). Also during 1999-2000 the price of the company's shares rose by 3000% (Petroleum Economist, 2001), and although a substantial part of this accomplishment was a tremendous increase in the world oil price, the new strategy proved to be very successful.

2.13 Summary

This chapter presented the Russian oil industry including the most important aspects. Particular emphasis was placed upon crude oil exports and two main companies – 'Yukos' and 'LUKoil' as they provide the necessary information for further research and are closely related to the Lithuanian oil industry.

Lithuania was a part of the former Soviet Union until 1991 and its oil supplies are still very much dependent upon Russia, despite numerous attempts by the Government to reduce such dependence. Therefore it was vital to present Russian oil industry in such detail, as it is a key element of this research.

The next chapter provides a comprehensive overview of the Republic of Lithuania, including a short history, economic situation and the country's development, because such information will provide a basis for further understanding of the project.
CHAPTER 3

INTRODUCTION TO LITHUANIA

3.1 INTRODUCTION

This chapter presents a general overview of Lithuania including the most important facts and figures. It includes a short historical background about Lithuania’s transition from a part of the Soviet Union to an independent country, as well as the progress in achieving a number of goals during a decade of independence. It incorporates an overview about the potential of Lithuania as a transit country in terms of road, rail and sea transportation, as well as introduces some aspects of the development of foreign trade.

3.2 GENERAL OVERVIEW

Lithuania is an Eastern Europe country, located on the Baltic Sea coast with an area of 65,200 sq km. The border countries are Byelorussia (502km), Latvia (453km), Poland (91km) and Russia (Kaliningrad, 227km). The Baltic Sea coastline stretches for 99 kilometers.

There are two maps provided to illustrate the above. Figure 3.1 presents the map of Europe, which shows Lithuania’s size and location in respect to other European countries. Figure 3.2 presents a map of Lithuania, which indicates the major cities, main roads and railways.
Figure 3.1 Map of Europe (Source: http://www.lib.utexas.edu)
3.3 HISTORY SINCE 1989

In the post Second World War period Lithuania was one of the Soviet Union republics and the entire economy was structured along Soviet lines, with collectivisation of agriculture, Soviet style industrialisation and central planning from Moscow (Gros, Steinherr, 1995). In 1991 Lithuania regained its independence and since then has achieved a number of major goals. The Government adopted comprehensive stabilisation and reform programmes, which led to the rapid development of a market economy (Estrin, 1994). An extensive privatisation program has transferred almost 50% of small and medium
enterprises from state property to the private sector by 1994 and most trade has gradually shifted from former Soviet to western markets (Lavigne, 1999).

One of the major problems that Lithuania had to face was the fact that the country was heavily dependent upon external energy, mainly Russian oil and gas. In response to Lithuania’s declaration of independence Russia initially refused to supply oil and gas (Financial Times, 2001), but eventually a compromise was found. Meanwhile the loss of port facilities on the Baltic Sea coast meant that Russia became partially dependent on the Baltic States for its oil transit and therefore the establishment of good relations between the countries was of vital importance.

In 1992 Lithuania suffered severe shortages of energy, because of unstable political relations with Russia and its oil and gas suppliers, which consequently led to very high inflation as well as economic recession. Nonetheless, some progress was made when Lithuania joined the World Bank in July 1992.

The first World Bank financed project was launched in October, when the World Bank approved a loan of 60 Million USD dollars for a Rehabilitation Project (see table 4.1 for more detail). In 1993 the national currency – Litas was introduced and a private banking sector as well as capital infrastructure were created (Jauernig and Roe, 2000). By 1994 Lithuania appeared to have pulled out of recession, the economy stabilized and ‘private property emerged as the prevailing form of ownership’ (Jauernig and Roe, 2000, p 449). However in early 1995 a banking crisis hindered the recovery. Due to a number of reasons such as financial liberalization allowing too many banks in the market (Steinherr, 1997), inadequate macro-economic policies, lack of experience of bank management and fraud, a series of dramatic bank failures occurred (Lavigne, 1999).

The economy recovered and steady growth continued during 1996 and 1997, until the Russian financial and economic crisis struck in 1998 (Eastern Europe and Commonwealth of Independent States, 1999). At that period Russia was Lithuania’s main trade partner
(Lithuanian Development Agency, 2002b) and therefore the crisis had a significant impact upon Lithuania’s economy. One of the main problems was the steep decline of Russian imports (Eastern Europe and Commonwealth of Independent States, 1999), which resulted in bankruptcy of many Lithuanian companies involved in trade with Russia and consequently in increased unemployment (11.4% in 2000, the highest since 1991) and economic recession (Energy Information Administration, 2001a). Slow recovery started in 2000 and the economic situation improved during 2001.

The steady growth of Lithuania’s GDP from 1995 till 2001, is illustrated by figure 3.3, with the exception of 1999, when country’s economy was significantly influenced by the Russian financial crisis (Lithuanian Development Agency, 2002a).

![Lithuanian Gross Domestic Product, 1995-2001](http://www.lda.lt)

**Figure 3.3** Source: Lithuanian Development Agency, [http://www.lda.lt](http://www.lda.lt)

Table 3.1 presents the population size, GDP per capita figures and GDP composition by sector in the Baltic States, EU and Russia. Lithuania has the largest population when compared to Latvia and Estonia, mid level of GDP per capita and highest influence of agriculture sector on its economy. In comparison to an average EU country, Lithuania has significantly smaller GDP per capita and needs to further develop its services and industrial sectors.
Table 3.1 GDP PER CAPITA IN THE REGION

<table>
<thead>
<tr>
<th>Population (million, 2002)</th>
<th>GDP per Capita (USD), 2002</th>
<th>Economic Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Industry</td>
</tr>
<tr>
<td>ESTONIA</td>
<td>1.4</td>
<td>10,900</td>
</tr>
<tr>
<td>LATVIA</td>
<td>2.3</td>
<td>8,300</td>
</tr>
<tr>
<td>LITHUANIA</td>
<td>3.5</td>
<td>8,400</td>
</tr>
<tr>
<td>EUROPEAN UNION</td>
<td>379</td>
<td>27,500</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>144.5</td>
<td>9,300</td>
</tr>
</tbody>
</table>


Furthermore, despite all the difficulties, successful cooperation with the World Bank continued and by the end of 2001 16 projects were approved (see table 3.1). The most recent projects, approved by the World Bank during 2000 and 2001 were the Klaipeda Port Project, which aims to strengthen the long-term competitiveness of the port as well as improve the environmental conditions and the Second Structural Adjustment Loan Project, which supports the reform of five critical areas: budget management, pensions, private sector development, energy and agriculture. The main objectives of this latter project are the restoration of economic growth, fiscal deficit reduction and limitation of the current account deficit. In addition to the above, the Vilnius District Heating Project was also approved, and was designed to improve the supply of safe, reliable energy at least cost as well as encourage the efficiency and reduce the impact of energy on the environment (see table 3.2).
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Total Amount (USD Million)</th>
<th>Sector</th>
<th>Status</th>
<th>Board Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation Project</td>
<td>60</td>
<td>Multi sector</td>
<td>Closed</td>
<td>22/10/92</td>
</tr>
<tr>
<td><em>Power Rehabilitation Project</em></td>
<td>26.4</td>
<td>Electric Power and Energy</td>
<td>Active</td>
<td>24/05/94</td>
</tr>
<tr>
<td><em>Klaipeda Environment Project</em></td>
<td>7</td>
<td>Environment</td>
<td>Active</td>
<td>08/12/94</td>
</tr>
<tr>
<td>Enterprise &amp; Financial Sector Assistance Project</td>
<td>25</td>
<td>Finance</td>
<td>Closed</td>
<td>13/04/95</td>
</tr>
<tr>
<td><em>Siauliai Environment Project</em></td>
<td>6.2</td>
<td>Environment</td>
<td>Active</td>
<td>05/12/95</td>
</tr>
<tr>
<td>Private Agricultural Development Project</td>
<td>30</td>
<td>Agriculture</td>
<td>Closed</td>
<td>02/04/96</td>
</tr>
<tr>
<td><em>Klaipeda Geothermal Demonstration Project</em></td>
<td>5.9</td>
<td>Electric Power and Energy</td>
<td>Active</td>
<td>09/05/96</td>
</tr>
<tr>
<td>Energy Efficiency/Housing Pilot Project</td>
<td>10</td>
<td>Urban Development</td>
<td>Closed</td>
<td>11/07/96</td>
</tr>
<tr>
<td>Highway Project</td>
<td>19</td>
<td>Transportation</td>
<td>Closed</td>
<td>05/09/96</td>
</tr>
<tr>
<td>Structural Adjustment Loan Project</td>
<td>80</td>
<td>Economic Policy</td>
<td>Closed</td>
<td>15/10/96</td>
</tr>
<tr>
<td><em>Social Policy &amp; Community Social Services Development Project</em></td>
<td>3.7</td>
<td>Social Protection</td>
<td>Active</td>
<td>18/02/97</td>
</tr>
<tr>
<td><em>Municipal Development Project</em></td>
<td>20.1</td>
<td>Urban Development</td>
<td>Active</td>
<td>27/05/99</td>
</tr>
<tr>
<td><em>Klaipeda Port Project</em></td>
<td>35.3</td>
<td>Transportation</td>
<td>Active</td>
<td>11/05/00</td>
</tr>
<tr>
<td><em>Structural Adjustment Loan Project (2)</em></td>
<td>98.5</td>
<td>Multi sector</td>
<td>Active</td>
<td>25/07/00</td>
</tr>
<tr>
<td><em>Vilnius District Heating Project</em></td>
<td>17.1</td>
<td>Electric Power and Energy</td>
<td>Active</td>
<td>03/08/01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>456.4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4 MOST IMPORTANT EVENTS SINCE 1990

A summary of the most important events, during the period of 1990-2002 is presented next.

11 March 1990 Lithuania re-established its independence.
17 September 1991 Lithuania is admitted to the United Nations.
14 February 1993 Algirdas Brazauskas becomes the first freely elected President.
31 August 1993 Last Russian troops left the country.
4 January 1994 Lithuania applied for NATO membership.
12 June 1995 Lithuania signed a Europe (Associate) Agreement with the EU.
4 January 1998 Valdas Adamkus was elected the President of Lithuania.
1 February 1998 Lithuania became an Associate Member of the EU
February 2000 The negotiations for the EU accession started.
9 October 2002 Lithuania is invited to start membership negotiations with NATO.
January 2003 Rolandas Paksas was elected the President of Lithuania.
16 April 2003 Lithuania signs the EU accession Treaty.
11 May 2003 91% of Lithuanians back the EU membership in a referendum.
(Facts from Lithuanian Development Agency, 2003)

3.5 THE STRUCTURE OF THE GOVERNMENT

Since 1991, when Lithuania became independent from the Soviet Union, the type of Government in Lithuania has been a Parliamentary Democracy. There were two Presidents elected during the period of 1991 – 2002, each for a term of office of five years. The most recent elections were held in January 2003 and Rolandas Paksas became the third President of the Republic of Lithuania since 1991.

Each president can be elected for a maximum of two consecutive terms and has a relatively broad range of powers, including appointment and removal of the Prime Minister, individual ministers and commander-in-chief of the armed forces (Europarl, Briefing
In 2002, the Prime Minister appointed by the Presidential Decree of 4 July 2001 was A.M. Brazauskas (http://www.lrvk.lt).

The Seimas (parliament) is elected every four years and has 141 members (http://www.lrs.lt), 71 of which are elected in single member constituencies, and the remaining 70 by party-list proportional representation (Europarl, Briefing No.11, 2000).

The Board of Seimas consists of the Chairman, Deputy Chairman, the Chancellor and the leader of the opposition in the Seimas. The principal task of the Board is the settlement of the organizational issues in the Seimas, as well as assistance to the Chairman of the Seimas, upon his request (http://www.lrs.lt).

There are 13 Ministries in Lithuania (http://www.lrvk.lt) representing the following sectors of the economy:

1. The Ministry of Justice
2. The Ministry of Economy
3. The Ministry of Health
4. The Ministry of Foreign Affairs
5. The Ministry of National Defense
6. The Ministry of Environment
7. The Ministry of Transport
8. The Ministry of Finance
9. The Ministry of the Interior
10. The Ministry of Culture
11. The Ministry of Agriculture
12. The Ministry of Social Security and Labor
13. The Ministry of Education and Science

The judiciary system in Lithuania operates through district and administrative (regional) courts, the highest being the Supreme Court, where all judges are appointed by the Seimas, followed by the Court of Appeal, where judges are appointed by the President (Europarl, Briefing No.11, 2000). There is also the Constitutional Court of the Republic of Lithuania, which was formed in 1993 and admitted to full membership in the Conference of the European Constitutional Courts in 1997 (http://www.lrkt.lt). It ensures 'the supremacy
of the Constitution within the legal system' and the rulings are 'promulgated on behalf of
the Republic of Lithuania'. The decisions of the Constitutional Court are final and not
subject to appeal. They have the power of law and are obligatory

'for all institutions of authority, courts, all enterprises, establishments and organizations, officials and citizens' (both quotes from http://www.lrkt.lt/apie_kt/eng/first.htm).

3.6 Geographical Position

Historically the location of Lithuania has determined its role as a transit point between East
and West. Now this role is becoming more and more important with a view to becoming a
European Union country and an important regional centre on the eastern coast of the Baltic
Sea (Greiciunas, 1998). The EU has already recognized Lithuania as the prime transport
center in the region linking the EU and CIS (Lithuanian Development Agency, 2003).

3.6.1 Road Transit

In the last decade, the transportation system has played a major role in Lithuania's social
and economic development as well as affecting the political situation and the process of
integration into the EU (Greiciunas, 1998). The European Union's Commission has
identified ten priority multi-modal transport routes in Europe, two of which pass through
Lithuania (Lithuanian Development Agency, 2002d). The first corridor (I), known as Via-
Baltica, is the North-South route linking Scandinavia with Central Europe and the second
is the East-West corridor XI B linking Russia and the CIS (Commonwealth of Independent
States) with Western Europe (See figure 3.4). Lithuanian trucking companies have already
taken advantage of the country's geographical position and in 1998 Lithuanian truckers
were moving nearly the same tonnage between east and west, as Russian companies were
At the end of 1999 Lithuania started upgrading several sections of Via Baltica – the international motorway linking Scandinavia and Central Europe (Lloyd’s Shipping Economist, 2000). It crosses three Baltic States – Lithuania, Latvia and Estonia and is connected to the Scandinavian road system by ferries from Tallin in Estonia (see figure 4.3) as well as merging with the European Motorway System in Poland.

3.6.2 RAIL TRANSIT

Lithuania also has an extensive railway network (see figure 3.5), including one of the largest hubs in the region. Even though the rail gauge does not conform to European standard, the rail network is worked intensively between the port of Klaipeda (Lithuania) and the CIS. Lithuanian railways have direct connections with Russian, Byelorussian, Latvian, Polish and German railways. Between 1995 and 1998 the traffic on Lithuanian railways increased by 17%, up to 30.4 Million tonnes and over 27% of the total traffic was transit cargo (Lithuanian Development Agency, 2002d).
The main commodities moved by rail are oil and refined oil products, peat, metals, agricultural machinery, cars, fertilizers and coal (Lithuanian Development Agency, 2002d).

Towards the end of 1999 Lithuania started privatization of the railway network (Lloyd’s Shipping Economist, 2000), but nonetheless, it was still incomplete in 2002.

3.6.3 SEA TRANSIT

The port of Klaipeda is the northernmost ice-free port on the coast of the Baltic Sea (Washington Post, 2001a) and is essential to the development of Lithuania’s economy and transport sector (Canfield, 1993). It is the connection between the principal sea and land routes in a West-East direction and also serves as a main junction of the international multi-modal transport corridor IX b (Greiciunas, 1998).

In 1999 Klaipeda was the fifth largest port in the Baltic Sea region in terms of its stevedoring volume (Port Development International, 1998). It handled over 19 Million tonnes of cargo in 2000 (Klaipeda State Seaport Authority, 2002) and 17.2 Million tonnes in 2001 (Lithuanian Development Agency, 2002d). Around 70% of cargo turnover in the port of Klaipeda was transit cargo, which mainly comes from Russia and Kazakhstan and goes to Germany, Netherlands, the United States (Brodin, 2000, Lithuanian Development
Klaipeda is a universal seaport, which is able to handle than 25 Million tonnes of cargo per annum (http://www.port.lt). However, after the port modernization programme is complete in 2015, the capacity will reach 40 Million tonnes per annum. The port modernization programme is financed by the European Union, World Bank, European Investment Bank and the Governments of Scandinavian countries (Klaipeda State Seaport Authority, 2002). Klaipeda specializes in handling various types of cargo, but mainly handles oil products, metals and fertilizers. Figure 3.6 shows the handled cargo structure, during the year 2000. The future plans of the port of Klaipeda include the deepening of the channel to 17 meters, and acquiring free port status. In 2002 Klaipeda started the construction of 205 hectare free economic zone in order to enlarge the growth of the industrial activities, distributional centers, additional cargo processing services and simplify the customs procedures in the port (Contemporary Review, 2002).

There are no facilities in the port of Klaipeda for handling crude oil and this amongst other reasons was behind the construction of a new crude oil import/export terminal at Butinge in 1999 (Lloyd's List, 2000). The terminal and its competitors are presented in detail in the following chapters.
3.7 FOREIGN TRADE

One of the most important conditions of integration to the EU is good neighborhood relations. Therefore Lithuania is trying to maintain trade with both west and east European countries, based on the principles of friendly contacts and mutually beneficial cooperation. Being a transit country Lithuania seeks to establish good business and cooperation relations with the west and east countries based on stability and profit on both sides.

The share of trade with the EU countries is becoming more and more important for Lithuania. From 1996 to 2001 the share of Lithuanian exports to the EU grew from 32.9% to 47.9% and imports from the EU increased from 42.4% to 44.4% (Lithuanian Development Agency, 2002b). This increase has been predicted in the free trade agreement between Lithuania and the EU, which came into force on 1 January 1995 (Jauerning, Roe). It was agreed that the trade of industrial products would be completely liberalized by 2001. Despite the increase of trade with the EU, the CIS still remains a very important sector for
both Lithuanian exports and imports. Although the share of Lithuanian exports to the CIS decreased from 45.4% to 19.5% and imports from the CIS were reduced from 32.9% to 29.7% during the period 1996 – 2001 (Lithuanian Development Agency, 2002b), these countries still are the most important suppliers of raw materials, especially oil, gas, timber and metals.

The major Lithuanian export partners in 2001 were United Kingdom, Latvia, Germany and Russia (The World Factbook, 2001). Such statistics prove that the EU countries are becoming essential trade partners and the influence of the CIS has been reduced. Although Russia is only fourth of the key export partners, it remains the leading import partner, followed by Germany, Poland and Italy. This is mainly due to the fact that Lithuania has no crude oil or natural gas resources and the supply from Russia has been established over the years.

3.8 SUMMARY

This chapter has presented Lithuania as a developing Eastern Europe country, which has a lot of potential for the future, especially in becoming a major transit point between Russia and Western Europe. It also provides a background for further analysis of the topic, as oil transit via Lithuania will be discussed in more detail in the forthcoming sections.

The next chapter introduces the European Union including the principles of its formation and the enlargement policy. It is one of the major factors in this research, because since regaining its independence Lithuania has aimed to become a member of the EU. The process of accession has had a major influence upon all sectors of the economy in Lithuania and therefore represents a substantial influence on the research.
CHAPTER 4

THE EUROPEAN UNION

4.1 INTRODUCTION

This chapter provides an insight into the formation and principles of the European Union (EU), the enlargement process, with emphasis on Eastern Europe, and then presents detailed analysis of the relations between the EU and the Republic of Lithuania. This part includes the process of Lithuania's negotiations for EU membership, overview of the country's progress in adoption of the acquis, development of the legal system, EU financial aid contribution to the economy and analysis of environmental issues.

The second part of the chapter deals with EU energy policy, acquis in that sector and energy dialogue between EU and Russia.

4.2 FORMATION AND PRINCIPLES OF THE EUROPEAN UNION

The European Economic Community (EEC) was formed in 1957 when six countries – West Germany, France, Italy, Netherlands, Belgium and Luxembourg signed a common free trade agreement and agreed upon Community-wide programmes financed by fiscal contributions from member Governments (Begg, Fisher, Dornbusch, 1997). Over the next four decades, the EEC structure underwent major changes. In the 1970's Denmark, Ireland and the UK joined (first enlargement), in the 1980's Spain, Portugal and Greece (second enlargement) and in the 1990's Austria, Finland and Sweden became members (third enlargement) (Begg, Fischer and Dornbusch, 1997). The most important changes took place in the 1980's with a renaming to the European Community (EC) and when 'member
states agreed on some broad outlines for harmonizing policy' (Begg, Fisher, Dornbusch, 1997, p 578). This was a new start for the harmonization process and in 1987 the member states ratified the Single European Act. The main objectives were: to abolish the foreign exchange controls on capital flows; to remove all non-tariff barriers to trade within the EC; to eliminate the bias in public sector purchasing favoring domestic producers; to remove the frontier controls; and to progress towards harmonization of tax rates (Begg, Fischer, Dornbusch, 1997).

In 1992, a very important step for the development of the EC was taken, when the Maastricht Treaty (or the Treaty on European Union) was signed, based on the following elements: the European Community, Common Foreign Policy and Security Policy and Cooperation in Justice and Home Affairs (Hitiris, 1998, p 47).

The Treaty on European Union was reviewed during 1995-1996 and amended on the 17 July 1997, when all Member States signed the Treaty of Amsterdam (Cowles and Smith, 2000). The latter consolidated all three elements of the Maastricht Treaty and outlined four main objectives (Hitiris, 1998, p 57):

1. To make the employment and citizen’s rights a priority
2. To remove all obstacles for freedom of movement and strengthen security
3. To give Europe a stronger voice in world affairs
4. To make the institutional structure more efficient, with a view of enlargement

The aim of the EU outlined in the Treaty on European Union was

'\textit{to promote a harmonious and balanced development of economic activities, sustainable and non-inflammatory growth respecting the environment, a high degree of convergence of economic performance, a high level of employment and social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity amongst members}' (The Treaty on European Union, Article 2)
During the years of successful development in all sectors the European Union became ‘an exemplary form of voluntary interstate cooperation of previously unknown scope and closeness’ (Lithuania in the World, 2000, p 9).

4.3 EU ENLARGEMENT

Since its creation the EU has been faced with enlargement issues and over the years, what was the original free-trade agreement between six countries, became a major union of European countries with substantial political and economic power.

The Treaty on European Union declares that ‘any European State may apply to become a Member of the Union’ (Hitiris, 1998, p 43) provided that these preconditions are fulfilled:

1. The applicant State must be European
2. It must be democratic
3. It must accept the political and economic objectives of the European Community, (Hitiris, 1998, p 43)

In the first three rounds of enlargement, mentioned earlier, there were no set rules and regulations for the process, each round being ‘a discrete exercise involving a distinct mix of issues’ (Pentland, 2000, p 272). However, the fourth enlargement is a significantly different project in the way it is conducted and in the way it will influence the future of Europe (Preston, 1997). This process will create a European Union

‘that is not just bigger than, but different in kind both from what its founders envisaged and from what it is today’ (Pentland, 2000, p272).

The fourth enlargement will not only expand Europe’s geopolitical boundaries, but will also allow changes in the trans-formative potential of policy networks and multi-level governance of the EU politics (Pentland, 2000). The most important developments of the fourth enlargement process are presented next.

In June 1993 the European Commission at the Copenhagen Summit decided that
"the associated countries in central and eastern Europe that so desire shall become members of the European Union. Accession will take place as soon as an associated country is able to assume the obligations of membership by satisfying the economic and political conditions required" (Council of the European Union, 1993)

The requirements for applicant countries outlined in the Summit became known as 'Copenhagen Criteria' in the enlargement process.

The Commission also acknowledged

ʻthe prospect of membership and basic criteria for the East European countries to become Member States of the EUʼ (Saudargas, 2000, p1).

These decisions had a major impact upon the EU policy, as the question of if these countries could join the Union, was answered and it became a matter of when the accession would commence.

During the period of 1991-1996 ten 'Europe Agreements' were signed between the EU and the applicant countries. These agreements established a political dialogue, which aimed at creating 'lasting links of solidarity and new forms of cooperation' (Henderson, 1999, p 93). Although Europe Agreements did not constitute any obligations by the EU for future accession of candidate countries, they implied commitment from both sides as well as marked a new stage of contractual relationships (Lithuanian Foreign Policy Review, 2000).

In June 1997, after the Treaty of Amsterdam was signed, the European Council announced decisions concerning the overall enlargement process as well as practical arrangements, which would be taken in the meeting at Luxembourg in December 1997 (Henderson, 1999).

In July 1997 the European Commission published 'Agenda 2000' documents containing detailed analysis of each country's application (Henderson, 1999) and proposals for possible enlargement.
The European Council meeting in Luxembourg (December 1997) clarified some of the remaining issues concerning the accession process. A new legal instrument – 'Accession Partnership' was introduced, which would govern relations between each applicant country and the EU. The Council also stated that a 'decision to enter negotiations did not imply successful completion' (Henderson, 1999, p 72).

During the meeting, the European Council indicated five countries – Hungary, Poland, Estonia, the Czech Republic and Slovenia, which were in the position to satisfy the conditions for membership in the medium term, provided they maintain their efforts of preparation for accession (Henderson, 1999). It was recommended that accession negotiations with these countries and with Cyprus, start in 1998.

Nonetheless, at the same time it was also emphasized that all applicant countries

'are destined to join the European Union on the basis of the same criteria and they are participating in the accession process on an equal footing' (The European Council Meeting, 1997, point 10).

Such a statement implied that, although the five countries selected at the Luxembourg meeting were most likely to be the first to joint the EU, there was an equal possibility for the rest to show progress and be included in that list. The progress would be assessed annually by the 'Accession Partnership' programme, where each applicant country would make comments

'relating in particular to democratic, macro-economic stabilization, nuclear safety and national programme for adopting the community acquis within a precise timetable' (European Commission, 'Agenda 2000', supplement 5/97, op. cit. 53).

At this point it is necessary to state that acquis communautaire (usually referred as acquis) is the

'body of common rights and obligations which bind all Member States together. The crucial texts are the Treaty of Rome, the supplementary legal texts and the extensive secondary legislation. The acquis communautaire mainly covers the
single market and four fundamental freedoms, the associated common policies and solidarity measures in favor of the most disadvantaged regions and population groups' (Europarl, Briefing No.43, Section II).

Europarl Briefing 43 states that it is the applicant country’s ability to adopt the acquis that provides the most marked differentiation between them.

On the 13 October 1999 the Commission recommended opening negotiations for accession with Romania, Latvia, Lithuania, Bulgaria, Slovakia and Malta.

A historic moment in the development of the EU took place in Athens, on the 16 April 2003, where ten candidate countries signed the Accession Treaty. It will come into force on the 1 May 2004, when all of them become official members of the European Union.

After these general enlargement issues have been presented, the development of legal cooperation and accession negotiations between the Republic of Lithuania and the EU are introduced.

4.4 LITHUANIA: EU MEMBERSHIP

Lithuania did not have an opportunity to participate in European integration from the beginning, as it was a part of the Soviet Union. Nonetheless, the legal foundations for cooperation between Lithuania and EU were laid shortly after Lithuania regained its independence.

Lithuania's integration into the EU appears to be a natural process, guided by common objectives, such as globalization, technological development, protection of the environment, security of citizens and many others (Saudargas, 2000). Lithuania seeks to contribute to the European progress, especially in social, political and economic areas and therefore EU membership has been one of the principal objectives for Lithuania since 1991, and is reflected in all major Government programmes.
European Union accession has been a major issue in Lithuania for a number of years and in June 2000 the chief negotiator for Lithuania’s accession to the EU, Usackas stated that the EU is ‘a model for democratic, economic and social reforms in Lithuania’ (Lithuania in the World, 2000).

4.4.1 PRE-ACCESSION INSTRUMENTS

The main pre-accession instruments for Lithuania are the Europe Agreement, Accession Partnership programme and participation in the EU programmes, agencies and committees.

The purpose of establishing the Europe Agreement was analysed earlier in the chapter, however at this point it is necessary to outline the key instruments, which ensure the efficient implementation of its requirements (http://europa.eu.int):

1. The Association Council (bilateral meeting at ministerial level, between the EU and associated countries, where all areas of approximation towards EU are discussed);

2. The Association Committees (meetings at senior official level, where all areas covered by the Europe Agreement are reviewed at great detail); and

3. Joint Parliamentary Committees (meeting of the national parliaments of all associated countries and the European Parliament)

The Accession Partnership programme was also presented earlier in the chapter, however it is important to outline that it is the key feature of reinforced pre-accession strategy, as well as pre-accession aid (http://europa.eu.int). It provides economic analysis of each candidate country, indicates the areas where progress should me made, and provides the ways in which the EU financial aid could support such preparations (http://europa.eu.int).
The Accession Partnership is complemented by the National Programme for the Adoption of the Acquis, which sets out the details of how each country, in this case Lithuania, intends to fulfil the Copenhagen criteria and prepare for the EU accession (http://europa.eu.int).

The participation of associate member states in various programmes, agencies and committees of the EU is another very important pre-accession tool, considered by the European Commission in the Enlargement Strategy Paper (November 2000, Clause 11.4).

4.4.2 LEGAL ISSUES IN COOPERATION WITH THE EU

Some very important agreements were ratified as well as a sizable progress made in cooperation between EU and Lithuania during the years of negotiations for accession. The most significant ones are introduced below.

The first step towards establishment of diplomatic relations was made on 27 August 1991, when the EU recognized the independence of Lithuania.

On 11 May 1992 the first agreement on economic, commercial and trade cooperation was signed by both parties (Saudargas, 2000).

On 18 July 1994 the Free Trade Agreement (which came in force on the 1 January 1995), incorporating legal foundations for cooperation was ratified, and later it was integrated into the Europe Agreement (Saudargas, 2000).
4.4.3 The Europe Agreement

The framework for Lithuania’s aspirations for EU membership and the pre-accession strategy were outlined in the Europe Agreement, which was signed by both parties on the 12 June 1995 (Saudargas, 2000) and came into force on the 1 February 1998.

These are some of the protocols and annexes that were incorporated in the Europe Agreement since February 1998:

The protocol adjusting trade aspects with new Member States – Austria, Finland and Sweden, was included in the Europe Agreement on 16 July 1998 (the provisions applied from 1 January 1999).

On the 18 December 1998 an additional protocol on the trade liberalization in textiles was signed between the EU and Lithuania (provisions applied since 1 January 1998) and since 2001 the trade in industrial products was also fully liberalized (European Integration Department, 2001).

In June 2000 reciprocal agricultural concessions were concluded and larger export quotas were granted to Lithuania, in particular for dairy products (European Integration Department, 2001).

In March 2001 the negotiations for the signing of the Protocol on European Conformity Assessment to the Europe Agreement started. This protocol will grant the notified, Lithuanian, conformity assessment bodies the right to issue certificated quality, which will be recognized in the EU (European Integration Department, 2001). It was signed in May 2002 and ratified by the Seimas in July 2002 (Regular Report, 2002).

Also, negotiations concerning ‘reciprocal trade liberalization in fish and fishery products’ (European Integration Department, 2001, p3) started in September 2000. The agreement
for gradual liberalization within three years was reached in January 2001 (The Association Council, 2001) and entered into force in February 2002 (Regular Report, 2002).

The negotiations for Lithuania’s accession started on the 15 February 2000 and in November 2001 Lithuania’s Chief Negotiator for EU membership P. Austrevicius noted that expectations to join the EU in 2004 are very realistic (Financial Times, 2001b).

On the 16 April 2003 Lithuania signed the EU Accession Treaty, which is the biggest treaty in EU history, covering every aspect of accession (BBC News, 2003). It will come into force on 1 May 2004, when all candidate countries will officially become members of the European Union (http://europa.eu.int). The Treaty requires ratification from all 15 existing members as well as from each candidate country. If one of EU countries fails to ratify the Treaty, it would become null and void, nonetheless such an event would be very unlikely; however if a candidate country fails to ratify, the Treaty would still enter into force, but that particular country would remain outside EU (BBC News, 2003).

Lithuania held a referendum on the 11 May 2003 and 91% of Lithuania’s population voted in favor of the EU accession (Lithuanian Development Agency, 2003).

In the next section Lithuania’s progress in the framework of pre-accession strategy will be analyzed.

4.5 LITHUANIA: THE PROGRESS

Since regaining its independence the country has made significant progress, in terms of economic stability, reduction of fiscal and external imbalances and privatisation.

Lithuanian development was assessed in the Regular Report 2001 and a further revision ‘of the priorities and intermediate objectives’ (Explanatory Memorandum, 2001), identified
by the Accession Partnership programme, was proposed by the European Commission later that year.

The reform of the Lithuanian legal system was welcomed by the Association Council in the fourth meeting between EU and Lithuania, on 27 February 2001, in Brussels. The Council noted that the

‘implementation of the Europe Agreement is running smoothly and that no significant trade problems have been reported’ (the Association Council, 2001).

The Council gave a very positive review on Lithuania’s progress in achieving the Copenhagen criteria by implementing public administration and legal system reforms, adoption of a national anti-corruption strategy, privatization of the banking sector, liberalization and restructuring of the energy sector and in land restitution (the Association Council, 2001). However, it was outlined that additional progress was required in taxation, agriculture, regional policy and financial control sectors (the Association Council, 2001).

The accession Partnership identified two groups of priorities – short term and long term. The EU stated that in 2001 Lithuania made a satisfactory progress in addressing short-term priorities, concerning economic criteria, the internal market, energy and the environment (http://europa.eu.int); and satisfied most of the medium-term ones, especially those relating to the management and control of Community funds (http://europa.eu.int). The priority areas for 2002, which were of equal importance at the time, were outlined as:

1. Economic Reform
2. Strengthening institutional and administrative capacities
3. Internal market
4. Justice and home affairs
5. Environment

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There were short-term and long-term objectives outlined for each of these areas, however there is no need to discuss them in detail in this case, except for the ones related to the energy sector, which are related to the specific issues of this project. They will be discussed later in the chapter.

Further more, the Association Council acknowledged the substantial contribution of EU financial assistance to the development of the Lithuanian economy, mainly provided by three programmes, which are introduced next.

4.6 EU Financial Assistance

Since 1991 various sectors in Lithuania have received a significant financial aid from EU institutions. All major financial aid programmes are orientated towards

'long-run structural measures, which will make a considerable contribution to the modernization of Lithuania's agriculture, environmental protection and transport networks' (Saudargas, 2000, p2).

4.6.1 PHARE Programme

The PHARE (Pologne, Hongrie, Assistance a la Restructuration Economique) programme was initially introduced as immediate financial aid for Poland and Hungary (Henderson, 1999), but nonetheless during the 1990's it was enlarged to 12 recipient countries. The
focus of the programme was redefined in 1997, when PHARE became a pre-accession tool in the EU enlargement process.

Lithuania has been a beneficiary of the PHARE programme since 1991 and has received 328 Million Euros during the 1992-1999 period, 50 Million Euros in 2000 and 48.5 Million Euros in 2001. The allocation for 2002 was 43.7 Million Euros, complemented by 18.5 Million Euros under the PHARE 2002 supplementary institution building facility (Regular Report, 2002). The main objective of the programme is to provide financial support for the countries in the Central and Eastern Europe to help their preparation for the EU accession (Co-operation Between Lithuania and the European Union, 2001). The programme provides

'support for institution building, investment to strengthen the regulatory infrastructure needed to ensure compliance with acquis, and investment in economic and social cohesion' (Regular Report, 2002, p12).

4.6.2 ISPA

The Instrument for Structural Policies for Pre-Accession (ISPA) is guided by the Accession Partnership and the National Programme for the adoption of the Acquis. It was designed for project financing; however it also required a strategy to be completed by 2000 by the Ministry of Transport and the Ministry of Environment in coordination with the Ministry of Foreign Affairs (Co-operation Between Lithuania and the European Union, 2001).

Particular emphasis was placed on completing and improving European Transport Corridors that pass through Lithuania, especially railways with plans to completely renew the East-West Corridors (Regular Report, 2002).
In the field of the environment, water, waste water and solid waste sectors were given a priority status.

In 2000-2001 Lithuania received 102.7 Million Euros from ISPA, and between 44 and 65 Million Euros was allocated for 2002.

4.6.3 SAPARD

The Special Accession Programme for Agriculture and Rural Development (SAPARD) aims to support the efforts of the accession countries to prepare for participation in the Common Agricultural Policy (Co-operation Between Lithuania and the European Union, 2001).

SAPARD has allocated 29.829 Million Euros each year for Lithuania until it becomes a EU member.

4.7 POSSIBLE PROBLEMS

Although the fourth enlargement of the European Union is a very structured process, which covers all legal aspects of the potential accession of Central and Eastern European States, some issues still remain unresolved (Henderson, 1999). It is difficult to predict what problems the accession of ten new members would initiate within the existing framework of the European Union. Each new member will not only extend the geographical boundaries of the EU, but also would bring new perspectives and interests in to the Union (Cowles and Smith, 2000).

Therefore if for any reason Lithuania was to be excluded from the first wave of countries to join the EU, it is possible that the process would become very lengthy in the future and
the requirements even more demanding. Nonetheless, the country has made excellent progress during the years of negotiations and the EU membership in May 2004 is a very realistic target.

4.8 THE EU ENERGY SECTOR

After analysing the general issues concerning the EU and its enlargement, the next section introduces legislation of the EU energy sector as well as overview of EU energy industry.

The general overview of EU energy policy is provided by the European Parliament Briefing No.43 (1999). The paper provides an outline of 'the problems relating to enlargement as far as energy policy is concerned'. More specific issues concerning Lithuania, such as relations with Russia, privatisation and progress, are addressed in the survey published by Financial Times (2001a) and also in the European Parliament Briefing No. 11 (2000).

The legal base for the common EU Energy Policy is outlined in the Europarl Briefing No.43 (1999) and primary legislation consists of:

1. European Coal and Steel Community (ECSC) Treaty, (signed in 1951) which established the European Coal and Steel Community and created the first common energy market for coal and steel. It includes provisions for coal production, prices and general objectives.

2. The EURATOM Treaty establishing the European Atomic Energy Community (EAEC), which was found in 1957 and since then promoted the effective nuclear power industry. EURATOM includes provisions for nuclear energy policy and provides loans for safety and efficiency improvements of nuclear power plants.
3. Treaty on European Union, which provides the general energy policy provisions for other sources of energy (including crude oil and natural gas).

Although the European Treaty provides the general policy, it does not include a separate chapter on energy, or any specific provisions. Some aspects of the energy policy are included in the objectives and others are referred to in various articles, such as Environment title and Trans-European Networks (energy infrastructure).

Originally, only two forms of energy were included in the EU energy policy – coal and nuclear power (Europarl, Briefing No.43, 1999). All Member States agreed on the promoting of nuclear power, as a key element for the future energy supplies, until the mid 1980's. However since then many different views were expressed among the European Institutions concerning the overall energy policy, but no consensus was reached (Europarl, Briefing No.43, 1999). Also in the later stages of the EU development various problems arose, creating the need to concentrate on other important energy questions. Therefore recently the EU acknowledged that these areas are of particular importance to the energy sector (Europarl, Briefing No.43, p2):

1. The white paper on energy and the energy framework programme
2. Completion of the internal market for energy (electricity and gas)
3. Promotion of the role of renewable sources of energy within the Community's energy strategy

The secondary legislation is derived from the basic legislation in the Community treaties and includes provisions for oil supplies, stocks, intra-community trade, import and export.

Overall, the secondary legislation for the energy sector has reached considerable proportions since 1998 and whilst incorporating acquis in the energy sector, it could impose a significant burden upon the applicant countries. Although the majority of
secondary legislation is not legally binding, it contains some very important directives, regulations and recommendations.

Further more, where imports are concerned, EU is greatly dependent upon crude oil and natural gas imports from non-EU countries, and it is important to reduce such dependence. The overview of European Union's oil supply is presented next.

4.9 EU OIL SUPPLY

The European Union is the key player of the international energy market, it is the largest importer and second largest consumer in the world (Negotiations for enlargement, 2002). EU is dependent on imports for approximately 50% of its supplies, and this figure is estimated to grow to 70% by 2030, if no measures will be taken to prevent this (Negotiations for enlargement, 2002).

In 1999 the EU consumed 34% of the world's nuclear power, 18% of world's oil and 16% of natural gas in the world, whilst producing 5% of the world's oil and 9% of natural gas (Energy Information Administration, 2001). The EU was a significant net importer of energy, as in 1999 EU member states consumed 16% of world's energy and produced only 8%.

Oil was the dominant fuel in 1999 (accounting for 44% of energy consumption in the EU), however natural gas was the fastest growing fuel and is expected to continue growing over the next 20 years.

OPEC was the main crude oil supplier in 1999, providing 43% of overall EU imports (The European Union's oil supply, 2000), however Russia was the biggest combined raw materials (oil and gas) supplier, providing 21% of net oil imports and 41% of gas imports for the EU member states (Ninth EU-Russia Summit, 2002).
Next section presents the energy dialogue between EU and Russia.

### 4.10 THE ENERGY DIALOGUE BETWEEN EU AND RUSSIA

It was already mentioned before that Russia is the biggest crude oil and natural gas supplier for the European Union and therefore it is important to analyse this matter in more detail. Because of the geographical position providing easy access, established trade relations and future possibilities, the EU has

> 'a vital interest in maintaining and enhancing Russia's role as a supplier of gas and oil and to strengthen Russia as a secure and reliable supplier by technology transfers and investments to upgrade the Russian energy infrastructure' (Ninth EU-Russia Summit, 2002, p3).

Russia already has a network of oil pipelines – Druzhba pipeline and BPS (Baltic Pipeline System), as well as a new terminal on the Baltic Sea coast (Primorsk), all of which are used for exporting oil to the EU (facilities of the Russian oil industry are discussed in chapter 3). The new oil terminal has a huge potential to increase the exported capacity, however part of it is still under construction, but should be completed by December 2003.

In October 2000 the European Union and Russia established the Energy Dialogue, which aims to establish a progress in the energy partnership between both parties as well as provides an opportunity to discuss all questions relation to the sector (Ninth EU-Russia Summit, 2002).

The overall objective of this summit is to improve energy relations

> 'whilst ensuring that the policies of opening and integrating energy markets are pursued' (EU-Russia Energy Partnership, 2002, p2).

In the future the energy dialogue between Russia and EU should strengthen the cooperation between the parties, create security for long time energy supplies, ensure the
physical security of transport networks and provide possibilities for creation of new infrastructures of common interest (Petroleum Economist, 2000c).

4.11 EU ENERGY INDUSTRY AND ENLARGEMENT

The overview of the EU energy sector shows that it is very dependent upon energy imports and the share of dependency is increasing. At the same time, it is necessary to outline that the EU enlargement will only

'**reinforce these trends, despite the fact that certain candidate countries are producers of primary energy**' (Negotiations for enlargement, 2002).

In 2001 the European Commission launched a Green Paper 'Towards a European strategy for the security of energy supply', which is concerned with establishing

'**a stable flow of energy, ultimately underpinning the Union's efforts to ensure peace, stability, security and prosperity**' (Negotiations for enlargement, 2002).

The energy acquis communautaire represents all energy related EU law, regulations and policies. For each candidate country implementation of the acquis will require adequate legislation and functioning institutions. Chapter 14 of the negotiations for enlargement (2002) states that each country will have to:

1. Decide on an overall energy policy with clear timetables for reconstructing the sector.

2. Prepare for the internal energy market (the Gas and Electricity directives; the Directive on electricity produced from renewable energy sources).

3. Improve energy networks in order to create a real European market.

4. Prepare for crisis situations, particularly through the constitution of 90 days of oil stocks.
5. Waste less energy and increase the use of renewable energies such as wind, hydro, solar and biomass in their energy balance.

6. Ensure the safety of nuclear power plants in order that electricity is produced according to a high level of nuclear security.

7. Ensure that nuclear waste is handled in a responsible manner, and prepare for the implementation of Euratom Safeguards on nuclear materials.

All of these requirements and progress of their implementation will be addressed throughout the following chapters, which deal specifically with the Lithuanian energy sector and oil industry.

Because only one of the outlined requirements deals directly with oil issues, and it is the main focus of this research, at this point it is necessary to present the EU legislation on the 90-day oil stocks.

4.11.1 THE STRATEGIC RESERVES IN EU

The existing figures and future forecasts show that in 2000, EU imported 75% of oil and this figure is likely to increase further and exceed 85% by 2020 (The European Union's oil supply, 2000). Such high level of dependency makes the European Union very sensitive towards any disruption of oil supply and therefore strict legislation was implemented, concerning emergency stocks. The directives are as follows:


They impose an obligation on Member States

'to maintain a level of stocks equivalent to 90 days' consumption for each of three main categories of petroleum products for energy use' (The European Union oil supply, 2000, p11)
Directive 73/238/EEC

This Directive has two aims, which state the following:

In the case of an energy crisis, each Member State should be ready to act by the means of providing themselves with intervention plans and appropriate bodies should

'enable stocks to be released onto the market, to restrict consumption, to safeguard the supply of priority and to regulate prices' (The European Union's oil supply, 2000, p11).

The second aim is to emphasize the importance of 'consultation amongst the Member States for coordination purposes' (The European Union's oil supply, 2000, p11) in case of crisis.

4.12 Summary

This chapter presented principles and enlargement strategy of the European Union, its relations with Lithuania as well as the energy policy and relationship between EU and Russia to some extent. The next chapter provides detailed analysis of the Lithuanian energy sector, including heat, gas and electricity and further analyses the impact of the EU accession, progress in implementation of acquis, and Russian influence upon it.
CHAPTER 5

THE LITHUANIAN ENERGY SECTOR

5.1 INTRODUCTION

This chapter begins with the general overview of the energy sector in Lithuania and then introduces four sub-sectors individually, including heat, gas, electricity and oil. Particular emphasis will be placed on the requirements for each sub-sector, imposed by the European Union for successful accession, which were clearly outlined in the end of chapter 4.

5.2 THE GENERAL OVERVIEW

Since the breakup of the Soviet Union Lithuania’s energy market was dominated by the State owned natural monopolies – AB Lietuvos Dujos (gas supplier) and AB Lietuvos Energija (producer and supplier of electricity) (Energy Law, 2002). Other important players included ‘Mazeikiu Nafta’ oil refinery and Ignalina Nuclear Power Plant. The Lithuanian energy sector was, and still remains, heavily dependent on Russian oil and gas supplies, (Energy Information Administration, 2001b), as there are insufficient oil or natural gas deposits within Lithuania’s territory. However it is not only the oil and gas industries that depend upon these supplies, the other sectors, including heating and electricity are also strongly influenced.

Heat is mainly produced using oil and gas as fuel, and where electricity is concerned, Lithuania has a major nuclear power plant in Ignalina (for its location see map in appendix 7), but it should be closed by 2010 due to the requirements of EU accession (Regular
Report, 2002) and potential danger to the environment. Therefore, the electricity sector will become dependent on conventional power plants for electricity generation, which use oil and gas as their main fuel as well.

There are some hydro power plants in Lithuania; however it is very unlikely that they would have the potential of generating a significant share of electricity required by the country.

The pipeline infrastructure, which was built during the Soviet Union period, as well as the low price (compared to world prices) of oil and gas offered by Russian suppliers places Lithuania in a very difficult position. It does not require any additional investment and offers excellent co-operation opportunities, however the fact that Russia could become the sole supplier of both crude oil and natural gas to Lithuania, has significant implementations for other issues such as those relating to EU accession and strategic as well as political dependency on Russia.

5.3 LEGISLATION IN THE ENERGY SECTOR

When Lithuania regained its independence, all sectors of the economy faced very difficult changes, which in many cases were unexpected. The

‘abrupt price rise of all primary energy resources and the loss of former Eastern markets together with other factors led to a deep decline in industry’ (National Energy Strategy, 1999, p1).

Although the overall state of the energy sector could be described as relatively modern (National Energy Strategy, 1999), problems occurred when issues such as energy efficiency were addressed. During the Soviet Union period, energy prices were very low and there were no incentives for energy efficiency or energy saving. Therefore the
Lithuanian Government had to initiate a strategy and long-term investment plan in order to reduce high-energy intensity.

The first National Energy Strategy was approved in 1994, and was revised in 1999 (Resolution No. VIII-1348, adopted on 5 October 1999). It outlined

*the main guidelines of the Government on the restructuring and development of energy sector*

and has the following objectives:

1. Reliable and safe energy supply with least costs
2. Energy efficiency enhancement
3. Improvement of the energy sector management and implementation of market economy principles in the energy sector
4. Reduction of the negative impact upon the environment; assurance of nuclear safety requirements
5. Integration of the Lithuanian energy sector into the energy systems of the European Union
6. Regional co-operation and collaboration

The National Energy Strategy (1999) states that these objectives were formulated with particular consideration of the principles of EU energy policy (as well as policies of individual Member States), requirements outlined by the Europe Agreement, the Energy Charter Treaty and other international treaties.

Creation of the National Energy Strategy itself was a very big step in terms of acquis implementation in Lithuania, because it sets the guidelines and to some extent the timetable for restructuring the sector.

Other general legislation for the energy sector includes:

'regulates general energy activities, the basic principles of energy development and management, energy and energy resources efficiency'.

National Energy Efficiency Programme (Resolution No 1121 of September 19, 2001, Vilnius, http://www.ekm.lt), which was revised with regard to the Directives of the EU and outlines directions for implementation of the energy efficiency programme in Lithuania until 2005.

The legislation concerning specific sectors (electricity, nuclear energy, natural gas, oil and petroleum products) will be presented later in the chapter, when each of them are analyzed individually. Next, the regulatory framework is presented.

5.4 REGULATORY FRAMEWORK

The energy sector in Lithuania consists of a number of institutions, which are competent to exercise the regulatory authority (Energy Law, 2002), and in the next section its structure will be introduced.
Figure 5.1 presents the structure of the regulatory framework, followed by a brief introduction of each participant.

The National Control Commission for Prices and Energy is a state enterprise, which was founded in 1995 as a public commission, consisting of the representatives from various sectors. It became one of the Government’s institutions in November 1996, when the regulations for its existence were passed by Presidential decree. The National Control Commission for Prices and Energy has five members, appointed by the President of the Republic of Lithuania (http://www.regula.is.lt).

Its main functions are to set prices for electricity, gas, water and central heating sectors, as well as control the road, rail and inland waterways transportation tariffs. In addition, the Commission has a Licensing Department, which issues licenses for new companies entering the gas and electricity sectors (http://www.regula.is.lt).
The Nuclear Power Safety Inspectorate was established in October 1991, by a resolution of the Government of the Republic of Lithuania in order to deal with nuclear safety standards in Lithuania (http://www.vatesi.lt). The head of the Inspectorate is appointed and dismissed by the Prime Minister of Lithuania. It is a regulatory institution, which sets national nuclear safety standards, ensures that they meet international requirements and controls adherence to them (http://www.vatesi.lt).

The Energy Agency is a state enterprise, incorporated by the Ministry of the Economy of the Republic of Lithuania. It was created in 1993, when the first energy strategy was drafted and foreign experts, participating in the process, expressed their opinion that, based on the government structure in Western Europe countries, it is essential to create such an enterprise for successful development of the Lithuanian energy sector (http://www.ena.lt). Since then, under the instructions of the Ministry of Economy, the Energy Agency has dealt with a series of very important matters such as

'drafting the National Energy Program, other programs regarding the improvement of efficient use of local, renewable and waste energy resources; organization of their implementation, updating and revision; preparation of legal, economic, and organizational energy efficiency measures for implementation of the national policy' (http://www.ena.lt/en/main_apie.lt).

The Energy Agency is also engaged in organization of international cooperation in the energy sector and harmonization of Lithuanian legislation and EU legal requirements (http://www.ena.lt).

The Energy State Inspectorate works closely with the Ministry of Economy and its main functions include the control of efficiency in distribution, production, supply and consumption of the electricity, gas and central heating sectors (http://www.ekm.lt/inspekcija). The Inspectorate also issues licenses for exploitation of power grids, supervises the work of most companies in the energy sector as well as publishes a periodical ‘Energetikos prieziura’, which covers the most important news of
the energy industry, and presents all changes in relevant legislation (http://www.ekm.lt/inspekcija).

The **Radioactive Waste Management Agency** was established in July 2001, by the Ministry of Economy, under a resolution of the Government of Lithuania. The standard of storage facilities for radioactive waste did not conform to international requirements in 2001 (http://www.rata.lt), and therefore the Radioactive Waste Management Agency was created in order to address these problems.

The functions of the Agency are to manage and bury radioactive waste from the Ignalina nuclear power plant, and other institutions, as well as build the new short-term and long-term storage facilities for the radioactive waste, which would conform to the required standards (http://www.rata.lt).

**Lithuanian Petroleum Products Agency** was created in December 2001 and is owned by the Ministry of Economy. It is responsible for *accumulation and management of the state owned oil stocks* (Regular Report, 2002, p86).

Following this introduction to all the official institutions, each sector of the energy industry, including heat, gas, electricity and oil will be analyzed. Main companies in each sector are outlined in appendix 2.

### 5.5 Heating sector

The heat supply sector in Lithuania is facing serious economic as well as technical problems and the solution could be found only *in the context of the general strategy of the Lithuanian energy sector* (National Energy Strategy, 1999, p9).

The main guidelines for solving these problems were outlined by the National Energy
Strategy and include the following: the necessity to upgrade the district heating systems, so they would include combined heat and power plants capable of generating electricity; to encourage the efficient use of combustible waste for the generation of heat; to install metering equipment in all sections for accurate assessment of heat production; to upgrade heating systems, which would allow consumers to regulate their heat consumption; and to promote modernization of the existing system (National Energy Strategy, 1999).

The heat production and consumption in the country, as well as consumption by major economic sectors are presented in appendix 3, which shows a gradual decrease of both, production and consumption during the period 1990-2001. The overall production was reduced from 39,774 Giga-Watt hours (GWh) in 1990 to 14,608 GWh in 2001, and the consumption from 35,746 to 10,069 respectively (http://www.ekm.lt). Although the household consumption has remained relatively stable over the years, the consumption in of the industry decreased by almost 90% during the same period.

In addition to the above, further issues related to the efficiency in the heating sector are addressed in the National Energy Efficiency Programme (NEEP), however there was no need to analyze them in this case.

5.6 Gas industry


"the general principles of the natural gas sector and the operations of natural gas undertakings and relations with the customers (in the supply, distribution, transmission and storage of natural gas)."
Lithuania has minimal natural gas reserves and no natural gas production and is completely dependent on imports from Russia (Fossil Energy International, 2002).

The Government of the Republic of Lithuania has indicated that natural gas supply is not limited at present or in the future, even though the only supplier is Russia (National Energy Strategy, 1999). Adequate measures were taken, in order to ensure the reliability and safety of supply and the National Energy Strategy (1999) outlines the main ones:

1. Promotion of the development of the gas transmission network and gas transit via the territory of the country.
2. Further investigation and later construction of underground gas storage.
3. Preparation with the other two Baltic States and implementation of the project for interconnection with the gas networks of Poland and Finland.
4. Promotion of the natural gas as environmentally sound fuel.

'Lietuvos Dujos', the state owned gas pipeline operator in Lithuania, has long term supply agreements with the gas company 'Gazprom' in Russia for gas supply. 'Gazprom' has agreed to supply 53 billion cubic feet (approximately 1.5Mm$^3$) in 2000 and to increase the supply to 88 billion cubic feet (approximately 2.5Mm$^3$) by 2005 (Energy Information Administration, 2001b). Appendix 4 presents the natural gas consumption balance in the country during 1990-2001. The overall consumption has decreased from 5810Mm$^3$ (million cubic meters) in 1990 to 2682Mm$^3$ in 2001 (http://www.ekm.lt), which was mainly due to the reduced consumption by the thermal power plants (from 2616Mm$^3$ to 958Mm$^3$) and industry (from 828Mm$^3$ to 485Mm$^3$) in that period. Nonetheless it was gradually growing since 1998 and is expected to grow in the future (http://www.ekm.lt).

At this point it is important to mention that although the cooperation with 'Gazprom' has been successful over the years, the Lithuanian Government has been looking for a way to diversify the supply sources. A second Russian gas company 'Itera' is already supplying...
natural gas to Lithuania and furthermore there are plans to build a gas pipeline from Gdansk in Poland to Lithuania, by 2004 (Energy Information Administration, 2001b). This would provide an opportunity to import gas from Western Europe and would integrate Lithuania into the EU market.

In 2001, the Lithuanian Government took a final decision for the privatization of Lietuvos Dujos, which is 92% state owned. The company has the control of gas transmission, distribution and export operations and is the key player in Lithuania's energy sector (Fossil Energy International, 2002). The privatization plan involves selling a 34% stake to a strategic investor, which would receive management rights from 'Lietuvos Dujos' and would have to upgrade the gas distribution network, as well as integrate it with Western Europe (News and Trends in CIS/Russia, 2001). The other 34% would be sold to the gas supplier and its partners in Lithuania. The remaining 24% would remain owned by the Government, and at a later stage might be sold on the stock exchange (Energy Information Administration, 2001b). 'Gazprom', 'Itera', 'EON Energie' (Germany), 'Ruhrgas' (Germany) and 'Williams International' (United States) have expressed their interest in buying a share of Lietuvos Dujos in 2001 (News and Trends in CIS/Russia, 2001).

The restructuring of the gas sector was considered to be an important step in the process of acquis adoption, especially adoption of the Natural Gas Law, which entered into force in July 2001, because it 'provides for opening up 80% of the market' (EU Enlargement, 2002) for the competition; however further progress in privatization will be essential.

5.7 ELECTRICITY PRODUCTION

The electricity sector in Lithuania is governed by the Law on Electricity (20 July 2000, No. VIII -1881, as amended by 26 June, 2001, No. IX-408, Vilnius), which states that it
'establish basic principles regulating the generation, transmission, distribution, and supply of electricity with account of the requirements of European Union law; it shall formulate the relations between suppliers of electricity and their customers, and shall establish conditions for the development of competition in the electricity sector'.

At this point it is necessary to mention that this sector Lithuanian electricity production is dominated by the Ignalina Nuclear Power Plant and therefore it would be relevant to present the additional legislation related to nuclear energy.

**Law on Nuclear Energy** (14 November, 1996, No I-1613, as amended by 20 November 1997, No VIII-534, Vilnius), which states that it shall

> 'regulate public relations arising during the use of nuclear energy for generation of electricity and heat. (...) The objective of the Law shall be to ensure nuclear safety when nuclear energy is used to meet peaceful needs, and to prevent the development of nuclear arms by illegally disposing nuclear materials'.

The sector also has an extensive secondary legislation to support the law on electricity and other important laws and conventions related to nuclear energy production and safety (http://www.ekm.lt).

Almost every power plant that produces electricity in Lithuania is owned by ‘Lietuvos Energija’, a joint stock company, created in 1995. It is 86.5% state owned, 10.1% belongs to a Swedish company ‘Vattenfall’ and the remaining shares are owned by the company’s employees. ‘Lietuvos Energija’ owns the Ignalina nuclear power station, as well as four major conventional fuel power plants including Lithuanian Power Plant, Kruonis Hydro Power Plant, Mazeikiai Combined Heat and Power Plant and Kaunas Hydro Power Storage Plant (see table 5.1) (Washington Post, 2001b). In 1998 Vilnius Power Station became independent of Lietuvos Energija and is being run by the municipality of Vilnius City, as
The main source of electricity in Lithuania is the Ignalina Nuclear Power Station, which started operating in 1984 and since then less than a half of its generated electricity covers around 70% Lithuania's domestic needs for electricity (Fossil Energy International, 2002). The electricity balance is presented in the appendix 5.

The overall production decreased from 28,405 GWh in 1990 to 14,737 GWh in 2001, which was mainly due to reduced production by the public CPH plants (from 10,809 to 2,589) and Ignalina NPP (from 17,033 GWh to 11,362 GWh). The overall consumption declined from 12,013 GWh to 6,447 GWh, which could be considered as a consequence of reduced consumption by two sectors – agriculture and industry, where it dropped form 2,697 GWh to 197 GWh and from 5,460 GWh to 2,347 GWh respectively (see appendix 5).

Since Lithuania gained its independence and started negotiations for joining the EU, the Commission (EU's executive body) has put a lot of pressure on the Lithuanian

### TABLE 5.1 LITHUANIA’S MAJOR POWER STATIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>FUEL</th>
<th>INSTALLED CAPACITY (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignalina Nuclear Power Station</td>
<td>Nuclear</td>
<td>3,000</td>
</tr>
<tr>
<td>Lithuanian Power Plant (LPP)</td>
<td>Oil/gas</td>
<td>1,800</td>
</tr>
<tr>
<td>Kruonis Hydro Power Plant</td>
<td>Hydro</td>
<td>800</td>
</tr>
<tr>
<td>Vilnius Power Stations</td>
<td>Oil/gas</td>
<td>384</td>
</tr>
<tr>
<td>Mazeikiai combined Heat and Power Plant</td>
<td>Oil</td>
<td>194</td>
</tr>
<tr>
<td>Kaunas Power Station</td>
<td>Oil/gas</td>
<td>170</td>
</tr>
<tr>
<td>Kaunas Hydro Power Storage Plant</td>
<td>Hydro</td>
<td>101</td>
</tr>
<tr>
<td>Klaipeda Power Station</td>
<td>Oil/gas</td>
<td>11</td>
</tr>
<tr>
<td>Petrasnianai Power Station</td>
<td>Oil/gas</td>
<td>8</td>
</tr>
<tr>
<td>Private Hydro Plants</td>
<td>Hydro</td>
<td>8</td>
</tr>
<tr>
<td><strong>TOTAL CAPACITY</strong></td>
<td></td>
<td><strong>6476</strong></td>
</tr>
</tbody>
</table>

Government to set the date for closing Ignalina (the Baltic Times, 1999). The main reason for this pressure is that the Ignalina station is modeled on the same design as the Chernobyl plant in Ukraine and could constitute a considerable danger for the region.

On 8 September 1999, Lithuania and the EU reached agreement that one of the two nuclear reactors will be closed by 2005 and Lithuania’s economic affairs minister stated that it would cost around 530 million USD (the Baltic Times, 1999). The final date for closing the second reactor was set in June 2002, when Lithuania formally agreed to close it by 2009 (Regular Report, 2002). EU acknowledged country’s efforts and assured further financial support with an amount of approximately 285 million USD during the period 2004-2006 (Negotiations for Enlargement, 2002).

After the Ignalina NPP is closed, Lithuania will be dependent on electricity supplies from conventional power plants, which use oil and gas as their fuel, with the exception of hydro power plants. Although ‘Lietuvos Energija’ has planned substantial investments into the hydro power plants, it is unlikely that they would be able to generate a significant share of the electricity required by the country. Lithuania would have to modernize the next largest power plant in the country – the LPP. With an existing capacity of 1,800MW, it would become the primary source of power generation. However the plant will require a substantial investment, which was estimated to be 13 million USD until 2005 and around 264 million USD from 2006 to 2010 (Energy Information Administration, 2001b).

5.8 OIL AND PETROLEUM PRODUCTS SECTOR

This sector is governed by the Law of State Stocks of Petroleum Products and Crude Oil (25 June 2002, No. IX-986, Vilnius), which aims to ensure

‘s that state stocks of petroleum products and/or crude oil are built, accumulated,'
Lithuanian oil and petroleum products sectors are greatly dependent on the Russian crude oil supply, despite the fact that the country has some 46 million tons of extractable oil in its territory. In 2000 domestic production constituted only 7-8% of the country's consumption.

The oil sector facilities in Lithuania include Mazeikiai oil refinery, Butinge oil terminal, oil pipeline 'Naftotiekis' and oil product terminal 'Klaipedos Nafta'. In 1998 three of these entities were merged to create one enterprise – 'Mazeikiu Nafta', whilst 'Klaipedos Nafta' remained a separate company.

The oil sector, its facilities and reorganization will be analyzed in great detail in the next chapter. However at this point it is necessary to present requirements for the oil sector imposed by the European Union.

In the field of oil and oil product supplies crisis management, the most important obligation assumed by Lithuania, was the creation of oil stocks for 90 days (Negotiations for Enlargement, 2002). The EU legislation concerning this issue was already presented in chapter 4, and it will apply to Lithuania, after it becomes a member state.

In order to meet these requirements Lithuania was granted a transitional period, until 2010, because EU acknowledged the fact that country does not have necessary financial resources for a quicker implementation. Therefore until 2004 Lithuania will have to accumulate oil stocks for 49 days, and the rest until 2010 (Position Paper of the Republic of Lithuania, 2002).

Next, Lithuania's progress in adopting acquis in the energy sector is presented.
5.9 Lithuania's progress

Lithuania has made excellent progress in the energy sector during 2001 (the Association Council, 2001). Where the liberalization and restructuring of the sector are concerned, oil industry was partially privatized, thus securing a second oil supply source (Regular Report, 2002); the gas and electricity sectors are also being restructured, with plans to privatize them in the near future (Regular Report, 2002).

The Gas and Electricity Laws adopted in 2000, were regarded as very important steps towards creation of internal energy market and it was stated in the Regular Report for 2002 that Lithuania has achieved

> 'a high level of alignment on the internal energy market, by creating necessary market conditions' (p89).

The progress in the gas sector was very satisfactory (80% of the market was opened for competition), but where the electricity sector is concerned, the Lithuanian Government postponed the entry into force of the Electricity Law until January 2002, whilst the electricity company was being restructured and stated that market will be opened gradually until 2010 (EU Enlargement, 2002). Despite that the European Commission decided that

> 'the plans to open up the market in this sector appear to satisfy the current requirements of the Directive concerning common rules for the internal market in electricity' (EU Enlargement, 2002, p2).

Lithuania achieved very good results in the area of energy efficiency and is very close to full alignment with the acquis in this sector (Regular Report, 2002). The steady increase in renewable energy production can be seen in the appendix 6.

In the negotiations for EU accession a lot of emphasis was placed upon closure of Ignalina Nuclear Power Plant and in June 2002 Lithuania formally confirmed that the nuclear plant
would be closed by 2009. The EU recognized Lithuania’s effort as well as its excessive financial burden and agreed to continue to provide adequate Community assistance to support that effort (Regular Report, 2002).

Lithuania also addressed a number of nuclear safety recommendations, which were outlined by the Council of the European Union and agreed to implement them. In particular EU recommended increasing the resources of the Nuclear Power Safety Inspectorate (VATESI) in order to maintain the levels of nuclear safety in the country (EU Enlargement, 2002).

Furthermore, security of oil supply has been addressed adequately, with a clear timetable established for implementing the EU Directives. The Regular Report 2002 states that

‘Lithuania made important steps through the adoption of the Law on the State Oil Product Stocks, but needs to complete alignment by adopting the necessary implementing legislation’ (p89).

The European Commission emphasized that it was necessary to set up an administrative structure for crisis management in the oil sector and therefore the Ministry of Economy established the Lithuanian Oil Products Agency (Position Paper of the Republic of Lithuania, 2002). In addition to that, further measures are required in order to ensure the financial means for necessary investments in building up the stocks.

The negotiations between Lithuania and EU on ‘Energy’ chapter were provisionally closed on 11 June 2002 (Position Paper, 2002) and it was stated that

‘Lithuania is generally meeting the commitments it has made in the accession negotiations in the energy field’ (Regular Report, 2002, p91).
This chapter presented the structure of Lithuanian energy sector and its components, because it is a very important segment of the country’s economy and constitutes a significant part of this research. It emphasized the influence of EU accession upon various aspects of the sector and outlined country’s progress in terms of acquis implementation.

Next chapter presents detailed analysis of the oil industry in Lithuania, which is the most essential part of this project.
CHAPTER 6

OIL INDUSTRY IN LITHUANIA

6.1 INTRODUCTION

This chapter presents a detailed analysis of Lithuanian oil industry, which is the most important part of this project. It provides a short historical overview, introduces the production sector and analyses the industry. Particular emphasis will be placed on the new developments and restructuring process in the sector.

6.2 HISTORICAL OVERVIEW

During Soviet Union times Lithuania was an important region, mainly because of its oil industry facilities (The Baltic Times, 2001), which were built in order to provide the Baltic region with required oil products. The most significant facility was the Mazeikiai oil refinery, which had a capacity of refining 14 million tonnes of crude oil per annum and produced a wide range of products. Others included the oil product terminal in Klaipeda, on the coast of the Baltic Sea and a branch of ‘Družba’ crude oil pipeline, connecting the refinery in Lithuania and Russia’s crude oil producers.

During the existence of the Soviet Union the pipeline systems, as well as strategic objects such as oil refineries and oil terminals, were built using the tactic where all countries within SU would depend on each other, and mainly on Russia, in order to form a strong structure which could function only with the participation of each sector. The Baltic States are a very good example of this. The major oil export terminal was built in Latvia; however, the main oil refinery is in Lithuania and the pipeline connecting Latvia’s terminal
with the Russian oil producers runs through Birzai pump station also situated in Lithuania’s territory.

Since Lithuania became independent, the oil industry has faced tremendous changes. Initially it was split by the Government into three sectors: the oil refinery ‘Mazeikiu Nafta’, the oil terminal ‘Klaipedos Nafta’, and the crude oil pipeline operator ‘Naftotiekis’. All of these issues will be addressed later in the chapter.

At this point is important to mention that although there are no sufficient oil deposits within Lithuania’s territory, which could provide enough oil to meet the country’s demand, there are some deposits and therefore production sector is introduced next.

6.3 LITHUANIAN OIL

Oil exploration in Lithuania began in 1958 and since then more than 400 wells have been drilled and 19 oil fields discovered (The Baltic Times, 2001). There are approximately 128 million tonnes of oil in the inland territory of Lithuania (Jura, 2002), out of which 46 million tonnes are extractable (Baltenergy, 2001a) and around 80 million tonnes are located on the continental shelf (Jura, 2002).

In 2002 oil was extracted from 33 oil wells, located in ten oil fields (Verslo Zinios, 2001) by four oil production companies in Lithuania; ‘Minijos Nafta’, the largest oil producer extracting almost 70% of oil in the country, ‘Geonafta’, the largest company in terms of offered services and financial investments, ‘Genciu Nafta’ and ‘Manifoldas’. Figure 6.1 presents these companies and their share in the Lithuanian oil production market (see map in appendix 7 for the location of Lithuanian oil fields).
6.3.1 **MINIJOS NAFTA**

Lithuanian-Danish joint venture ‘Minijos Nafta’ was established in 1995 and has been successfully managed by the Danish company Odin Energi A.S. (Baltenergy, 2001b). The ownership of ‘Minijos Nafta’ is split between the Lithuanian company ‘Geonafta’, holding 50% of the shares and three Danish companies Odin Energi A.S., TKB Energi A.S. and E. Phil and Son, holding a joint stake of the other 50%.

In 2000 ‘Minijos Nafta’ extracted oil from ten oil wells and supplied half of its production to the Lithuanian ‘Mazeikiu Nafta’ refinery whilst the rest was exported to Poland. However from 2002 the company intended to sell all of its production to the Lithuanian oil refinery (Baltenergy, 2001b). The general director of ‘Minijos Nafta’ Tom Haselton stated that such an agreement would be mutually beneficial for both companies, as well as for the Lithuanian state, as all the taxes paid for these supplies would stay in Lithuania (http://www.nafta.lt).

During 2001 ‘Minijos Nafta’ doubled its extraction volumes, as the company discovered new oil deposits and invested 60 million Litas (15 million USD) into new oil wells.
The profit also grew accordingly from 48.25 million Litas (12 million USD) in 2000 to 88.4 million Litas (22.1 million USD) in 2001 (Baltenergy, 2002c).

In 2002 'Minijos Nafta' was considered to be the biggest oil extraction company in the Baltic States, (Baltenergy, 2002a). The company operates on four oil fields and extracts oil from 15 oil wells (Baltenergy, 2002b), as well as continuing to search for new oil deposits. The company reported that precision in choosing drilling locations and the use of depression drilling, which allows for change in drilling trajectory, have contributed significantly to the success of the company (Baltenergy, 2002a).

6.3.2 GEONAFTA

The first Oil Exploration Expedition in Lithuania was established in 1964 and in 1991 was reorganized into the Gargždai State Oil Geology Enterprise, which started oil production, and finally in 1995 became the joint-stock company 'Geonafta' (http://www.geonafta.lt). Until 1993 the company carried out prospecting and exploration of oil fields and has discovered almost all the oil fields and potential oil-bearing structures in Lithuania, as known up to 2001 (http://www.geonafta.lt).

The company was privatized in October 2000 (Verslo Zinios, 2001), by the concern 'Naftos Gavyba', which consists of two Polish companies 'Petrobaltic' and 'Energopol Oil' and two Lithuanian companies 'Vivum', which specializes in finance brokerage, and the West Lithuanian Industrial and Finance Corporation (Respublika, 2001c). 'Naftos Gavyba' paid 52 million Litas (13 million USD) for 80,94% of 'Geonafta' shares.

In 2000 'Geonafta' produced 54.7 thousand tonnes of oil and in 2001 the production reached 71.6 thousand tonnes (http://www.geonafta.lt). Although the production increased, the company reported that the profit of 48.2 million Litas (12 million USD) in 2001 was 6% down when compared to 2000 when the profit was 51.5 million Litas (12.87 million USD).
USD) (Baltenergy, 2002d). The more detailed report from ‘Geonafta’ showed that in 2001 the profit earned from oil extraction and sales amounted to 16.5 million Litas (4.1 million USD) and the rest came from financial and investment activities.

The joint-venture ‘Geonafta’ owns 50% of shares in each of these companies: ‘Minijos Nafta’, ‘Genciu Nafta’ and ‘Manifoldas’ and is actively involved in their activities and management (http://www.geonafta.lt).

6.3.3 GENCIU NAFTA

The joint venture ‘Genciu Nafta’ is the oldest oil production company in Lithuania and is the second largest producer of oil. It is owned by ‘Geonafta’ and Swedish company Svenska Petroleum Exploration, each holding 50% of the shares (Baltenergy, 2001d).

‘Genciu Nafta’ was the only company which reduced its oil extraction in 2001, compared to 2000 due to shrinking oil reserves. Nonetheless the profit of the joint venture increased from 21.21 million Litas (5.3 million USD) in 2000 to 24.3 million Litas (6 million USD) in 2001 (Baltenergy, 2002e). The company reported that the increase in profit was mainly generated by the rise of revenues in other activities, excluding oil production (Baltenergy, 2002e).

In 2000 ‘Genciu Nafta’ produced 99,700 tonnes of oil and in 2001 the amount was reduced to 79,000 tonnes of oil. All of the company’s production is exported to Poland.

6.3.4 MANIFOLDAS

Joint venture ‘Manifoldas’ was established in 1996 and started oil exploration in 1999. It is the most recently established oil production company in Lithuania, but nonetheless it has
been the fastest growing company during 2000 and 2001 (http://www.manifoldas.lt). Oil production increased very significantly from 2000, when the company produced only 7,800 tonnes of oil, to 2001 when the production reached 29,550 tonnes.

‘Manifoldas’ was partially privatized in 2001, when joint venture ‘Geonafta’ purchased 50% of the shares. The company showed excellent results in the oil extraction business and has a promising strategy for future expansion (http://www.manifoldas.lt).

6.4 OIL PRODUCTION SECTOR

Lithuania has never been a major oil producer, although the oil extraction business is an important sector to the country. Lithuania has enough of its own oil reserves for the next 30 years (Baltenergy, 2001e) and there are 46 million tonnes of extractable oil in the country’s territory (Baltenergy, 2001a). In 2001 estimates showed that if oil price stood at 108 Litas per barrel (27 USD) the Lithuanian land oil recourses would be worth 38 billion Litas (9.5 billion USD) (Baltenergy, 2001e).

Oil production in Lithuania has been expanding significantly and therefore table 6.1 presents the results of the four oil-extracting companies, as well as the total increase of oil production in the country during the period 2000 – 2002.

<table>
<thead>
<tr>
<th>TABLE 6.1 OIL PRODUCTION IN LITHUANIA, 2000-2001</th>
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<tr>
<td>OIL PRODUCING COMPANY</td>
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<tr>
<td>‘Minijos Nafta’</td>
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<tr>
<td>‘Genciu Nafta’</td>
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<td>‘Geonafta’</td>
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<td>‘Manifoldas’</td>
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<td>TOTAL (tonnes)</td>
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</table>

Although Lithuania’s oil production sector expanded significantly and the producers achieved excellent results, the country still remains heavily dependent upon imported crude oil. The statistics of 2000 show that domestically produced oil constitutes approximately 7 to 8% of country’s consumption, when the local production was 316,500 tonnes of oil and the country’s consumption 3.89 million tonnes of oil (Fossil Energy, 2002). It is also important to outline, that Lithuania has the biggest oil refinery in the region; however only ‘Minijos Nafta’ supplies oil to the refinery, the rest of the producers sell their production internationally, mostly to Polish companies.

6.5 FACILITIES OF THE LITHUANIAN OIL INDUSTRY

6.5.1 MAZEIKIAI OIL REFINERY

Mazeikiai crude oil refinery started its operations in 1980 (http://www.randburg.com), but it is still one of the most modern refineries in the region. According to a survey carried out by the Mazeikiai research department (1998), the refinery is fifth between other refineries in Finland, Poland, Czech Republic, Slovakia, Hungary, Belarus, Russia and Ukraine, based on the quantity and quality of produced oil (East European Energy Report, 2000). Mazeikiai has a capacity of producing 14 million tonnes of various oil products per annum.

Until 1991 (under the Soviet Union) Mazeikiai oil refinery supplied all the oil products required by Lithuanian consumers and a large Soviet hinterland (Lloyd’s List, 1999a), including distillate required by Latvia and most of the gasoline required by Estonia. Around 14% of the refinery’s product mix was also exported to other neighbouring regions. Due to its convenient geographical location and technological advantages, Mazeikiai oil refinery was highly competitive with other regional refineries in neighbouring countries (The Russia Journal, 1999).
Mazeikiai is the only crude oil refinery in the Baltic States and was designed to achieve a greater conversion of crude oil to higher value distillates than any other refinery in the FSU west of the Urals. Operating in the 'conversion mode' at 8 million tonnes per annum, it is the only refinery in the region, which could be viable at Western Europe refinery-grade product and crude oil prices (Energy Information Administration, 2001).

Since Lithuanian independence there have been a number of problems arising from the fact that the only crude oil supplier for the refinery was Russia, through a branch of the 'Druzba' pipeline.' Nevertheless, a solution for this dependency for Lithuania was found in 1996, when the Lithuanian Government took a strategic decision to build a new oil import/export terminal at Butinge (Petroleum Economist, 1998) and a pipeline connecting it with the Mazeikiai refinery. In 1999 the new oil import/export terminal in Butinge started operating (Klaipeda Port News, 2000).

6.5.2 BUTINGE OIL TERMINAL

Butinge terminal is the most modern branch of 'Mazeikiu Nafta', which was designed according to the most recent American Petroleum Institute (API) and Lithuanian standards (Butinge Terminal, 2000). It is a reverse oil import/export terminal built on the coast of the Baltic Sea, which is all year ice-free and offers opportunities for exporting oil from CIS (Commonwealth of Independent States) countries and importing light or medium oil from Western countries. The Single Mooring Buoy (SPM) with the Catenary Anchor Leg Mooring (CALM) system is located 7.2 kilometres from shore and in 20 meters water depth. It is connected with the Butinge terminal by a 36-inch diameter oil pipeline, which was designed for reverse flows (Butinge Terminal, 2000).

The terminal consists of the onshore pipeline connecting Mazeikiai oil refinery and Butinge terminal, Mazeikiai pump station, terminal facilities and crude oil tank farm in
Butinge, an offshore pipeline and SPM buoy. The tank farm capacity is about 150,000 tonnes, but there are plans to extend it by another 150,000 tonnes and build an oil product import/export pipeline (News and Trends in CIS/Russia, 2000).

6.5.2.1 BUTINGE OIL TERMINAL: THE COMPETITORS

The main competitor for Butinge oil terminal is Ventspils port in Latvia, which was used for the export of Soviet crude oil to various Western countries (The Baltic Times, 1999). Therefore after the break up of the Soviet Union, Ventspils already had all the required capacity and infrastructure for a successful expansion of oil transit business. This remains the main advantage of Ventspils port when compared to Lithuanian oil terminals.

The oil terminal in Ventspils is operated by the joint-stock company 'Ventspils Nafta' and it is the largest crude oil and petroleum product terminal on the coast of the Baltic Sea. It can accommodate tankers up to 12.4 meters draft and the total capacity of the terminal is about 30 million tonnes per annum (Lloyd's List, 2000). The volume of the terminal's oil product tank farm is over one million cubic meters.

'Ventspils Nafta' handled 18.8 million tonnes of crude oil and oil products in 2000, 22.3 million tonnes in 2001 and 13.8 million tonnes in 2002 (http://www.vot.lv, 2002). The sharp decline of oil transit in 2002 was mainly due to decrease of oil prices, decisions of the governmental institutions of the Russian Federation on limitation of oil products export and to some extent due to the cancellation of the Russian tariff discounts for oil products transportation by railway to the Latvian ports (Ventspils Nafta, 2003).

The future plans of 'Ventspils Nafta' include the expansion of the terminal until 2005, in order to provide long term storage of crude oil and oil products service for the customers, as well as upgrade the terminal for export of new grades of crude oil and oil products, and increase the overall capacity of the terminal (Free Port of Ventspils Authority, 2001).
Once completed and operating at full capacity Primorsk oil terminal and Baltic Pipeline System (these facilities were presented in chapter 2) will become another major competitor, which could reduce the transit of oil through Butinge considerably. The main disadvantage of Primorsk terminal is that it freezes during the winter, while Butinge and Ventspils remain ice free.

6.5.3 OIL PIPELINE 'NAFTOTIEKIS'

The construction of the 'Naftotiekis' pipeline began in 1966, when the Soviet Union decided to build the oil pipeline network 'Druzba' for oil transportation from the main oil fields to export terminals and refineries (http://www.randburg.com). The pump station in Birzai, Lithuania was built in 1970, in order to serve a part of this network (http://www.randburg.com).

After Lithuania became independent, the pump station in Birzai and oil pipelines served by it, became a state owned Transportation Company 'Naftotiekis'. Until 2002 the company served around 500 kilometres (km) of crude oil and product pipelines, which include 87.4 km of crude oil pipeline 'Polock-Ventspils', 87.4 km of product pipeline 'Polock-Ventspils', 225.5 km of crude oil pipeline 'Polock-Mazeikiai' and 91.5 km of crude oil pipeline 'Mazeikiai-Butinge' (http://www.nafta.lt/).

Future plans involve the building of a product pipeline connecting Mazeikiai oil refinery and oil product export terminal either in Butinge or Klaipeda (http://www.nafta.lt/).

In 1998 'Naftotiekis' transported 24.1m tonnes, of which 14.6m tonnes was crude oil delivered to Ventspils, 3.2m tonnes was diesel delivered to Ventspils and 6.3m tonnes was crude oil delivered directly to Mazeikiai. The Russian companies transporting most of the oil using 'Naftotiekis' were 'Lukoil', 'Ozako Tupeks', 'Sidanko' and 'Yukos' (Mazeikiu Nafta, 2000).
In 1999 the overall figure dropped to 21.5m tonnes (News and Trends in CIS/Russia, 2000), out of which 4.3m tonnes was crude oil for Mazeikiai refinery, 0.66m tonnes oil delivered to Butinge, 12.9m tonnes oil for Ventspils and 3.6m tonnes diesel for Ventspils (Mazeikiu Nafta, 2000). In 2000 the volume increased again to 24.5m tonnes, mainly due to growing transportation of crude oil to Butinge oil terminal (Mazeikiu Nafta, 2000).

6.5.4 Oil terminal 'Klaipedos Nafta'

Until 1999 the oil terminal in the port of Klaipeda was mainly used for exporting fuel oil from refineries in Russia, Belarus and Ukraine. However, the terminal has been modernized (Jura, 2000) and since 2000 can be used as an import terminal, as well as capable of handling a range of products, such as technological fuels, marine fuel oil, diesel fuel, vacuum gas oil, gasoline and jet fuel and therefore was considered to be 'one of Europe's most advanced and best-equipped terminals' (Oil and Capital, 2001b, p36). The capacity of the terminal after modernization was 7.1 million tonnes annually.

The requirement for terminal capacity at Klaipeda mainly depends upon the choices made with respect to the output of the Mazeikiai oil refinery, Russian and Belarusian transit (Klaipedos Nafta, 2001). Figure 6.2 shows the main oil product suppliers to the 'Klaipedos Nafta' terminal. It is clearly indicated, that Russian oil product exporters have the strongest influence over the 'Klaipedos Nafta' terminal and although in 2001 it was still state owned, the future investment of Russian companies is highly possible.

'Klaipedos Nafta' mainly transships oil products delivered by rail. The terminal is served by the extensive Pauostis railway station, which can accommodate 500 railway cars at a time (Klaipedos Nafta, 2001) and facilities, which are capable of discharging 124 railway tanks simultaneously (Jura, 2001).
Figure 6.2 Source: 'Klaipedos Nafta' official brochure, 2001

Figure 6.3 presents the cargo turnover during the period between 1995 and 2002 at the 'Klaipedos Nafta' terminal.

Figure 6.3 Source: 'Klaipedos Nafta', official brochure, 2001

The quay depth at the terminal was 10.5 meters and tankers up to 60,000 dwt could be loaded at the capacity of up to 4000 tonnes per hour for heavy oil products and up to 2000 tonnes per hour for light oil products (Jura, 2001). In 2000 'Klaipedos Nafta' launched a
project for deepening of two quays up to 14.5 meters. The project was complete in September 2001 and the terminal was able to load tankers up to 100,000 dwt (Jura, 2001).

Further developments of ‘Klaipedos Nafta’ include the expansion of the oil product storage farm capacity, which was 350,000 cubic meters in 2001, but should be increased to 570,000 cubic meters in the future (Klaipedos Nafta, 2001). Also the project to build an oil product pipeline connecting ‘Klaipedos Nafta’ terminal and Mazeikiai oil refinery was considered by ‘Mazeikiu Nafta’ (further referred to as ‘MN’), as it would allow the direct loading of ‘MN’ production to the tankers and would be beneficial for both companies (Jura, 2001).

The main competitor of ‘Klaipedos Nafta’ is the oil terminal in Latvia, ‘Ventspils Nafta’, which was outlined in some detail at a earlier stage.

6.6 THE PROCESS OF OIL INDUSTRY PRIVATIZATION

The process of privatization has been very significant to the Lithuanian oil industry, because it has involved a strategic plan created by the Government. It will be presented in chronological order, to provide a clear overview.

1996

In 1996 the Lithuanian Government took a decision based on the commonly held view in the country, that only vertically integrated oil industry structures, which include oil exploration, transport, processing, distribution, wholesale and retail departments can be economically successful (Energy Information Administration, 2001b). The structure of the Lithuanian oil industry at that time did not correspond to these requirements. Therefore, in 1996 the Government, at the time led by Lithuanian Democratic Labour Party, decided to
create a public company, ‘Lietuvos Nafta’, which had to consolidate the efforts of four main players Mazeikiai refinery, Birzu Naftotiekis, Klaipedos Nafta and Lietuvos Kuras in order to solve the problems of crucial importance for the whole Lithuanian oil industry (see appendix 8 for the law on public company ‘Lietuvos Nafta’). The main objective was that the Lithuanian State, Russian oil companies and Western oil companies were each to hold one third of ‘Lietuvos Nafta’.

Nevertheless, the ‘Lietuvos Nafta’ plan never came to pass. The law enforcing the creation of the company came into force in September 1996. However one-month later elections of the parliament were held, where the opposition Conservative Party won the majority of votes and therefore the creation of ‘Lietuvos Nafta’ was abandoned (Veidas, 2002). Thereafter followed a series of events in the oil sector initiated by the new Conservative Party Government and their consequences will be further analysed.

1998

At the beginning of 1998 the Lithuanian Government started negotiations with the U.S. based company Williams International, about the privatisation of the Lithuanian oil sector. Williams International specialises in the building of pipelines and telecommunications (Lloyd’s List, 1998) and has investments in more that 29 countries in Asia, Latin America and Europe (Company news in CIS/Russia, 1998a). On 20 February 1998 Williams and the Lithuanian Government signed an agreement in principle for investment in and operation of several oil and gas infrastructure projects in Lithuania.

On the 16 July 1998 Williams offered to buy a 33% stake in the three most important Lithuanian oil companies (‘Mazeikiu Nafta’, ‘Butinges Nafta’ and ‘Naftotiekis’) for 600 million Litas (150 million USD) plus 600 million Litas (150 million USD) in reinvested profits (Lloyd’s List, 1998). However Lithuania valued the package at 1.6 billion Litas.
(400 million USD) and therefore agreement was not reached. However the price was not
the only reason to delay the deal, as the Lithuanian Government was also threatened by
Russian crude oil supplier 'Lukoil' that they would withhold the supply of oil, unless a one
third stake of Lithuanian oil complex was sold to 'Lukoil's subsidiary company 'Nikoil'.

However, despite the disagreements with Russian crude oil suppliers the negotiations with
Williams continued. According to a letter signed by the Lithuanian Economy Minister
Vincas Babilius and Williams International Co. on the 31st July 1998, Williams would own
33% of each of the companies (Company news in CIS/Russia, 1998b): ‘Mazeikiu Nafta’
(oil refinery), ‘Naftotiekis’ (Birzu pipeline) and ‘Butinges Nafta’ (import/export oil
terminal). It was also agreed that these three companies would be merged if the agreement
was achieved (Lloyd’s List, 1998). Williams would also gain the priority right to buy more
shares if the Government decided to sell them.

On 29 September 1998 the Seimas of the Republic of Lithuania passed the law on the
reorganisation of Lithuanian Public companies ‘Butinges Nafta’, ‘Mazeikiu Nafta’ and
‘Naftotiekis’ companies. The reorganisation involved creation of the ‘Mazeikiu Nafta’
concern, by merging all three companies (Law No. VIII-866 as amended by the 3 June
1999 Law No. VIII-1208).

1999

On the 14 April 1999 Lithuania's State defense council approved the Government’s plan to
privatize all three enterprises by selling 66% of shares to the foreign investor (Company
News in CIS/Russia, 1999d). In July 1999 the Lithuanian president Valdas Adamkus
signed amendments to the oil privatization law allowing U.S. firm Williams to take up to
66% in the oil concern 'Mazeikiu Nafta' (Company News in CIS/Russia, 1999e) and the
Lithuanian Parliament passed the legislation. However this legislation had a very negative
effect on Lithuania’s negotiations with the Russian oil suppliers, in terms of reaching a long-term agreement for crude oil supply.

The main Russian oil supplier ‘Lukoil’ in July 1999 proposed a plan for linking ‘Nikoil’ (the subsidiary of Lukoil) and ‘MN’, in order to help to eliminate the oil supply problems between the two countries. ‘Nikoil’ offered to link the Russian oil fields with the ‘MN’ concern in exchange for a 33% stake in the Lithuanian oil sector (News and Trends in CIS/Russia, 1999b). Nevertheless, they received no response from the Lithuanian Government.

On the other hand, Williams announced that they were close to signing the deal with BP Amoco for buying oil products from the Mazeikiai oil refinery. They also said that they were talking with several other oil companies including Elf, Statoil and Neste about becoming customers of the ‘MN’ concern (Company News in CIS/Russia, 1999f).

Later on in July 1999 the new Lithuanian Government started to review the agreement with Williams, in this way delaying the final close of the deal. They required changes to some aspects of the agreement (Company News in CIS/Russia, 1999g):

1. Williams should be made liable for the losses caused by personnel issues.

2. The part requiring the Lithuanian Government to be liable for any undisclosed problems at the MN concern should be deleted.

3. The Government should not take sole risk for problems associated with potential cut-off of crude oil supplies from Russia.

Nevertheless, Williams did not agree to make these management changes, but allowed several smaller changes, including allowing the EBRD and IFC to take equity stakes in the company (Company News in CIS/Russia, 1999h).
In September 1999 the Lithuanian Government was given the opportunity to sell 12.5% stake in the 'MN' concern to another major crude oil supplier from Russia - 'Yukos'. In return the company offered an annual of supply 1.7 million tonnes of crude oil to Mazeikiai refinery and to export 2.5 million tonnes annually though the Butinge terminal (Lietuvos Rytas, 1999b). But here again, the Lithuanian Government did not show a lot of interest due to various political issues related to the agreement with 'Williams'.

On 5 October 1999 a package of law amendments was approved by the Lithuanian parliament, which was seen as a final stage of closing the deal with Williams. The amendments allowed Williams to buy a 33% stake in the 'MN' concern for 600 million Litas (150 million USD) and also to double this share over the next seven years (Company News in CIS/Russia, 1999i). The law also allowed a small equity stake to be sold to financial institutions such as the EBRD, IFC or crude oil suppliers. This could result in Williams having only a 51% stake in seven years instead of a 66% stake, which was agreed. The requirement for the Lithuanian State to keep a 25% stake was removed by the amendments and the Government was also

'authorized to back $650 million in loans with State guarantees needed for the refinery's reconstruction, working capital shortfall and completion of the Butinge oil terminal' (Company News in CIS/Russia, 1999i).

In the middle of October 1999 Lithuania's Prime Minister Rolandas Paksas announced that was to resign his post due 'to his opposition to a controversial oil industry privatization' (Lloyd's List, 1999). However at that time the president Valdas Adamkus was on a working visit to the USA and Rolandas Paksas promised to ensure a stable Government until the president returned. Nevertheless before the return of the president the Prime Minister rejected the deal and stated that Lithuania

'could not afford to finance some 350 million USD in long-term loans to 'MN', raising the fiscal deficit to some 9.8% of GDP and jeopardizing a new precautionary agreement with the IMF' (Lloyd's List, 1999).
He finally handed in his resignation on 27 October 1999 along with six other cabinet officials. Even though the main reason for his resignation was privatization of the ‘MN’ concern, Rolandas Paksas said that he was in favour of privatization, but not on the terms offered by Williams (Lietuvos Rytas, 1999a).

After the resignation of Rolandas Paksas, Irena Degutiene became the acting Prime Minister. The deal was finally closed on 29 October 1999 when Williams International President John Brumgarner and Irena Degutiene signed the protocol.

6.7 MN UNDER WILLIAMS MANAGEMENT

In November 1999 ‘Williams’ took over the management of the ‘Mazeikiu Nafa’ concern and in 2000 it was to become clear whether the Lithuanian Government made a right decision in choosing the strategic investor.

During the year 2000 the Russian oil company ‘Lukoil’ supplied the Mazeikiai refinery with 35% of the crude oil it needed (Lietuvos Rytas, 2001a), however the statistics of the overall oil supply to ‘MN’ refinery and Butinge oil terminal during the period of January 1999 – August 2000 showed that ‘Lukoil’ supplied only 11% of the crude oil (see figure 6.4).

‘Lukoil’ made a number of attempts to reach an agreement to buy a share in the company. In May 2000 ‘MN’ and ‘Lukoil’ negotiated over a long-term agreement where the Russian oil company would commit itself to supply six million tonnes of crude oil annually as well as participate in the oil product realisation. However the negotiations were unsuccessful due to the fact that ‘Lukoil’ requested the privilege to buy the oil products cheaper, but ‘MN’ would not agree with such a condition (Lietuvos Rytas, 2001b). The ‘Lukoil Baltija’ (subsidiary company of ‘Lukoil’, which is responsible for oil logistics in the Baltic States) representative Ivan Paleicik stated that ‘Lukoil’ was not interested in becoming a crude oil
suppliers for ‘MN’, however they would be interested in buying the production of Mazeikiai refinery for their own chain of petrol stations in the Baltic States (Kauno diena, 2001a).

At the end of 2000 the Lithuanian Government initiated an investigation over the privatisation terms of ‘Mazeikiu Nafta’, as some aspects of the agreement were considered to be in breach of the Lithuanian Constitution (Kauno Diena, 2001). On 18 October 2000, the Constitutional Court of the Republic of Lithuania ruled that certain clauses of the law on the reorganization of Lithuanian public companies ‘Butinges Nafta’, Mazeikiu Nafta’ and ‘Naftotiekis’ were in breach of the Lithuanian Constitution (Lietuvos Rytas, 2001c).

All sections, which allowed the Lithuanian Government to undertake the essential financial obligations under the name of the State in the agreements with the strategic investor and AB ‘Mazeikiu Nafta’ were considered in breach of the Lithuanian Constitution. The clause, which states that the Lithuanian Government and the strategic investor have the prerogative right to purchase the shares of smaller shareholders if they decide to sell them, was also in breach of the Lithuanian Constitution, as it limited the rights of smaller shareholders to sell their shares in any other way (The Constitutional Court of the Republic of Lithuania, 2000).
In addition to the above, the clause of the law of tax administration in the Republic of Lithuania, where the Government was allowed to exempt the strategic investor from tax increases over a period of ten years, was ruled to be in breach of the Lithuanian Constitution (The Constitutional Court of the Republic of Lithuania, 2000).

Despite such rulings the Government has not taken any immediate actions and the process appears to be moving very slowly (Kauno diena, 2001b).

Further problems arose when the company ‘Klaipėdos Nafta’, which specializes in oil product shipping, refused to load a tanker with 20 thousand tonnes of ‘MN’ production. The main reason was that ‘MN’ had breached the contract signed by both parties, stating that the minimum amount of oil products that ‘MN’ will export via ‘Klaipėdos Nafta’ terminal is 800 thousand tonnes annually (Respublika, 2001a). The records show that in 2000 only 540,3 thousand tonnes of ‘MN’ oil products were shipped and the lawyers of ‘Klaipėdos Nafta’ advised that the company was entitled to compensation (Respublika, 2001a). The director of ‘Klaipėdos Nafta’ stated that in addition to the breach of contract, the agreement with ‘MN’ to export their production was unprofitable to the company as the standard tariff for the export of oil products was 27 Litas (6.75 USD) per tonne, whilst ‘MN’ was paying only 10.4 Litas (2.6 USD) per tonne (Lietuvos Rytas, 2001d).

In the beginning of March 2001, three tonnes of crude oil were spilled into the Baltic Sea, because of an accident at Butinge oil terminal. It occurred during the loading of Norwegian tanker ‘North Pacific’ (Lietuvos Rytas, 2001m). ‘Mazeikiu Nafta’ ensured that reason of the accident will be evaluated by the experts.

The disagreements between ‘Lukoil’ and ‘MN’ continued during 2001, when during the first quarter ‘MN’ incurred almost four and a half times higher losses than during the same period in 2000 (Respublika, 2001b). The management of ‘MN’ stated that such excessive losses were encountered due to very high crude oil prices dictated by ‘Lukoil Baltija’. In return the Russian oil company replied that crude oil is sold at the market price and if it is
not satisfactory for ‘MN’ they could find another supplier from Russia or Western Europe (Respublika, 2001b).

The negotiations between the Lithuanian Government and ‘Lukoil’ were renewed in May 2001, when ‘Lukoil’ once more offered to buy a 33% stake in ‘MN’ (Lietuvos Rytas, 2001e). Ivan Paleicik, the director of ‘Lukoil Baltija’, stated that the Russian company would guarantee crude oil supply for the refinery and would be satisfied to have a right to enter the Lithuanian market, as well as find a compromise with ‘Williams’ for successful co-operation (Lietuvos Rytas, 2001e). Despite the promising start, the negotiations were unsuccessful.

In the agreement signed by the Lithuanian Government and ‘Williams’ in 1999, the Lithuanian Government was obliged to provide a loan for the modernization of Mazeikiai refinery. During 2000 and 2001 ‘Mazeikiu Nafta’ received a 884 million Litas (221 million USD) loan from the Lithuanian Government (Respublika, 2001d). The report from the independent experts indicated that only 8% of the loan has been used for modernization purposes, more precisely for the construction of Butinge oil terminal (Respublika, 2001d). It was also pointed out that compared with the privatisation of other regional refineries, ‘Polsky Koncern Naftowy ORLEAN S.A.’ and ‘Rafinerija Gdanska’ in Poland, ‘MOL’ in Hungary, ‘Slovenské’ in Slovakia, ‘Ceska Rafinerska’ in the Czech Republic and ‘OMV’ in Austria, the privatisation of ‘Mazeikiu Nafta’ was the least successful project. In total, other refineries have invested 4 billion USD (16 billion Litas) into their modernization, and this could result in ‘Mazeikiu Nafta’ missing the opportunity to establish itself in the oil product realization market (Lietuvos Rytas, 2001f).

In June 2001, ‘Williams’ renewed negotiations with the Russian oil company ‘Yukos’ for the long-term agreement of oil supplies. ‘Yukos’ would supply a minimum of 4.8 million tonnes of oil annually to the Mazeikiai refinery, as well as export 4 millions of crude oil through Butinge terminal, and would be given an opportunity to buy 26.83% of ‘MN’
shares, if the Lithuanian Government agreed. Although this time both companies found a compromise for the deal, another Russian company ‘TNK’ expressed their objections (Lietuvos Rytas, 2001g). ‘TNK’ started supplying the oil to Mazeikiai refinery on 5 June 2001 and also expressed their interest in a long-term agreement with the ‘MN’ (Lietuvos Rytas, 2001g). The officials of ‘TNK’ wrote an official complaint to the Lithuanian Government, stating that they were offering very similar terms of investment to ‘MN’ as ‘Yukos’ and the talks about the long-term oil supply and purchase of ‘MN’ shares were already started with ‘Williams’, when they decided to cooperate with ‘Yukos’ (Lietuvos Rytas, 2001h). In return the Lithuanian Government stated that ‘Yukos’ was a more established and reliable company and if ‘TNK’ was serious about investing in ‘MN’ there was plenty of time before the negotiations with ‘Yukos’ were started (Lietuvos Rytas, 2001g).

One of the obstacles in reaching agreement with ‘Yukos’, was the ruling of the Constitutional Court of the Republic of Lithuania, that certain clauses in the agreement with ‘Williams’ were in breach of the Lithuanian Constitution. In order for the Lithuanian Government, ‘Williams’ and ‘Yukos’ to sign the new agreement, the existing one had to be modified, in order to avoid further problems (Lietuvos Rytas, 2001i). The Lithuanian Government and ‘Williams’ discussed the issue and concluded that changes in the agreement would be made (Lietuvos Rytas, 2001i).

The first disagreements in the process of negotiations appeared in October 2001, when ‘Williams’ became concerned about a certain clause in the agreement, where it is stated that in 2004 ‘Yukos’ may demand to buy the shares held by ‘Williams’ and ‘Williams’ would have to agree to sell them (Lietuvos Rytas, 2001j).

On 11 December 2001 ‘Williams’ announced that they would like to terminate negotiations with ‘Yukos’ due to a number of reasons, but mainly because they refused to include certain clauses in the agreement (Lietuvos Rytas, 2001k). One was the clause
where 'Yukos' would take on the financial responsibility if the amount of crude oil, stated in the agreement, would not be delivered to the refinery, which would consequently suffer financial loss. 'Yukos' refused to take such responsibility (Lietuvos Rytas, 2001k).

In the beginning of 2002, 'MN' was still looking for a company, which would sign a long-term crude oil supply agreement. There was a survey carried out for this research in February 2002 and therefore further events will be introduced after the analysis of survey results.

6.8 Summary

This chapter presented the key players in Lithuanian oil industry, their facilities, privatisation of 'MN' and its management. The detailed analysis of 'MN' privatisation indicates its importance for Lithuania, however, at the same time, it suggests that this process should have been considered further by the Government. The strategic investor should have been chosen using specific criteria, rather than political reasons. Williams's management problems provide a very strong background for this assumption.

The next step for the assessment of these issues will be distribution of the questionnaire in order to assess opinion of the experts in Lithuania. The questionnaire will be constructed in the later stages of the project, and will include a number of underlying issues within the Lithuanian oil industry.

This chapter concludes a theoretical part of this project, and therefore next chapter introduces the conceptual model, which will summarize the underlying issues of first six chapters and will provide an outline for the following ones.
CHAPTER 7

THE CONCEPTUAL MODEL

7.1 FOUNDATION FOR A CONCEPTUAL MODEL

Models in general, as measuring and explanatory tools, have been widely accepted in cases of studying complex phenomena (Pieczek, 2000). They have been applied in a very wide range of reports and studies including those from the academic and real world, which has led to the formation of many typologies that classify models according to their specific characteristics.

Lilien (1975) outlined that models can be classified according to their specific use. He identified four main categories, which are conceptual, descriptive, experimental and prescriptive models, where 'a conceptual model helps consideration of reality' (Pieczek, 2000, p 111); the descriptive model is used for describing situations and in some cases for forecasting and planning, experimental models investigate the aspects of characteristics and response of the system and the prescriptive models deal with possible solutions of an existing problem (Lilien, 1975).

In addition to Lilien's (1975) classification, models can also be classified according to a variety of criteria and categories (Heijveld, 1999). The criteria could be: purpose, degree of certainty, behavior characteristics etc. and the category could be: descriptive, predictive, explanatory, graphic, analytical etc. (Pieczek, 2000).

Given such wide range of model types, it was necessary to choose the best one for this study. Three types could have been appropriate in this case – descriptive, explanatory and conceptual. After careful investigation, the most appropriate model was considered to be...
the conceptual model. The main reason for selecting this particular type was that the structure of the thesis required some kind of generalization of the overall situation, one which involves many factors and in certain instances is very complicated.

All the chapters presented extensive analysis of various topics, however in some cases the relationship between them was not clearly identified and analyzed. Therefore the conceptual model was considered to be the most appropriate way to address such a problem, especially at this point, where the theoretical analysis has been completed and the next stage of the project involves detailed analysis of such a complex situation.

7.2 COMPONENTS OF THE CONCEPTUAL MODEL

The conceptual model for this study consists of two parts, which could be identified as the theoretical part (this includes the first six chapters of the project, with extensive overview of background information) and the analysis part (which will include the content analysis and analysis of Likert scale questionnaire results using the analysis of variance to derive composite policies for the Lithuanian oil industry).

In the first part, all components of the conceptual model were already analyzed in the previous chapters of the thesis, however at this point it is necessary to outline the fundamental factors and identify the links between them. It can be seen in this part all components are very closely related to each other, as they present the main elements of the research.

In figure 7.1 three main issues within the industry – the Russian influence, the Lithuanian oil industry and EU accession are shown alongside one another, with arrows identifying links between them. Such a structure made the presentation of the strategic players in each industry and relationship between them less ambiguous.
CURRENT SITUATION

RUSSIAN INFLUENCE
- Main crude oil suppliers
  - Yukos
  - LUKoil
- Competition
- Baltic Pipeline System
- Primorsk oil terminal

LITHUANIAN OIL INDUSTRY
- ‘Mazeikiu Nafta’
- Privatization
- Modernization
- Crude oil import and export facilities
- Export of oil products

EU ACCESSION
- Legislation for oil industry
- New regulations for ‘MN’ production

CONTENT ANALYSIS

LIKERT SCALE
(collection of experts’ opinions in the region)

ANALYSIS OF THE RESULTS

COMPOSITE POLICIES FOR LITHUANIAN OIL INDUSTRY

Figure 7.1 Conceptual model (Source: the author)
7.3 The Russian Influence

The Russian influence over the Lithuanian energy sector has been very significant since the breakup of the Soviet Union and although many aspects of such influence were already presented in the earlier chapters, at this stage it is necessary to provide a comprehensive summary.

The Lithuanian energy sector, in particular the oil sector, was very much dependent upon Russian suppliers due to the following reasons: there was an existing crude oil pipeline network, connecting Russian suppliers and Lithuanian consumers; Russian crude oil is cheaper when compared to the world price; and trade relations with oil suppliers were already established.

There were the two largest Russian oil companies presented in the previous chapters – ‘Yukos’ and ‘LUKoil’, both of which were involved in the Lithuanian oil industry, mainly by being major oil suppliers, and also by participating in the privatization process of ‘Mazeikiu Nafta’. In many instances key players in the Lithuanian oil industry were experiencing problems with Russian oil suppliers, however the majority of them were caused by the fact that ‘Mazeikiu Nafta’ was sold to ‘Williams International’ (a company based in the United States) and none of the Russian companies were given an opportunity to become a strategic investor.

Arrows in the conceptual model clearly show that the crude oil suppliers in Russia had a direct influence over ‘Mazeikiu Nafta’.

The third key factor presented in the conceptual model, under the Russian influence, was competition, which includes the Baltic Pipeline System and Primorsk oil terminal. The decision to construct such large oil export facilities on the Baltic Sea coast was taken by the Russian Government, as it was decided that Russian producers lose too much money by exporting their crude oil and oil products via Baltic States ports. Therefore it could be
stated that one of the primary aims of the Russian Government was to redirect the majority of oil exports transiting via Klaipeda and Ventspils to the new Primorsk terminal. This could have a major impact upon crude oil export facilities in Lithuania and hence is indicated in the conceptual model.

7.4 The Lithuanian Oil Industry

The Lithuanian oil industry is the main theme of the research and therefore it is presented in the centre of the model. The key player of the industry is 'Mazeikiu Nafta', which was analyzed in great detail in previous chapters. It can be seen in the conceptual model that two factors with the biggest influence over the company are the Russian crude oil suppliers and the new legislation for the oil industry, influenced by EU accession. 'Mazeikiu Nafta' is very much dependent upon the crude oil supplied from Russia, as the alternative way – to buy oil elsewhere and import it through the terminal at Butinge, has proved to be a much more expensive and commercially unprofitable option. The new legislation for the oil industry, is an equally important factor, and could have a significant impact upon various issues such as production quality and export destinations.

Privatisation of 'Mazeikiu Nafta' was a very significant event in the Lithuanian oil industry and therefore was presented and discussed in detail. There were many controversial opinions that followed such a decision made by the Lithuanian Government. However the privatisation process was a necessity during Lithuania's preparation for EU accession. It was also assumed that the strategic investor would find the required funds for the modernization of the complex and especially for the oil refinery, as the Butinge oil terminal was built in 1999 and therefore did not require modernization and the state of the pipeline 'Naftotiekis' was still sufficiently good at the time.
In the conceptual model, the Lithuanian crude oil import and export facilities are shown as a separate factor, mainly due to the fact Butinge terminal was built for a specific reason – to ensure Lithuania's political independence from Russia in the energy sector. Its secondary purpose was to function as a transit terminal for the Russian crude oil, and develop into a commercially successful project. Although at the time when it was built, the only competitor was considered to be Ventspils port in Latvia, the situation changed significantly, when the Russian Government decided to build a large oil export terminal at Primorsk and the Baltic Pipeline System connecting the terminal with oil fields in West Siberia. The new terminal opened at the end of 2001, however the impact upon the Lithuanian oil export facilities was still unclear in 2002.

The export of oil products is one of the main income sources for 'Mazeikiu Nafta' refinery, which makes it a significant factor for the Lithuanian oil industry. The refinery was built during the Soviet Union existence in order to supply the whole Baltic region with required oil products, however the situation changed significantly after all countries became independent. Since then 'Mazeikiu Nafta' had to adopt a commercial strategy and establish itself as a competitive player in the international market.

It is indicated in the conceptual model that the main influence for the export of oil products in Lithuania will be the European Union regulations, as all of 'Mazeikiu Nafta' production will have to conform to the new standards. Therefore at this point it is necessary to mention that in order to make these production adjustments, the refinery will have to be modernized, which would be impossible without the involvement of private capital. This indicates that privatization was a necessary step taken by the Government in order to ensure that 'Mazeikiu Nafta' would have the required financial funds.
7.5 EU Accession

EU accession, presented in the third column of the conceptual model, has two main factors influencing the Lithuanian oil industry – legislation and new regulations for ‘MN’ production, both of which were already mentioned earlier in this chapter.

It is important to outline that although there are no specific provisions concerning the oil sector in the European Treaty, the EU remains the most important factor influencing Lithuania’s policy for the oil industry. During the negotiations for EU accession, Lithuania had to restructure and liberalize its energy sector, therefore allowing the privatization of a strategic object, such as ‘MN’, which contributes approximately 10% of the country’s GDP.

This was a final stage of the theoretical part of the project, which involved analysis and presentation of all important issues of the research, as well as examination of relationship between key factors. At this stage it was essential to present the information in the least biased manner in order to provide an objective overview of the overall situation.

However, the second part of this project mainly involves the analysis of expert opinion, therefore providing a very different perspective of the issues.

7.6 Content Analysis

All of the above will be brought together by the content analysis, a process equivalent to the literature review, where a large number of publications will be reviewed and used for derivation of dominant themes for this study. It will be one of the essential elements of the research, as it will cover the whole range of academic and commercial publications and will help to derive a set of main issues, which are not influenced by the bias of the opinion of the researcher.
It is necessary to derive the main themes, or in other words a set of most important issues, which are unbiased, mainly because the subject of the project is highly political and therefore could be easily influenced by the political beliefs or an opinion of the researcher. Although every effort was made to avoid this kind of influence, it was difficult to retain an objective judgment in a few instances. Content analysis could be considered to be the best solution in this case, as it involves a large number of publications from various sources and provides a quantitative filtering process with a level of security.

A number of categories will emerge as a result of content analysis, each one accommodating a number of variables reflecting the current state of the industry. It is possible that they will be further merged into adequate content areas, which will serve as a basis for the questionnaire construction in the later stage of the project.

### 7.7 Scaling Technique

At this point it will be necessary to employ an appropriate method order to assess the opinion of the experts upon the most important issues derived from content analysis. Therefore a scaling technique will be introduced, which will involve the following steps: creation of inter-related set of statements about main issues in the Lithuanian oil industry, selection of a measurement technique to assess the opinion and administration of the questionnaire to the experts. This method will generate mainly quantitative data, which will be used as an input for the analysis of variance, however in addition to that the experts will be asked to provide relevant comments, which could help to identify the underlying issues.
7.8 ANALYSIS OF THE RESULTS

This section will present a detailed analysis of quantitative and qualitative survey results, using descriptive statistics and analysis of variance. The quantified opinions will be used as an input to a statistical programme, which will perform a number of tests to identify the differences and tendencies towards the main issues of the industry. Furthermore, each statement will be presented individually with all relevant descriptive statistics and comments from the experts. A lot of emphasis will be placed on the comments, because sometimes the quantitative data does not represent the essence of the findings and in this case, the less obvious underlying issues may be as important as the most obvious ones.

The analysis process will form a foundation from which the composite policies for the industry will emerge.

7.9 COMPOSITE POLICIES FOR THE LITHUANIAN OIL INDUSTRY

The final part of the project will introduce policies for the Lithuanian oil industry, which will represent the essence of the findings for this research.

7.10 SUMMARY

As a final point for this chapter it can be stated that conceptual model presented a required generalization of the collected data and provided a short outline of the remaining stages of the research.

The next chapter deals with the quantitative and qualitative research methods, and identifies the most appropriate approach for this project.
CHAPTER 8

RESEARCH METHODS

8.1 INTRODUCTION

The issue of qualitative and quantitative research approaches has been already noted in the content analysis chapter, however it was a very brief overview and at this point it is necessary to examine it in more detail. There are a very wide number of areas where these research techniques have been applied and therefore it was necessary to concentrate upon their application in social sciences, due to the nature of this project.

This chapter introduces three types of approaches – quantitative, qualitative and a combination of both of them. Any method that can be adopted for a specific study would fall in to one of these categories. Therefore at this point it was important to present all three approaches and introduce the ways to analyze the collected data in each case, with particular emphasis placed upon the mixed methods and their benefits.

In many cases, where a research question is strictly defined in a very early stage of planning, it is necessary to choose either a quantitative or qualitative approach for the analysis of the results. However in other instances where 'the specific focus and research questions emerge during the enquiry' (Punch, 1999, p241), it is possible to use a combination both methods.

8.2 QUANTITATIVE RESEARCH IN SOCIAL SCIENCES

Quantitative research is a measurement technique, which pre-structures data, conceptual frameworks and design (Punch, 1999), and involves the examination of various issues in
order to ‘understand the patterns and relationship between the variables’ (Abdel-Fattah, 1997, p197).

The advantages of this research are reliability of findings and suitability for ‘identifying general patterns ... testing theories and making predictions’ (Ragin, 1994, p106).

Figure 9.1 shows the main steps of quantitative research if it was carried out under perfect circumstances; however in the real world, such a process is very rarely found in its pure form (Neuman, 1997).

The fact that this method starts with theory (see figure 8.1), indicates that it is a

‘broadly deductive approach to the relationship between theory and research’ (Bryman, 2001, p63).

It is commonly accepted that a second step is to specify the hypotheses, which would be tested in the later stages, but nonetheless, this step has been left out by many researchers and instead theory was considered to be a set of concerns

‘in relation to which the social researcher collects data’ (Bryman, 2001, p63).

The third step involves the selection of research design. According to Bryman (2001) there are five types – experimental design, cross-sectional or social survey design, longitudinal design, case study design and comparative design. All of these research designs have very distinctive differences in their structure and although some of them have been more widely used than others, each type is very important in the social sciences. Table 8.1 presents a short description of the research designs.
designs and examples of their application in both – quantitative and qualitative research methods.

<table>
<thead>
<tr>
<th>TABLE 8.1 RESEARCH STRATEGY AND RESEARCH DESIGN</th>
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<tbody>
<tr>
<td>RESEARCH DESIGN</td>
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<tr>
<td>Experimental</td>
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<tr>
<td>Cross-sectional</td>
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<tr>
<td>Longitudinal</td>
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<td>Case study</td>
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<td>Comparative</td>
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Step four entails the development of concept measures, or in other words, the selection of the appropriate measures for the main concepts, which constitute the essence of the research (Black, 1999).
Steps five and six are concerned with the choice of research site and respondents, as in the real world the appropriate setting may be a very important factor in the development of a successful research project.

Step seven involves the administration of the research instruments according to which research design is employed, for example in the cross-sectional research it would involve the distribution of a self-completion questionnaire (Bryman, 2001).

Step eight requires the collected data to be prepared for analysis and in some cases i.e. where structured interview or observation was used for its collection, to be transformed into quantifiable data.

Step nine is the analysis of collected quantitative data using an appropriate technique, usually in order to reduce the amount of data or to test for relationships between the variables within the data (Black, 1999).

The following steps – ten and eleven, involve derivation of conclusions and their interpretation in writing. At this point the researcher is obliged to convince the readers 'that the research conclusions are important and that the findings are robust' (Bryman, 2001, p65) because otherwise these findings would be neither significant nor valid and would not make any contribution to the knowledge of others.

In addition to this, it is important to mention that a feedback loop connects steps eleven and one (see figure 9.1), because when the results of the research are published, they become a part of the literature base for other researchers (Bryman, 2001).

8.3 QUALITATIVE RESEARCH IN SOCIAL SCIENCES

Qualitative research is another very commonly used method in the social sciences, however in contrast with the qualitative methods, it is a
It mainly concentrates upon the inductive view of the relationship between theory and research, as well as upon the importance of the context in understanding the issue (Neuman, 1997). It also requires the issue to be viewed in the context of the case (Holloway, 1997) and it was outlined by Gordon and Langmaid that such an approach is best used when the results would

'increase understanding, clarify issues, generate hypothesis and expand knowledge' (Gordon and Langmaid, 1988, p15).

with particular emphasis upon interpretation and understanding provided by the carefully selected participants of the study.

It can be clearly seen how the qualitative research structure in figure 8.2 differs from quantitative research structure, which was presented earlier in the chapter (figure 8.1). Qualitative research involves six steps, which theoretically can be applied to any study, however in the real world some alterations to the structure are usually acceptable.

<table>
<thead>
<tr>
<th>Figure 8.2 An Outline of the Main Steps of Qualitative Research</th>
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<tbody>
<tr>
<td>1. General research questions</td>
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<tr>
<td>2. Selecting relevant site(s) and subjects</td>
</tr>
<tr>
<td>3. Collection of relevant data</td>
</tr>
<tr>
<td>4. Interpretation of data</td>
</tr>
<tr>
<td>5. Conceptual and theoretical work</td>
</tr>
<tr>
<td>5b. Collection of further data</td>
</tr>
<tr>
<td>6. Write up findings</td>
</tr>
<tr>
<td>5a. Tighter specification of the research question(s)</td>
</tr>
</tbody>
</table>

The first step is to define general research questions, which form the base of the study, and this indicates that qualitative research has

> 'an inductive view of the relationship between theory and research, whereby the former is generated out of the latter' (Neuman, 1997, p264).

The second step involves the selection of relevant sites and subjects to carry out the research. The importance of this process was already mentioned when analyzing the steps for quantitative research, however it may be even more significant when applying a quantitative technique (Sarantakos, 1993). The reasons for such assumption would be – because the qualitative research concentrates on quality of data and words rather than numbers and its respondents are usually carefully selected, as opposed to quantitative research, where the emphasis is placed on numerical data and the participants can be randomly selected.

The third step is to collect the relevant data. The process of data collection could be very lengthy in quantitative research, depending on how complicated are the questions that the researcher aims to answer (Neuman, 1997).

The fourth step entails interpretation of the collected data. There is a variety of techniques for interpreting and analyzing qualitative data, because

> 'there are different questions to be addressed and different versions of social reality that can be elaborated' (Coffey and Atkinson, 1996, p14)

It is the responsibility of the researcher to select an appropriate technique, according to the type and nature of the collected data, because only the correct method would generate correct results (Punch, 1999).

Step five involves the derivation of concepts and theory and it is this step 'coupled with the interpretation of data, that forms the study’s findings' (Bryman, 2001, p268). It can be seen in figure 9.2, that both steps are interconnected by the arrows.
Step five also has two subsections, which require tighter specification of the researcher's question (5a) and collection of further data (5b). One can see in the figure 9.2 that steps four, five and the two subsections form a closely related circle, which form the study's findings. However, it is also necessary to mention that although these steps are important in order to provide a deeper insight into the research, in some cases i.e. where the respondents may not be reached for a second time, the initially collected data (step three) is considered to be sufficient (Bryman, 2001).

The final step six includes the writing up of findings and conclusions for the study. This step is equivalent to the same process in the quantitative research and therefore the same points outlined there would apply to the writing up in qualitative research.

8.4 MIXED METHODS

Both types of research – quantitative and qualitative despite being very different are complementary and ‘most sophisticated research designs contain elements of both’ (Abdel-Fattah, 1997, p197).

The main distinctions between the two approaches lie within the differences in the nature of the data, and within the methods for collecting and analyzing it (Punch, 1999). However it is possible to combine both techniques based on logic. An important assumption was outlined by Miles and Huberman, when they stated that:

‘Both types of data can be productive for descriptive, reconnoitering, explanatory, inductive, opening up purposes. And both can be productive for explanatory, confirmatory, hypothesis-testing purposes’ (Miles and Huberman, 1994, p42).

It is widely accepted that quantitative research is mainly concerned with the deductive testing of hypothesis and theories, but nonetheless it can be also be used as a method to
explore the area, as well as generate theories and hypotheses (Punch, 1999), which under usual classification would fall under the purpose of qualitative techniques.

According to Punch (1999) and Sarantakos (1993) these are the main reasons why the stereotyped distinction between qualitative and quantitative methods can be overcome. First of all both of the approaches are equally good and neither is superior to the other. Both 'are correct approaches to the essence of social reality' (Sarantakos, 1993, p56) and each one has its strengths and weaknesses in the structure and therefore choosing to rely on one of the methods would not be appropriate.

Second, quantitative and qualitative methods are widely used in the social sciences and each of them (or combination of both) is an excellent technique, when applied in an appropriate way.

Third, in many cases the quantification progresses to qualitative data and visa versa as every social unit is a 'dialectic unit with quantitative and qualitative aspects' (Sarantakos, 1993) and therefore despite all stereotyped assumptions each

'method can be dealt with independent of those philosophical issues, and decisions about methods can be governed by the research context, purposes and practicalities as well as paradigms' (Punch, 1997, p 241).

A very good example of combined method research was provided by Bryman (2001), when he emphasized a particular case in ethnography studies. Hodson (1996), who studies workplace ethnographies, chose to apply

'a quantitative research approach - in the form of content analysis - to qualitative research' (Bryman, 2001, p 437).

The findings of this study resulted in a big increase of ethnographic evidence, as well as suggested that content analysis has a lot of potential in the social research (Bryman, 2001).

There are three ways to combine both approaches and they were outlined by Punch (1999). The first possibility is to combine the findings, but not the methods, the second is to
combine the data, which would contribute to the findings and the third, and most complex possibility, is to combine methods, data and findings.

Further more Brannen (1992), Bryman (1997), Creswell (1994), Miles and Huberman (1994) and Morse (1991) identified eleven ways to combining these techniques, however only two of them are relevant to this study. These are the approaches, where the

'qualitative research may: help to provide background information on contexts and subjects ... and aid scale construction'

and where 'quantitative research readily allows the researcher to establish relationships among variables, but is often weak when it comes to exploring the reasons for those relationships. A qualitative study can be used to help explain the factors underlying the broad relationships that are established' (Punch, 1999, p247).

There are no general rules on how the two methods can be combined, however in every case the researcher should provide reasons for doing so, as well as adequately explaining the circumstances, context and practical considerations (Jick, 1979).

8.5 CHOICE OF THE METHOD

After all three types of research methods have been presented, it is necessary to outline the reasons, according to which they can be applied in a specific case. Punch (1999) indicated that there are six factors that should be taken into account in order to select an appropriate method.

The first factor is the research question itself, because 'different questions require different methods to answer them' (Punch, 1999, p244). Although it may seem as a very obvious aspect, it should not be under estimated. The research question forms the essence of every individual study, and has to be addressed adequately. It is also necessary to ensure that the research question remains the most important factor throughout the process of method
selection, because otherwise we would run the risk of *starting with methods, and adapting research questions to them* (Punch, 1999, p244).

In this case, the research aims to analyze the impact of the EU accession upon crude oil and oil production policy in Lithuania as well as derive policy pointers for the industry. In order to assess such an impact, a number of issues had to be addressed within the study, including various aspects of the country's internal politics, industry organization and equally important external factors (i.e. oil supply from Russia).

In a very broad sense this project was constructed following the steps of quantitative research (figure 9.1). The study starts with theory, which acts as a set of concerns for the data collection, instead of hypotheses, which were not considered to be necessary in this case as the ultimate aim of the researcher is to assess the impact of EU accession upon Lithuanian oil industry and derive policy pointers rather than test hypotheses. After this was established, the following steps will be carried out – a research design will be applied, the concept measure will be developed, respondents for the study will be selected and so on.

The second factor is the consideration of what outcome is required for the research. It is essential to establish whether the author aims to make standardized and systematic comparisons, which are based on numeric data or if it is more important to study the topic in great detail within the context, including various interpretations provided by the people involved.

Where the research outcome is concerned, this study aims to assess the impact and derive policies for the oil industry in Lithuania. In order to achieve this aim, two techniques will be employed – content analysis and a scaling technique. Content analysis is a very good example of a mixed method and was appropriate to use in this case, because it generates both – quantitative and to some extent qualitative data. The scaling method, however, is an
example of a quantitative technique and was employed in order to gather quantifiable data, which would represent the opinion of the experts in the region.

Although a lot of emphasis will be placed on numeric data, the context of the study and comments provided by the participants will remain very important factors as such information will be necessary in order to make inferences when deriving policies.

The third factor is the research literature, which could indicate how other researchers dealt with the topic and how each particular project could be aligned to it.

In many instances it is very beneficial to assess how the topic was addressed by other researchers, however in this case there were no similar projects found, that could serve such purpose and therefore no guidance on the research literature could be found.

The fourth factor that should be considered is the practical issues, including

> 'time, money, the availability of samples and data, the researcher's familiarity with the situation being studied, access to situations, gaining the cooperation of others and so on' (Punch, 1999, p245).

Such considerations could be decisive in the process of method selection and indicate that context of the research is very important.

When the practical issues were considered for this research, the main concerns were the availability of specific data and cooperation of the participants. Although there is a lot of data about the subject available from various sources, the more specific issues could be very difficult to address. In some instances the required information may not be available to the public, or in other cases may not be disclosed for other reasons.

The cooperation of experts in the industry was also considered to be a major issue, because it was very difficult to predict whether they would be willing to take part in such a project, due to the highly political nature of the subject.
The fifth factor involves a series of questions such as – which approach would produce more useful and appropriate knowledge, and which one would generate more required information about the topic.

In this case, two techniques were considered, and as was mentioned before, content analysis and a scaling method will be applied. The main purpose of using content analysis for this study was to gather important information from a range of publications and employ it as a technique, which will help to determine the main themes and issues, based on the quantitative and qualitative evidence, within the project. Then the outcome of content analysis will form a base for the construction of a scaling method questionnaire, which will consequently be employed as a measure for the opinion of the experts.

The sixth factor is the matter of 'style' (Punch, 1999), as in some cases a certain method may be preferred by the researcher, based solely on his or her personal opinion.

This factor was not considered when selecting the most appropriate method, as there were no personal preferences expressed.

8.6 Summary

After all of the steps to establish the most appropriate technique were completed, a mixed method in the form of content analysis and a scaling technique for conducting a quantitative approach were selected for this study. At this point it is necessary to mention that such a combination of the research designs will allow to avoid a number of possible disadvantages which otherwise would have been inevitable, if only one approach was used.

It was outlined by Punch (1999) that the main reasons for combining both methods are

‘to capitalize on the strengths of the two approaches, and to compensate for the weaknesses of each approach’ (p246).
Therefore the findings of this study will be based on the data generated by two research methods.

The next chapter presents detailed analysis of the first technique applied in this project – the content analysis. It includes definition of the method, its development and use, advantages and disadvantages, reasons for its selection and other important issues concerned with the application of the method.
CHAPTER 9

CONTENT ANALYSIS

9.1 INTRODUCTION

This chapter presents the content analysis technique, which will help to identify the major policy themes for the Lithuanian oil industry.

It was already established in the previous chapter that there are three categories of research – qualitative, quantitative and a combination of them. Any research method that can be adopted for a specific study will fall in to one of these categories.

Both types of research (qualitative and quantitative) despite being very different are complementary and 'most sophisticated research designs contain elements of both' (Abdel-Fattah, 1997, p197). One such method is content analysis.

9.2 CHOICE OF METHOD

Content analysis was selected for this research, because it was considered to be the most appropriate method for deriving the dominant themes for Lithuanian oil policy. It is a widely recognized, effective, reliable and relatively easy method, which has been used in many disciplines by researchers for identifying the dominant themes.

In order to apply a certain research method for a particular study, a number of issues should be considered, for example some difficulties that will arise or whether there will be substantial amount of information available. Content analysis is a method that generates quantitative and qualitative results, which can be replicated if it is required and also
provides clear definition of the main themes for the topic. This was one of the main reasons for selecting this technique, because there were no other methods that could be applied in this case and would produce both quantitative and qualitative results.

Another advantage that it had over other methods was that it was possible to use the material published in other languages (i.e. Russian and Lithuanian) as well as in English.

It has been one of the most widely used techniques in social sciences and therefore development and use of content analysis will be analyzed further in this chapter.

9.3 CONTENT ANALYSIS DEFINED

Over the years of development there were many definitions of content analysis, for example in 1952 Berelson defined it as

‘a research technique for the objective, systematic description of the manifest content of communication’ (Carney, 1972, p23).

This definition emphasizes that content analysis is a quantitative method but does not reflect the full essence of this technique.

Holsti and Stone gave a more precise definition of content analysis; they defined it as

‘...a research technique for making inferences by systematically and objectively identifying specified characteristics within a text’ (Krippendorff, 1980, p23).

Carney (1972) described it as a technique, which ‘...aims to help improve the quality inferences made’ (p18) and George (1959) defined it as a method, which is used for ‘...obtaining descriptive data on content variables’ (p8).

However, the most appropriate definition, which shows that content analysis has elements of both quantitative and qualitative research approaches, was given by Krippendorf; he defined it as
... a research technique for making replicable and valid inferences from data to their context' (Krippendorf, 1980, p11).

9.4 DEVELOPMENT AND USE OF CONTENT ANALYSIS

The term 'content analysis' first appeared in Webster's Dictionary of the English Language in 1961, however its use can be dated as far back as the 1600s (Krippendorff, 1980), when it was used in religious studies. There is a wide choice of literature analyzing the historical development of content analysis, however those provided by Babbie (1995) and Jupp and Norris (1993) were considered to be the most appropriate. In the next section a short summary of development and use of content analysis will be presented.

The more significant development of this method started in 1893 when it was first applied to assess newspapers' content (Krippendorff, 1980). Since then it has developed rapidly and has been used in a very wide range of studies, such as

- American black and white popular song lyrics analysis carried out by Walker, J. in 1975 (Weber, 1990) where he found that 'soul' songs showed greater emphasis on action in the objective world and less concern with time.

- Schramm and Atwood examined content of seventeen Asian newspapers, the four major Western news wires and several Asian news agencies, in 1981, where they estimated the percentage of news content that was devoted to Asian developing countries (Schramm and Atwood, 1981).

- In 1984 Issacs applied content analysis in psychiatry to assess the relationship between words and phrases used by schizophrenic and non-schizophrenic patients and their clinical diagnosis (Issacs, 1984).

- Finally, Cullinane and Toy used this technique to identify attributes in freight route/mode choice decisions, in 2000. The outcome of the research was that
'the results ... of content analysis ... confirm what most would expect to be the most often considered facts or influences in freight route/mode choice decision making' (Cullinane and Toy, 2000).

The examples mentioned here show just a few cases where content analysis has been applied, and it should be outlined that it was also extensively used in areas such as psychology (O’Dell and Weideman, 1993), political science, communication research (Budd, 1967), historical development, and advertising (Auter and Moore, 1993). Overall content analysis can be applied

‘to study the content of any book, magazine, newspaper, individual story or article, motion picture, news broadcast, photograph, cartoon, comic strip, or a series or combination of any of these’ (Budd, 1967, p34).

9.5 ADVANTAGES AND DISADVANTAGES OF CONTENT ANALYSIS

When analyzing a research technique, it is very important to outline its advantages and disadvantages, as they are essential when choosing one particular method instead of others. Therefore table 9.1 presents advantages and disadvantages of content analysis.
<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Allows for both quantitative and qualitative operations.</td>
<td>1. Can be extremely time consuming.</td>
</tr>
<tr>
<td>2. Provides valuable historical/cultural insights over a period of time.</td>
<td>2. Is subject to increased error, particularly when relational analysis is used to attain a higher level of interpretation.</td>
</tr>
<tr>
<td>3. Looks directly at communication via texts or transcripts and gets at the central aspect of social interaction.</td>
<td>3. Is often devoid of theoretical base, or attempts too liberally to draw meaningful inferences about the relationship and impacts implied in the study.</td>
</tr>
<tr>
<td>4. Allows closeness to text, which can alternate between specific categories and relationships, and also statistically analyzes the coded form of the text.</td>
<td>4. Is inherently reductive, particularly when dealing with complex texts.</td>
</tr>
<tr>
<td>5. Can be used to interpret texts for purposes such as the development of expert systems.</td>
<td>5. Tends too often to simply consist of word counts.</td>
</tr>
<tr>
<td>6. Is an unobtrusive means of analyzing interactions.</td>
<td>6. Often disregards the context that produced the text, as well as the state of things after the text is produced.</td>
</tr>
<tr>
<td>7. Provides insight into complex models of human thought and language uses.</td>
<td>7. Can be difficult to automate or computerize.</td>
</tr>
</tbody>
</table>

Source: http://writing.colosolate.edu/references/research/content/com2d3.htm

After defining the main advantages and disadvantages of this method, some situations where possible mistakes could be made or difficulties encountered will be discussed.

It has been outlined that content analysis can be very time consuming, however in this research, time limitations were flexible, therefore allowing the researcher to adjust the time schedule. Furthermore, the issues such as drawing inferences or disregarding the context that produced the text were taken into account whilst applying the content analysis method for the topic. Finally the computer related problems were not relevant in this case, because under the circumstances the content analysis had to be done manually.
For every study where content analysis method is applied, it is very important to establish an acceptable level of reliability. This aspect was analyzed in detail by Weber (1990), Carney (1972) and Smith (1992) and reliability can be defined as

'\textit{the extent to which a measure, procedure or instrument yields the same result on repeated trial}' (http://www.writing.colostate.edu)

Smith (1992) also emphasized that the position of content analysis should be that

'\textit{regardless of who does the analysis or when it is done, the same data should be secured under similar conditions}' (Smith, 1992, p43).

There are three kinds of reliability - stability, reproducibility and accuracy. Weber (1990) and Smith (1992) provided short analysis of all of them.

**Stability**

was described as '\textit{the degree to which a process is invariant over time}' (Smith, 1992, p48). It can be determined when the coding is done repeatedly by the same person (Weber, 1990) and it is also suggested to carry out this process at different points in time (Smith, 1992), to achieve a greater level of reliability, since the inconsistent coding would generate unreliable results. The matter of establishing stability should be considered very carefully, since only one person does the coding and therefore stability is '\textit{the weakest form of reliability}' (Weber, 1990, p17).

**Reproducibility**

'\textit{is the degree to which a process can be recreated under varying circumstances, different locations, involving different material forms, i.e. yields the same results despite different implementations}' (Smith, 1992, p49).

In order to establish this type of reliability, the same text should be coded by another coder and high reproducibility is
considered to be 'a minimum standard for content analysis' (Weber, 1990, p17). It was also stated that while stability presents individual coder's understanding, reproducibility measures 'the consistency of shared understandings' (Weber, 1990, p17).

**Accuracy** can be defined as a

'degree to which a process conforms in effect to a known standard, i.e. yields the desired results in a variety of circumstances' (Smith, 1992, p49)

or in other words, the extent to which 'the classification of text corresponds to a standard' (Weber, 1990, p17). Weber (1990) also suggested that although it is the strongest form of reliability, due to the fact that only if very few cases texts have standard coding, accuracy is rarely used in reliability assessment.

In order to establish the adequate level of reliability for this study, achieving a high level of stability was considered to be the most appropriate method. Although it is considered to be the weakest type of reliability, the other two types (reproducibility and accuracy) could not be established in this case due to the language problems. In order to complete content analysis for identifying the main themes for Lithuanian oil policy, the material used included publications in three languages: English, Lithuanian and Russian. In such cases cooperation with other researchers was almost impossible to establish, since another person who would be familiar with the topic of the research and all three languages could not be found.
Nonetheless, the coding procedure was carried out three times by the researcher over the period of one year, in order to achieve the highest level of stability that is possible and it was found that the final result was 93.5% accurate when compared to the initial one.

9.7 VALIDITY

After the reliability of the research method is established, the question of validity should be raised. It may appear that since the research technique is reliable and consistent, it should also be valid, however in some cases this is a misleading assumption (http://writing.colostate.edu). Validity in content analysis was defined as an extent to which

'a study accurately reflects or assesses the specific concept that the researcher is attempting to measure' (http://writing.colostate.edu)

and therefore is a completely different issue from reliability. Two aspects, or themes, that run through validity are

'correspondence of the categories to the conclusions and the generalizability of results to a theory' (http://writing.colostate.edu).

In the case when the question of validity is raised in a content analysis study, one of the specific aspects is validity of the classification scheme. Validity of categories in implicit content analysis can be established by

'unitizing multiple classifiers to arrive at an agreed upon definition of the category' (http://writing.colostate.edu).

This is achieved by broadening the concept category, to include the synonyms (implicit variables) of the original variable (explicit variable). It was also emphasized by Weber (1990) that in order for the category to be valid, it should correspond with the 'abstract concept that it represents' (Weber, 1990, p18).
Two types of validity can be distinguished: internal and external. Internal validity can be defined as 'the rigor with which the study was conducted' (http://writing.colostate.edu) and external validity as 'the extent to which the results of a study are generalizable or transferable' (http://writing.colostate.edu). It was suggested that internal or face validity is the weakest form of validity, because it consists of

'\textit{the correspondence between investigators' definitions of concepts and their definitions of the categories that measured them}' (Weber, 1990, p18).

Face validity can be established as long as it 'appears to measure the construct it is intended to measure' (Weber, 1990, p18) and therefore relies on a single variable, which makes it weaker against external forms of validity, involving some external criterion or in other words, more than one variable. Next, the four forms of external validity will be presented, which were analyzed in detail by Weber (1990) and Smith (1992).

\textbf{Semantic validity} is described as a degree to which 'a method is sensitive to relevant semantical distinctions in the data being analyzed' (Smith, 1992, p52). The purpose of semantic validity is not to guarantee true results, but to ascertain that the concept and variables employed for a certain study are 'adequate in relation to its purpose' (Smith, 1992, p52).

\textbf{Sampling validity} is a type of validity, which

'assesses the degree to which a collection of data can be regarded as a representative of a given universe' (Smith, 1992, p52).

\textbf{Correlation validity} is a degree to which

'findings obtained by one method correlate with findings obtained by another method and justifies in a sense their substitutability' (Smith, 1992, p52).

\textbf{Predictive validity} was defined as
'the degree to which predictions obtained by a method agree with directly observable facts' (Smith, 1992, p52).

This type of validity has been rarely applied in content analysis, but nonetheless Weber (1990) presents some very good examples.

In this case sampling, face and semantic validity will be established, as other forms were impossible to verify. Correlation validity could not be established, as the time given for this research was adequate in order to complete only one method and predictive validity was not applicable for this study.

Sampling validity can be verified when it is proven that the sample chosen for content analysis represents the given universe of information. In this case a very large sample was chosen, which includes leading newspapers, commercial and academic journals, Internet sites, books, brochures, reports and papers from conferences. It was considered to be a sufficient sample of available data in order to establish the sampling validity.

The second form, face validity, may be considered to be the weakest form and has received lot of criticism, but nonetheless 'content analyses often have relied heavily on face validity' (Weber, 1990, p20) and therefore it has validity to be used in this study, as it has been used so frequently in others before.

The third form of validity that will be established is semantic validity. It is a form of external validity and can be established when persons

*'familiar with the language and texts examine lists of words placed in the same category and agree that these words have similar meanings or connotations'* (Weber, 1990, p18).

The process of establishing face and semantic validity will be discussed in more detail later in the chapter, when the results of content analysis are presented.
9.8 The Methodology of Content Analysis

9.8.1 Overview

General guidelines for conducting content analysis were outlined by many authors including Weber (1990), Holsti (1968) and Berg (1995). There are five fixed stages for the content analysis methodology, as presented by Cullinane and Toy (2000).

9.8.2 Forming the Research Question

The first step for conducting content analysis is to form the research question (Cullinane and Toy, 2000). It should be taken into consideration that although it may appear as an easy task, the question should be formed in a way so the answer will reflect the essence of the research. Therefore the question should be posed in a way 

*that he can obtain an answer which can be factually documented from his sources. And this has to be an answer that someone else would obtain too* (Carner, 1972, p37).

The question formed for this study was to establish the dominant themes when assessing Lithuanian oil policy. It reflects the essence of the research, because such policy will involve many different aspects starting with a short historical background, recent changes in the ownership of the major oil company, political issues where relations with oil suppliers are concerned and finally look to the future where issues of joining the EU will be examined.

9.8.3 Determining the Sampling Strategy

The second step is to determine the sample of available data that will be used for content analysis. It is almost impossible to use every single piece of data produced and therefore the
decision should be taken as to which sampling strategy will be employed. Berg (1995) identified three sampling strategies: random sampling, systematic sampling and stratified sampling. All three strategies are commonly used in content analysis and although they are different, the main issue of selecting the sample size applies in each case.

It was outlined by Carney (1972) that 'the smaller the sample, the greater the possibility of sampling error...' (Carney, p144) therefore emphasizing that a large sample is more likely to generate reliable results, as long as it is selected correctly.

Furthermore the decision should be made as to which sampling strategy to use. The most commonly employed sampling strategy for content analysis is simple random sampling (Cullinane and Toy, 2000). It can be defined as a strategy where

'each member of the universe or population to be sampled has an equal probability of being included in the sample' (Weber, 1990, p85).

In addition to that there are also systematic and stratified sampling techniques, which are discussed in detail by Babbie (1995) and Berg (1995).

Simple random sampling as the most widely employed method was selected to identify the main themes for deriving the Lithuanian oil policy and a good example where this sampling method was applied, can be seen in the article produced by Cullinane and Toy (2000). The sampling population for this study includes a very large range of publications, such as leading newspapers and commercial as well as academic journals in the United Kingdom, Lithuania, Latvia, Estonia and Russia, internet sites related to oil industry and other relevant topics, book chapters, a number of brochures and reports from the companies and papers from conferences (the list of used publications is included in appendix 9). The reason for selecting a large sampling population was outlined by Carney (1972), when he stated that 'the greater the sample of data, the less the risk of sample errors' (Carney, 1972, p39).
It is also important to mention that a small degree of selectivity was applied when gathering the information, as a large quantity of irrelevant information could generate invalid results for the content analysis and therefore only publications that are relevant to the research were included in the sample.

The last issue where sampling is concerned was the definition of time period. This particular topic was dealt with in detail by Muskens (1980), where he presented various issues concerned with the expression 'during a particular period of time'. Therefore it was essential to determine the period of time that will be analyzed in this project. It was considered to be reasonable to select the period between 1995 and 2001 (inclusive) for the content analysis, as most of the major changes relevant to this research took place during these years.

**9.9 CODING SCHEME**

**9.9.1 DEFINING THE RECORDING UNITS**

Explanation of what is the recording unit was given by Krippendorf. He stated that

'**recording units are the things to be counted. They may be words, themes, characters or even interactions**' (Krippendorf, 1980, p14).

Defining the recording unit (Krippendorf, 1980) of text that will be classified, could be considered to be one of the most important decisions, because the count of recording units will constitute the basis of outcome for content analysis. Weber (1990) and Frankfort-Nachmais and Nachmais (1996) present these types of recording units:

**Single words or terms** are used as recording units. This is the most commonly used coding system for the content analysis.
Sentences are used as recording units, when it is in the interest of the researcher to analyze "words or phrases that occur closely together" (Weber, 1990, p22).

Themes can be used as recording units in some cases as well, however the boundaries between themes and sentences, may be difficult to define. Nonetheless, "this form of coding preserves important information" (Weber, p22) and therefore may be useful in some cases.

Paragraphs can be used as recording units, however they 'often contain more that one theme and, therefore, are not necessarily mutually exclusive' (Cullinane and Toy, 2000, p46).

Items or whole text include whole books, articles, chapters or papers and can be used as recording units, however usually in such cases where the researcher aims to identify the overall message of the text (Cullinane and Toy, 2000).

The process of choosing the recording units was analyzed in detail by Carney (1972). Summarizing his study it can be outlined that the use of large recording units (i.e. paragraphs) was proven to be as likely to produce reliable results, as use of small recording units (i.e. words). However, despite whether small or large units are chosen, they have to be

'stable, that is, clear and precisely characterized and therefore easily distinguishable from the rest of the text' (Andersson, 1974, p10).

For this study two types of recording units were chosen to represent the findings of content analysis, these are single words (manifest content) and items (latent content). Single words
as most commonly used recording units were considered to be adequate to use in this project, as they provide a

'sound approach as far as reliability and replication are concerned' (Cullinane and Toy, 2000, p47).

Nonetheless, there are certain disadvantages in using this approach, for example if the context in which the recording units appear is not considered with due care, the inferences drawn from the data may prove to be misleading (Cullinane and Toy, 2000). Therefore a second recording unit was introduced in this study.

Items as the recording units are usually used when the researcher needs to identify the overall message of the text and in this situation this was the exact purpose of using them. The reason for choosing two types of recording units was to

'take advantage of the inherent strengths of each level of recording unit and to mitigate the effects of their respective limitations' (Cullinane and Toy, 2000, p47).

It is also a recommended approach for combining both manifest and latent content within the same content analysis, which then produces more reliable results, as long as the coding of both is reasonably consistent.

9.9.2 DEFINING THE CATEGORIES

After establishing the recording units, which will be used in the study, the next step is to identify the categories. Categories can be defined as 'classifications, ... into which the recording units are counted' (Krippendorff, 1980, p39). Although there are no rules for forming categories (Bailey, 1994), it is very important that they are formed appropriately, as

'content analysis is consequently only as good as the categories, or classification system, underlying it' (Krippendorff, 1980, p39).
Furthermore there are some issues that should be considered when forming the categories:

Validity

all categories formed have to 'reflect the conceptual framework of the research' (Cullinane and Toy, 2000, p45).

Flexibility

it has to be decided whether the coding will be done form pre-decided categories only or new categories will be added, as they are found in the text (Carley, 1992).

Exhaustive and mutually exclusive categories

every recording unit, which is relevant to the study, should 'fit into one given category' (Robson, 1993, p76), or in other words, it should be classifiable.

Transparency

the results of content analysis should be replicable and therefore 'it should be clear which recording unit is allocated to which category' (Cullinane and Toy, 2000, p45).

The process of category selection was summarized by Bailey, he stated that

'only by letting the categories emerge from the documents to be analyzed can the goals of mutual exclusiveness and exhaustiveness be met. Categories constructed without prior inspection of documents would no doubt exclude many categories and include many of that are superfluous or unnecessary' (Bailey, 1994, p307).

Moreover, it is also recommended to test the coding scheme, by coding a small sample of text, after it is chosen. Weber (1990) emphasizes the importance of testing as it

'not only reveals ambiguities in the rules, but also often leads to insights suggesting revisions of the classification scheme' (Weber, 1993, p23).
In order to identify the dominant themes for Lithuanian oil policy, eight exhaustive and mutually exclusive categories were established; they are presented in table 9.2. Some of them were pre-defined, however during the process of content analysis new categories, which clearly emerged from the text, were included as well as those that were not very accurate were adjusted. This was done in order to prevent any superfluous or unnecessary categories mislead the researcher from achieving the best possible results and as outlined by Cullinane and Toy

*the use of open coding strategy allows every possible category to be included*  
(Cullinane and Toy, 2000, p47).

| TABLE 9.2. CATEGORIES AND THEIR RELATIONSHIP TO UNDERLYING Attributes |
|-----------------------------|---------------------------------------------------------------|
| CATEGORY                    | VARIABLES                                                      |
| 1. Privatization            | Privatization of 'Mazeikiu Nafta', foreign investment, 'Williams International' |
| 2. Modernization            | Modernization, upgrade of the refinery, improved quality of oil products |
| 3. Butinge oil terminal      | Butinge terminal, Lithuanian oil import/export terminal         |
| 4. Russian oil supply/transit| Russian oil supply, Russian oil transit, oil import from Russia |
| 5. LUKoil                   | LUKoil oil supply, investment proposals by LUKoil               |
| 6. Yukos                    | Yukos oil supply, Yukos investment proposals                    |
| 7. Baltic Pipeline System    | Baltic Pipeline System (BPS)                                   |
| 8. European Union Accession  | EU accession, EU oil policy, requirements for joining EU        |

The allocation of each recording unit was another very important aspect of category construction sequentially to ensure that each one of them clearly belongs to a certain category and will not be misplaced.
It was also very important to establish a satisfactory degree of reliability and validity in this case, however as mentioned before, certain difficulties due to the language differences were encountered. Due to possibility of human error when coding, Weber (1990) and Sarantakos (1993) suggest that co-operation of at least one researcher is very important at this stage in order to eliminate any ambiguities in the process. They proposed 80% as an acceptable margin for establishing the required level of reliability in content analysis. However due to the nature of the problem encountered, it was solved by establishing a high level of stability when re-coding was carried out three times and partially by seeking the cooperation of a second researcher, where the material to be coded was in the English language. The results of coding by a second researcher were acceptable, as they exceeded the required 80% agreement margin.

Validity of content analysis has been introduced earlier in the chapter, however face and semantic validity should be discussed in more detail.

Semantic validity is very important form of validity, because it examines the categories and the recording units. In order to achieve the semantic validity all recording units should have similar meanings or connotations. It may appear as an obvious requirement in order to establish a valid content analysis, but in some cases it was a distinct difficulty due to ambiguous definition of the categories. However in this case such difficulties were avoided by obtaining a second opinion and eliminating the possibility of making this mistake.

It can be seen in table 9.2 that all categories derived from the content analysis clearly measure the construct they are intended to measure, or in other words represent the essence of the research question, which was to identify the dominant themes for the Lithuanian oil industry. Therefore it can be stated that face validity in this case was established.
9.9.3 SYSTEMS OF ENUMERATION

Among many systems of enumeration that exist, only four are commonly applied in content analysis studies. Bailey (1994) provides detailed description of each one of them, however in this case the short summary provided by Cullinane and Toy (2000) was considered to be sufficient.

**Time-Space System**
where the relative amount of column space given to each respective category is measured

**Appearance**
do categories appear in the context unit at all.

**Frequency**
where every occurrence of a recording unit is counted.
Probably the most widely applied system.

**Intensity**
generally employed when dealing with attitudes and values – scales are utilized.

For this project a frequency enumeration system was employed, as the most commonly used system in the content analysis studies. It is a simple and reliable way to achieve precise results from the content analysis and it was also outlined by Weber (1990) that ‘*the most frequently appearing words reflect the greatest concerns*’, which indicates that this system generates qualitative as well as quantitative results. Another very significant assumption was given by Cullinane and Toy (2000); they emphasized that ‘*each individual occurrence of a word or category is of equal importance or value*’.

The reason for choosing a frequency enumeration system in this project was the necessity to achieve relative and not absolute results of the analysis, when the dominant themes for Lithuanian oil policy were assessed for their importance in the region.
9.10 RESULTS OF THE CONTENT ANALYSIS

After all the required steps to establish valid and reliable content analysis were undertaken, over three hundred publications were examined in order to complete the analysis for this study and eight categories were constructed to accommodate all variables, which were relevant to the project. Manifest and latent analysis were carried out and the results are presented in tables 9.3 and 9.4.

Table 9.3 shows the results obtained by manifest analysis, using a single word as a recording unit. Four dominant themes were determined:

Privatization was found to be the most important issue. It is a process, which started in 1995 and was still incomplete in 2001. The privatization of major oil company ‘Mazeikiu Nafta’, pipeline system ‘Birzu Naftotiekis’ and the oil terminal at Butinge had a very big influence over Lithuania’s economy and its politics.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>NUMBER OF MENTIONS</th>
<th>PERCENTAGE OF TOTAL MENTIONS</th>
<th>CUMULATIVE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Privatization</td>
<td>789</td>
<td>23.9</td>
<td>23.9</td>
</tr>
<tr>
<td>2. Butinge oil terminal</td>
<td>654</td>
<td>20.0</td>
<td>43.9</td>
</tr>
<tr>
<td>3. Baltic Pipeline System</td>
<td>538</td>
<td>16.5</td>
<td>60.4</td>
</tr>
<tr>
<td>4. European Union Accession</td>
<td>426</td>
<td>12.9</td>
<td>73.3</td>
</tr>
<tr>
<td>5. Russian oil supply/transit</td>
<td>347</td>
<td>10.6</td>
<td>83.9</td>
</tr>
<tr>
<td>6. Yukos</td>
<td>265</td>
<td>8.0</td>
<td>91.9</td>
</tr>
<tr>
<td>7. LUKoil</td>
<td>210</td>
<td>6.3</td>
<td>98.2</td>
</tr>
<tr>
<td>8. Modernization</td>
<td>59</td>
<td>1.8</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>3288</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Butinge oil terminal was found to be the second major issue, when determining Lithuanian oil policy. The terminal was built in order to reduce political dependence on Russian oil supply and the content analysis results show that it is of a vital importance to the country and will be a major factor when determining policies.

Baltic Pipeline System is another concern, which will have a major impact upon Lithuania’s oil policy, when it is completed. Plans to create such a pipeline were initiated by the Russian Government in order to avoid high prices charged by all Baltic States’ ports for Russian oil transit.

European Union Accession is the fourth major issue derived from the content analysis. Since Lithuania became independent, it was aiming to become a member of the European Union and due to the progress made over these years it has been seriously considered by the EU Commission. Therefore it is a factor, which critically influenced many decisions taken by the Lithuanian Government, including those concerned with the oil industry legislation.

In addition to manifest analysis, in order to determine more accurate results, latent analysis was carried out and the findings are presented in table 9.4. This type of analysis is more dependent on the opinion of the person who is conducting the study, as the decision whether the category is represented by the theme of the publication lies with him/her. Therefore it might be considered to be less objective than manifest analysis, but nonetheless in this case every precaution was taken to avoid any misinterpretation and only publications, where the theme was clearly established, were included. The total of two
hundred and thirty publications were considered to be appropriate for inclusion in this analysis.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>ARTICLES WITH THE DOMINANT THEME</th>
<th>PERCENTAGE OF TOTAL MENTIONS</th>
<th>CUMULATIVE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Privatization</td>
<td>53</td>
<td>23.0</td>
<td>23.0</td>
</tr>
<tr>
<td>2. Butinge oil terminal</td>
<td>47</td>
<td>20.4</td>
<td>43.4</td>
</tr>
<tr>
<td>3. Baltic Pipeline System</td>
<td>41</td>
<td>17.8</td>
<td>61.2</td>
</tr>
<tr>
<td>4. Russian oil supply/transit</td>
<td>31</td>
<td>13.6</td>
<td>74.8</td>
</tr>
<tr>
<td>5. European Union Accession</td>
<td>26</td>
<td>11.3</td>
<td>86.1</td>
</tr>
<tr>
<td>6. LUKoil</td>
<td>19</td>
<td>8.3</td>
<td>94.4</td>
</tr>
<tr>
<td>7. Yukos</td>
<td>9</td>
<td>3.9</td>
<td>98.3</td>
</tr>
<tr>
<td>8. Modernization</td>
<td>4</td>
<td>1.7</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>230</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

Four most important categories derived from this analysis are privatization, Butinge oil terminal, BPS and Russian oil supply and transit. The first three categories are the same, as those determined by the manifest analysis, however Russian oil supply and transit emerged fourth in rank instead of EU accession.

**Russian oil supply and transit** category represents the major issues concerned with Russian oil supply and Lithuania’s dependency upon it. This has been a considerable concern over the years, because Lithuania does not have sufficient oil reserves within its territory.

Despite the fact that one of the four categories established by latent analysis was different from those that emerged from manifest analysis, the results generally have a very high level of correlation. This was considered to be a significant indicator of the validity and reliability of content analysis in this case.
Table 10.5 shows combined results from the manifest and latent analyses and ranks the importance between the categories using the derived average percentage of total mentions for each one of them.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PERCENTAGE OF MENTIONS IN:</th>
<th>AVERAGE PERCENTAGE</th>
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<td></td>
<td>MANIFEST</td>
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<tr>
<td>1. Privatization</td>
<td>23.9</td>
<td>23.0</td>
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<tr>
<td>2. Butinge oil terminal</td>
<td>20.0</td>
<td>20.4</td>
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<td>3. Baltic Pipeline System</td>
<td>16.5</td>
<td>17.8</td>
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<td>4. European Union accession</td>
<td>12.9</td>
<td>11.3</td>
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<td>5. Russian oil supply and transit</td>
<td>10.6</td>
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<td>6. LUKoil</td>
<td>6.3</td>
<td>8.3</td>
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<td>7. Yukos</td>
<td>8.0</td>
<td>3.9</td>
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<td>8. Modernization</td>
<td>1.8</td>
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<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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These categories will be used in order to construct a questionnaire in the next stage of this project, however because of the nature of the subject, some of the issues will have to be combined and addressed as one theme, rather than individually. Three content areas were formed to accommodate the categories, which will consequently be used as a basis for the questionnaire construction. These categories emerged using quantitative as well as qualitative information provided by the results of content analysis.

The first content area includes the issues of ‘MN’ privatization process, as well as addresses problems of oil supply, which were caused by that process. It also incorporates the Yukos and LUKoil categories, because they are the two largest Russian oil suppliers in Lithuania and were heavily involved in the privatization process. The quantitative content analysis results indicated that privatization was the most important theme, however data discussed in previous chapters (chapter 6) and many of the articles suggested that it would be appropriate to combine it with the oil supply related categories, to form the required context for the further analysis.
The second content area deals with the matter of Butinge oil terminal, which statistically is the next most influential category after privatization. In this case it was important to connect these issues with the Baltic Pipeline System, which could be the biggest competitor in the near future and could have a considerable impact on Butinge. Close examination of the related publications indicated that it would be inappropriate to address one topic, without at the same time reflecting on the other and possible consequences.

The third and last content area incorporates the issues of EU accession and 'MN' modernization, because the qualitative data suggests that the latter could be considered to be a direct consequence of the former. Although content analysis results show that issue of modernization was identified as the least significant amongst the others, based on previously examined data about the new requirements for the industry imposed by EU accession, it was adequate to combine both categories and present them as one theme.

9.11 Summary

This chapter presented a detailed overview of content analysis technique, analyzed its application and finally outlined the results. It was emphasized throughout the analysis that this technique generates both – quantitative and qualitative results, and therefore the final outcome provides three main content areas, which were formed by combining the numerical data with qualitative inferences from the related literature.
CHAPTER 10

THE DEVELOPMENT OF THE RESEARCH INSTRUMENT

10.1 INTRODUCTION

The next stage of the research is to further analyze the results of the content analysis. Eight major topics concerning Lithuanian oil policy were derived in the previous chapter and at this phase it was necessary to employ the most appropriate method, which would be suitable for collecting the opinions of the experts in the region with the ultimate aim to derive optimal Lithuanian oil transit policies.

The outcome of content analysis led to the hypothesis that a scaling method would be the most efficient approach, as the main themes derived suggested a number of assumptions, which consequently required an opinion from experts. The earlier research experience in the region has shown that application of a Delphi technique could be effective under similar circumstances (see publications, Pasukeviciute and Roe, p335), however it also causes a number of difficulties, especially because it requires the questionnaires to be delivered to the experts for a number of times (at least twice). In this case such a requirement could have resulted in a very poor response rate and therefore a scaling approach was considered to be more appropriate.

Therefore this chapter deals with the development of a scale, which then will be used for the assessment of experts' opinion.

The basic understanding of scaling lies within the concept of measurement, which is 'a fundamental activity of science' (DeVellis, 1991, p2). It can be explained as quantification of observations, which are interesting to a researcher (Ven, 1980). Commonly the
measurement procedure applied is the questionnaire and 'the variables of interest are part of a broader theoretical framework' (DeVellis, 1991, p3).

Scales can be referred to as

'measurement instruments that are collections of items intended to reveal levels of theoretical variables, not readily observable by direct means' (DeVellis, 1991, p8).

There are many scales developed for measuring a variety of constructs, and commonly a developed scale may be applied in as study, similar to this one. An application of a developed scale would eliminate many possible problems (most of which will be discussed further in this chapter), whilst creation of a new scale may be a very complicated process. Nonetheless, in this case there were no developed scales found, as the topic is very specific and aims to analyze a constantly changing situation and therefore a creation of a new scale was an inevitable process.

10.2 DEVELOPMENT OF A NEW SCALE

There are many factors that should be taken into consideration when developing a new scale and in this case it was necessary to follow the established guidelines for development of a measurement scale, in order to reduce the possibility of errors. DeVellis (1991) and Punch (1999) outlined a number of steps for successful scale development, which are identified in table 10.1 and will be applied in this study.
Next, the steps will be described theoretically including various aspects that should be considered, and then the theory will be applied to the scale development for this project. In order to construct a valid and reliable scale, it is essential that all steps are completed and that none ignored, because the initial scale development process will have an impact on its outcome.

10.3 Step 1: Determine Clearly What Will Be Measured

The first and the most essential element of scale development is to clearly and precisely define the construct of interest because

'a scale cannot be developed until it is clear exactly what that scale is intended to measure' (http://www.forest.edu/stats2000/tests/likert.htm).

There are three considerations that should be borne in mind when determining what will be measured. The first is theory, which provides great aid to the clarity of scale content, by setting guidelines for its development (DeVellis, 1991). The second consideration is specificity (or generality) at which a construct is measured, because sometimes

<table>
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<th>TABLE 10.1 GUIDELINES FOR THE SCALE DEVELOPMENT</th>
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<td>Step 7</td>
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'a scale is intended to relate to very specific behaviors or constructs while at other times a more general and global measure is sought' (DeVellis, 1991, p52).

Finally the third factor to consider is clarity about what to include, as inclusion of irrelevant concerns would result in measurement of the wrong construct (Black, 1999).

All three of the above factors are addressed in this case, to ensure that the correct construct is determined. The scale development guidelines were provided in table 11.1 and are followed throughout this chapter.

The specificity for construct measurement in this case is a significant factor, as the ultimate aim of the scale under construction is to measure the concept by the means of assessing opinion of experts in Lithuania towards very specific and important issues in the oil industry. However, although the addressed issues will be specific, it is important to emphasize that in this case every effort will be made to present the issues in the most unambiguous way, in order to avoid biased answers.

The third factor is also important, and it is necessary to emphasize that in this case the set of concerns, which will be included in the measure, were determined by the outcome of content analysis. This was done in order to ensure that all items are directed towards measuring the same phenomena.

10.4 Step 2: Select a Measuring Technique

In order to select an appropriate measuring technique, it is very important to define the scaling process itself, as it will provide background for further understanding of the selection.

Scaling as a process has been defined as 'the assignment of objects to numbers according to a rule' (Trochim, 2002). Although this definition may seem very clear, in some cases
the expression ‘according to a rule’ may be underestimated. It is very important to establish the difference between a scaling technique and a response scale, as the latter would be inappropriate to use in this case. Scaling is a set of combined procedures, which involves development of the actual scale and then application of it to collect the responses.

The main differences of scaling and response scale are as follows: first of all a scaling technique aims for results from a process, while a response scale is used for response collection (Cox, 1980). Secondly, each item used on a scale has a value, whereas in a response scale there are no values. Finally a scaling technique usually refers to a set of items, which are inter-correlated and the response scale may be applied to a single item (Trochim, 2002).

The underlying idea of scaling in this case is to derive the statements using the themes and variables defined by the content analysis and use them to measure the opinion of experts in the oil industry. It was very important to determine that a correct scaling technique was employed, because the results will be used as a basis when the Lithuanian oil policies are derived and will have a major impact upon the research outcome.

Scaling has been used in many cases, such as explanatory research, measurement of concepts, scoring purposes or testing of hypotheses (Torgerson, 1958). In this research, scaling is used in order to obtain the opinion of a panel of experts, as the topic of the research is a very sensitive political issue, which requires opinions from various representatives of the industry.

In order to determine the best scaling method for this research, a number of issues had to be taken into account. In particular scaling can have a number of dimensions (Trochim, 2002) and in this case the construct is unidimensional, or in other words one-dimensional, as it will measure the opinion of each respondent on the provided scale. Trochim (2001) suggests three unidimensional methods, which are Thurstone Scaling, Guttman Scaling and
Likert Scaling, however DeVellis indicates that Semantic Scaling is also an option. In the next section, all of the methods will be analyzed in more detail, giving advantages and disadvantages of each.

10.4.1 THURSTONE SCALE

The Thurstone scale was first introduced in 1927, as a mathematical model for ‘relating scale values of a set of stimuli to observable proportions’ (Torgerson, 1958, p155). Detailed analysis of how this scale works was given by Torgerson (1958) and it was also discussed by DeVellis (1991) and Trochim (2001).

In order to develop a Thurstone scale, or a method of equal-appearing intervals, first the researcher should define the focus for the scale. The next step is to create a large set of potential statements, which then will be presented to a panel of experts in order to receive their response of favorability on the eleven-point scale (Trochim, 2002). Next, the attitude is assessed according to the ranking of each statement (http://www.ndu.edu/ndu/irmc/mop98/m22-02s4.html). The questionnaire is constructed from the questions, which are at equal intervals across the median range (Trochim, 2002) of an eleven-point scale.

This method can be very useful in some cases, however it has many complications and usually the practical problems ‘outweigh its advantages’ (DeVellis, 1991, p62). Burns (2000) also outlines that a Thurstone scale needs to be considerably longer than a Likert Scale, if the same level of reliability is to be obtained.
10.4.2 Guttman Scale

The Guttman scale was developed by Guttman in 1944 (Ven, 1980, p7) and is also known as the cumulative scaling method. Van der Ven (1980) analyzed this method in great detail providing examples and explaining the method in a mathematical form.

The Guttman scale was defined by Trochim (2001) as a scale, which aims to establish a one-dimensional continuum for a concept that will be measured. It consists of a number of statements, which first are presented to a panel of judges in order to assess how 'the statement is related to the construct of interest' (Trochim, 2002). The next step is to construct the scale according to the feedback of the judges (DeVellis, 1991). The Guttman scale should be formulated in a way that if a respondent would agree with one statement, he would likely to agree with all previous statements as well (Trochim, 2002). Finally the results are assessed by adding up the scale values of every item the respondents have agreed with (Ven, 1980).

The Guttman scale has received a lot of criticism for its limited applicability and also for numerous difficulties concerning the scale construction (DeVellis, 1991). Despite that the scale can work very well, if it is applied to an appropriate situation and only objective information is used.

10.4.3 Semantic Differential Scaling

The semantic differential method was developed by Osgood, Suci and Tannenbaum in 1957 (Bailey, 1994). It was constructed to measure

'\textit{the respondents' reaction to some object or concept by asking them to indicate a rating on a bipolar scale defined by contrasting adjectives at each end}'

Most commonly two opposite adjectives, such as light/dark, fast/slow, weak/strong, simple/complex etc., are used at the ends of the continuum, which usually consists of 7-11 points (Neuman, 2000). For example the response options can be presented as:

Weak ___ ___ ___ ___ ___ ___ Strong

or

Honest ___ ___ ___ ___ ___ ___ ___ ___ Dishonest

The respondents are asked to indicate their feelings by marking a spot on the continuum between those adjectives.

The semantic differential scaling method has been applied in various fields, such as politics, marketing and psychology (Nachmais, Nachmais, 1996), however, in this research it was considered to be inappropriate. The main reason for rejecting this method was that the pattern of

'responses for each concept illustrates how this individual feels about the concepts' (Neuman, 1996, p189).

The purpose of the scaling technique in this case is to determine the opinion of the experts upon very important political issues, which then will be used for the construction of the policy and therefore a semantic differential scale was not considered to be sufficient.

10.4.4 LIKERT SCALE

The Likert scale was first introduced in 1932 (Taylor and Heath, 1996) by Rensis Likert and since then has been widely used in various areas of research including business (http://munshi.sonoma.edu/working/LIKERT.html). It also became one of the most important methods for 'measuring social and political attitudes' (Taylor and Heath, 1996, p1).
The scale consists of a number of inter-correlated statements, which are presented to the respondents and they are asked to express their opinion by choosing one of the response codes, typically ranging from strongly agree to strongly disagree (Taylor and Heath, 1996).

The most commonly used rating scale is a one to five agree-disagree scale, where:

1 - strongly agree
2 - agree
3 - undecided
4 - disagree
5 - strongly disagree

It is also important to mention that

"the response options should be worded so as to have roughly equal intervals with respect to agreement" (DeVellis, 1991, p68)

Although the five point response scale is the most commonly applied scale, it is also possible to use a four, six, seven or nine point scale. Jamal Munshi suggested that results of a seven-point-scale would produce results of higher precision (http://munshi.sonoma.edu/working/LIKERT.html). A scale with an even number of response options would eliminate the middle point ('undecided' or 'neither agree nor disagree') and therefore make the respondents choose a side (DeVellis, 1991). Such an approach could be useful in some cases, however was not appropriate for this study, as it would add too much pressure on the participants, which could consequently lead to less honest answers and unwillingness to co-operate. A traditional five-point scale was selected in this case, because it was considered to be sufficient and would help to avoid possible problems, which could arise whilst constructing an unconventional scale.

In some cases the Likert scale is referred to as 'summative' scale, because during the construction each statement has an assigned value (http://www.cultsock.ndirect.co.uk/MUHome/cshtml/psy/likert.html) and the results may
be presented by adding up these values for each respondent to assess their attitude towards the issue (Trochim, 2002).

The Likert scale has a number of advantages compared to the three previously described methods, and therefore it was considered to be the most appropriate approach in this case. The main reasons for selecting this scale include its flexibility, as the method was used by the researchers in many areas ranging from psychology to business (http://munshi.sonoma.edu/workin2/LIKERT.html). It was also a very suitable approach in the context of dealing with the respondents. The Likert scale questionnaire is an easy way to collect opinion of the experts on important issues, as it does not take a lot of time to complete and usually does not attempt to include any comments/complaints from them. Nonetheless in this case the experts were asked to provide additional comments, as such information could contribute significantly to the outcome of the research.

In addition to the described scaling techniques, the scales can also be classified by type. The four types are nominal, ordinal, interval and ratio scales.

10.4.5 Nominal Scale

This type of scale allows 'the classification of individuals, responses or objects based on a common property' (Pieczek, 2000, p157). However, although the nominal scale classifies the responses based upon common characteristics, the sequence of how the groups of responses are listed is not important (Foster, 1998). The numbers in this scale are used as a label, for example if sex of respondents is coded (where 1 is male and 2 is female) the numbers are meaningless, because in such case 2 is not bigger than 1, it just indicates a difference (Foster, 1998).
10.4.6 Ordinal Scales

Similar to the nominal scale, this scale also classifies the responses based on common characteristics, however in addition to that, it ranks *the magnitude of the quality represented by the numbers* (Foster, 1998, p6).

Foster (1998) suggested that this type of scale could be compared to a race, where it is clear that the person who came first was faster than the second one and the third was slower than the other two. Ordinal scale would only rank the positions, without indicating any other differences between those people (i.e. how much faster was the winner than the second person), because there is no quantitative unit of measurement (Pieczek, 2000).

10.4.7 Interval Scales

This scale has all the characteristics of an ordinal scale, but the numbers also represent the *magnitude of differences* (Foster, 1998). In the interval scale the response options would be placed at equally spaced intervals *in relation to the spread of the variable* (Pieczek, 2000, p158). The most frequently used example for this type of scale is the Celsius temperature scale, because the difference between 20 and 30 degrees would be equal to the difference between 30 and 40 degrees, however at the same time 40 degrees would not constitute something twice as hot as 20 degrees (Foster, 1998).

The interval scale is relative,

> *it plots the position of individuals or responses in relation to one another with respect to the magnitude of the measurement variable* (Pieczek, 2000, p158).
10.4.8 RATIO SCALES

Ratio scales have all the properties of the three previously introduced scales, and a true zero point, which makes it an absolute scale. This scale can be used for all mathematical operations (Kumar, 1996) because the ratio of the numbers ‘reflects the ratio of the attribute measured’ (Foster, 1998, p6) and its intervals are always measured from a true zero point. Example of such a measure could be length, as ‘an object 30cm long is twice the length of an object 15cm long’ (Foster, 1998, p6).

The interval scale was the most appropriate measure for this study, because a relative scale was what was required to assess an opinion of the participants.

10.5 STEP 3: GENERATE AN ITEM POOL

At this stage of scale construction, the scope of research is clearly established, and the next step is to generate a pool of items.

There are two basic methods for the Likert scale item development – inductive scale development approach, which involves item development from a clearly defined construct (http://www.forest.edu/stats2000/tests/likert2.htm) and deductive scale development approach, which on the contrary is a process when many items are administered to the subject and then factor analysis is used to select the most important ones (http://www.forest.edu/stats2000/tests/likert2.htm).

In this project, an inductive item development approach was applied, because it was based upon the construct defined by content analysis. Once again it is necessary to mention, that the definition of construct could be considered as ‘the most difficult part of scale construction’ (Friedman, Wilamowsky and Friedman, 1981, p2) and in many instances it can be based upon conceptual or empirical work, which already exists. Nonetheless in the
case of this research, no such work could be found and therefore content analysis was
carried out in order to provide the basis for such a construct, or in other words – the
content area. Over three hundred publications were examined in order to derive a number
of issues, which would represent the essence of the research. Eight categories were
constructed to accommodate all fundamental variables and these categories form the basis
of the construct of interest for the Likert scale.

Although content analysis provides the basis, the construction of actual items will be a
different process, and therefore it has to be ensured that the common link between the
items ‘is truly a construct and not merely a category’ (DeVellis, 1991, p55). It was already
established that all content analysis issues were closely related, or in other words, are the
main issues concerning the Lithuanian oil industry forming the construct of interest. The
eight issues, listed in order of importance, are as follows:

1. Privatization in 1999 the only Lithuanian oil company ‘Mazeikiu Nafta’
   was partially privatized. The company owns Mazeikiu oil
   refinery, ‘Birzu Naftotiekis’ and Butinge oil import/export
   terminal and is very dependent upon the supply of Russian
   oil.

2. Butinge oil terminal is a part of ‘Mazeikiu Nafta’, which at the time of research
   was managed by the U.S. based company Williams and was
   built for political independence reasons as well as for the
   export of Russian oil.

3. Baltic Pipeline System could have a major impact upon ‘Mazeikiu Nafta’ and the
   Lithuanian oil industry overall, as it will become the major
   competitor for Butinge oil terminal.
4. EU accession is a central issue, which affects the future of oil industry in Lithuania as well as has a lot of influence over Lithuania's oil policy legislation and production standards.

5. Russian oil supply/transit this issue represents the broader view of Russian oil supply to Lithuania, as well as transit matters, where the major emphasis is placed upon the relations between two countries rather than the individual companies.

6. Yukos Yukos is a giant Russian oil company, which was involved in business with 'Mazeikiu Nafta' for a number of years. In 2001 Yukos was engaged in serious negotiations with Williams concerning crude oil supply and possibility of becoming a 'Mazeikiu Nafta' shareholder.

7. LUKoil LUKoil has been the main oil supplier to 'Mazeikiu Nafta' for a number of years and was also one of the major contenders in the privatization process.

8. Modernization for a number of years, 'Mazeikiu Nafta' has been in need of modernization, because it is necessary to ensure that its production reaches the highest possible standards, in order to comply with EU requirements.

The short descriptions next to each issue provide the basic idea of how these issues are related. All of them will be used in order to construct a number of statements for the Likert Scale, which consequently will make up a set of internally consistent items, representing the essence of the research.
To ensure that derived items reflect the scale’s purpose, the items should be ‘created with the specific measurement goal in mind’ (DeVellis, 1991, p.54) because otherwise the items will fail to reflect the scale’s purpose and ‘will not accurately capture the essence of the construct’ (DeVellis, 1991, p.54).

Therefore in order to capture the essence of the construct, it was necessary to discard some of the categories and to merge some others. For example, two categories – Yukos and LUKoil are very important factors in this research, however their inclusion in the Likert scale questionnaire would have resulted in a very high risk of receiving biased responses from the experts. Such risk could evolve in the instances where present or former employees of these companies would participate in the survey. It is also important to outline that although these two categories were excluded, the underlying issues will still be addressed under more general terms, under the topic of Russian oil supply.

The remaining six categories were used to derive the statements for the Likert scale questionnaire. However due to a very close connection between them, it was more appropriate to form three content areas, which capture the essence of the research. They are: ‘Mazeikiu Nafta’ privatisation and oil supply from Russia; Butinge oil terminal and the competition, and European Union accession and modernization of ‘Mazeikiu Nafta’.

Next the new categories for Likert scale are explained in more detail and the derived statements are presented.

Privatisation and oil supply was the first content area presented in the questionnaire, which includes eight statements and is concerned with various issues in the privatization process and in the matters of oil supply. This category includes the largest number of items because it incorporates the most important category determined by the content analysis as well as three others – Russian oil supply ‘Yukos’ and ‘LUKoil’ (it was stated before that the last two categories were excluded, however some underlying issues were still considered). These categories were combined into one content area due to the fact that all
issues are very closely related, especially in the sense that Russian oil companies were major contenders in the privatization process and still remain the only crude oil suppliers for ‘MN’. Such connection is clearly established in the derived statements, which are as follows:

1. ‘Williams International’ investment had a positive influence on the company.

2. After the partial privatization of ‘Mazeikiu Nafta’, the rest of the shares will be sold profitably.

3. The rest of the ‘Mazeikiu Nafta’ shares should be sold to the company, which exploits oil fields and would be able to supply all the required crude oil to the Mazeikiai refinery.

4. Lithuanian Government’s rejection of the investment proposals for ‘Mazeikiu Nafta’ by the Russian companies, which exploit large oil fields, has resulted in shortage of crude oil during 1999-2001.

5. When the privatization of ‘Mazeikiu Nafta’ is complete, the State should keep a block of shares, in order to control the strategic object.

6. Oil supply and sale of ‘Mazeikiu Nafta’ shares should not be related.

7. Lithuanian Government should be interested in receiving the highest possible price for the rest of the shares, irrespectively of who will buy them.

8. Security of oil supply should be the base for the negotiations and arrangements with possible suppliers.

The second content area includes the Butinge oil terminal and its competitor – the Primorsk terminal (and the BPS in Russia). These two categories make up a very important topic, which summarizes and presents the key factors about the Butinge oil terminal, its
current use for Russian oil transit, and future possibilities of strong competition from the
new Russian terminal at Primorsk, which will be directly connected with the Russian oil
fields by the Baltic Pipeline System. There were six statements derived and they are as
follows:

1. At the moment crude oil delivered to Butinge from other countries is more
expensive than Russian oil and it would result in higher oil product prices in
Lithuania.

2. Operator of ‘Mazeikiu Nafta’ should try to increase Russian oil transit through
Butinge terminal, in order to make sure that it will become a profitable economic
unit.

3. There is a probability, that Russian oil transit through Butinge could pollute the
Baltic Sea and the liquidation of the accident effects as well as the cost of the
damage would be greater than possible profit.

4. The overall Russian oil export will increase in the near future and therefore the
amount of exported oil through the Baltic States ports will not change.

5. Russia will not reduce the amount of transit oil, because the Baltic States’ ports are
ice-free all year round and could offer a flexible tariff policy.

6. Economists in Russia have calculated that if Russia could use only BPS and
Primorsk terminal for oil export, the country would save 1-1.5 billion (USD) per
year on transit tariffs. Therefore oil transit through the Baltic States should fall
significantly.

The third and last content area deals with European Union accession and its requirements
upon the oil industry in Lithuania, as well as with the issue of ‘MN’ modernization. This
was the most difficult area in terms of statement construction, mainly due to the
uncertainty of such requirements and various speculations about the modernization issue within the industry. Therefore only three statements were considered to be appropriate to use in this case:

1. The operator of ‘Mazeikiu Nafta’ should find the required funds for the modernization of the refinery, so all the production will comply with the EU requirements and it would be possible to export the production to any EU country.

2. The modernization of the refinery should not be an issue now, because it is not known if EU countries would buy the production of ‘Mazeikiu Nafta’ and if the company will be able to return the credits. It is possible to continue to produce oil products which can be exported to the FSU countries.

3. ‘Mazeikiu Nafta’ refinery has a lot of potential of becoming the most profitable refinery in the Eastern Europe, capable of delivering products that meet the EU standards, when Lithuania joins the EU.

There have been many obstacles during the creation of the items for this study, and resulted in many statements being discarded and only 17 used in the actual survey. The main problems arose due to the instability of the situation in the Lithuanian oil industry (most of the changes were discussed in the Chapter 7). It would have been very difficult, or almost impossible, to derive a set of items which could be stable over time, because the issues, which require experts' opinion, were time sensitive and were bound to change. Therefore a decision had to be made, whether it was more important to establish stability over time or to address time sensitive current issues. Although stability over time is important in the scale construction process, and to some extent it would make the scale more reliable, in this case it could not be applied because of the nature of the research.
Therefore, after many factors were considered, the conclusion was reached that stability over time was less important where Lithuanian oil policies are concerned and it was decided to construct the set of items, which would focus on the current situation, despite its lack of stability.

Another important factor, which determined the number of items, was the fact that a new scale will be devised and there were no examples that could be followed. It would be poor practice of item writing if the number of statements was more important than their quality and therefore 17 statements were considered to be sufficient in this case.

The questionnaires were compiled in two languages – English and Lithuanian, as it was anticipated that some of the experts in Lithuania might not be able to fully understand the underlying issues in a foreign language (the English version may be seen in appendix 10 and the Lithuanian version in appendix 11).

10.6 STEP 4: HAVE INITIAL POOL REVIEWED BY EXPERTS

After the pool of items has been determined, it is necessary to select a number of experts ‘who are knowledgeable in the content area’ (DeVellis, 1991, p75) to review the pool. This procedure would provide an objective judgement about how relevant each item is to what you intend to measure and is especially useful if one is

‘developing a measure that will consists of separate scales to measure multiple constructs’ (DeVellis, 1991, p75).

It has already been outlined that although a single topic is addressed in this study, it has three main content areas, which form three constructs within the Likert scale.

Two experts were approached when constructing this scale - both experts from the Lithuanian oil industry. DeVellis (1991) states that a final decision whether to accept or reject the advice from the experts is the responsibility of the researcher and after careful
examination, the comments from both Lithuanian experts were taken into consideration and applied in practice. Although there were no disagreements about the definition of construct or allocation of items, some hints about the items' clarity and conciseness - especially the wording of the statements were very useful.

10.7 Step 5: Pre-test the Formed Scale

The next stage involves the pre-testing of the formed scale by administering the questionnaire to a large sample of people (Nunnaly, 1978). However the concept 'large sample' has been differently defined by various authors as some propose that it should be more than 300 people (Nunnaly, 1978), others state that 100-200 can be sufficient for social research (Punch, 1999) and finally it was suggested by Rust and Golombok (1999) that the minimum number of respondents should be equal to the number of items plus one.

DeVellis (1991) emphasizes that the scale developer should consider 'both the size and composition of the development sample' (p78). In this study composition was a very important factor as well as the main reason for selecting a small sample. Considering that the Lithuanian oil industry is rather small, the choice of participants was very limited and it was impossible to gather a large sample. The scale was specifically designed in order to assess only the opinion of the experts in the Lithuanian oil industry and therefore every participant was required to have a very good understanding of the topic. Questioning of random people would have resulted in a set of accidental answers and would by no means represent the opinion of experts.

Administration of the questionnaire was another major issue, which was addressed very seriously in this case, because
'It is worth taking every precaution possible to ensure that the data are as good as they can be, whatever the mode of administration of the instruments' (Punch, 1999, p104)

It was necessary to ensure that respondents were approached professionally, as well as informed about confidentiality and anonymity, the purpose of the research and how the information that they provide will be used (Punch, 1999). It was suggested by Punch (1999) that such information helps to gain the cooperation of the respondents and improves quality of data. These guidelines were very useful when dealing with the respondents in Lithuania, as the issues of confidentiality and anonymity were very important for most of the survey participants.

There are only a limited number of ways to collect the required data, which may be applied depending on the circumstances and limitations in each particular case. Collection of data can be found in these forms:

"face-to-face interviewing, telephone interviewing, self-administered questionnaires delivered personally by the researcher and mail questionnaires" (Sarantakos, 1993, p157).

The most common type of questionnaire administration is by mail, however it is not the best option, because

"if face-to-face administration is possible instead of a mailed questionnaire, it is to be preferred, despite the additional work" (Punch, 1999, p104).

The approach of face-to-face administration was taken in this case, mainly due to the fact that mail-response rates tend to be very low and it was also suggested that such an approach would improve the quality of data. It was decided that in this case it is better to have 'a smaller data set of good quality, than a larger one of lower quality' (Punch, 1999, p104) as it is the quality of the data that will determine an accurate and valid outcome, especially for this study where the ultimate aim is to derive policies based on the data collected by the Likert scale questionnaire.
It was attempted to contact 55 experts in Lithuania, ranging from the academics in the leading universities, to industry representatives in the main companies and Government officials involved in the legislation of the oil industry. Deliberate attempts were made to include senior management in each sector of the Lithuanian oil industry, because of their knowledge and experience. Especially, where Government officials are concerned, a number of Ministries were contacted in order to cover all aspects of oil industry including economy, energy, transportation and distribution. It is also important to mention that geographically all oil establishments in Lithuania were included in the survey (i.e. Klaipeda terminal, Mazeikiai refinery and Butinge terminal).

Depending on the individual circumstances it was attempted to contact the experts by sending an e-mail, a letter or in other cases by telephone. Successful contact was established with 36 of them, and short appointments were scheduled over a period of two weeks. Each questionnaire was delivered to the experts personally by the researcher, as it was considered as the most efficient method to gather information under the given circumstances. Because of the importance of confidentiality and anonymity to the participants, it was not possible to discuss their background in more detail, however it is essential to mention that every effort was made in order to select the best representatives of the industry and thus three groups – academics, experts from all sectors within the industry and the Government officials were regarded as a sufficient sample, to represent the opinion of the oil industry in Lithuania.

All meetings were very successful, and 36 questionnaires were completed by the required representatives by the end of the survey (quantitative results are presented in the appendix 12).
After the pool of items has been developed and ‘administered to an appropriately large and representative sample’ (DeVellis, 1991, p80), the next step is to identify the appropriate items, which will constitute the final scale. In order to make such selection the performance of each individual item should be assessed in terms of how well it correlates with the rest (DeVellis, 1999). The most common way to determine how the items are intercorrelated is to inspect the correlation matrix (DeVellis, 1999). DeVellis (1999) outlines four statistical methods for analyzing the correlation matrix and each one of them is presented next.

10.8.1 REVERSE SCORING

This method may be applied in cases where a negative correlation between the items was discovered, as it may be the case that some items were worded negatively, and should have been assigned a reverse score (Taylor and Heath, 1996). In other words, if the scale aims to measure ‘happy’, each item representing ‘sad’ should be reverse scored. Such an approach was not applied in this case, because it was not necessary and it can sometimes confuse the respondents as well as create ‘numerous opportunities for mistakes’ (DeVellis, 1991, p81).

10.8.2 INTER-SCALE CORRELATIONS

In order to derive a set of highly inter-correlated items, which measure the same construct each

‘individual item should correlate substantially with the collection of remaining items’ (DeVellis, 1991, p82).
The Statistical Package for Social Sciences (SPSS) was used to calculate the correlation coefficients for all 17 items. There are two ways of testing correlations - one-tailed and two-tailed hypothesis. The two-tailed hypothesis is a less restricted test, without any prior assumptions by the researcher about the outcome, whilst the one-tailed hypothesis involves predictions that certain groups of respondents would have a certain attitude (Kerr, Hall and Kozub, 2002). Some authors suggest that

*unless there are good reasons for doing otherwise, a two-tailed hypothesis should be postulated* (Kerr, Hall and Kozub, 2002, p45).

A two-tailed approach was applied in this case and it is clearly stated in the correlation matrix table (see appendix 13).

Usually a correlation coefficient above +0.2 is considered to be acceptable as an indicator of sufficient correlation between each particular item and the remaining pool. If the coefficient is lower than that, it is usually assumed that such item is 'bad' because it is measuring something other than that it was intended to.

The correlation matrix for all items is presented in appendix 13. The last column of the table shows the item-total correlation coefficients. At this point it is also necessary to outline that for each item-total correlation p value (probability value, which indicates how likely it is that the result occurred by chance) should be less than 0.05, because only then the result can be accepted as a significant one, which did not occur by chance. In the correlation matrix the significance is indicated by one star (p < 0.05) or two stars (p < 0.01) shown next to the item-total coefficient and therefore it can be clearly seen that only items 1, 6, 9, 10, 12, 13 and 17 may be regarded as 'good' ones. Usually, the rest should be discarded as 'bad' items and should not be included in the further analysis. The cluster of seven 'good' items will be further analyzed using reliability analysis - coefficient alpha, in the later stage of the scale construction.
However despite the above, in some cases ‘every item could be thought of as a separate test’ (Murphy and Davidshofer, 2001, p196) as long as it measures the construct that the test was designed to measure.

10.8.3 Item variance

Item variance is another important attribute, which should be assessed when analyzing the scale (Black, 1999). It measures the distribution of scores for every statement and once again can help to identify the statistically ‘good’ and ‘bad’ items.

High variance shows that the participants have provided a range of responses for a particular statement, which is an indicator of a good item. However if every respondent gave the same answer for a particular item, it would show no variance, and therefore constitute a statistically poor item (DeVellis, 1991).

In this case, the variance of the items ranged form 0.256 to 1.590; Figure 10.1 shows examples of both – a relatively good item and a bad item. It can be clearly seen that the range of responses for statement five is reasonably varied, however statement 15 represents the statistically poor item, where participants expressed a uniform attitude towards a statement. At this point it is also important to mention that a good item in theory should show an equal number of responses for each possible option (Murphy and Davidshofer, 2001). However it is rarely a possibility in the real-world research and therefore in many cases common sense should be used to judge the level of required variance.
Assessment of variance can be very useful, especially where survey includes a very large number of participants (Rust and Golombok, 1999). However in this case, it was not possible to use variance as a significant indicator when selecting the items, because the sample was too small and application of such method would have yielded invalid results.

10.8.4 ITEM MEAN

The item mean is another statistical instrument, which can be used to further analyze the importance of variance (Loewenthal, 2001). In this study the response options are 1 (strongly agree) to 5 (strongly disagree) and therefore a mean as close as possible to number 3 was desired. If a mean would be close to the extreme of the range (for example 4.5) it would indicate a lack of variance. DeVellis (1991) states that

*items with means too near an extreme of the response range will have low variances, and those that vary over a low range will correlate poorly with other items* (p83).
Table 10.2 presents means for all 17 items of this research, however despite the fact that a substantial number of items have a mean close to 3, in many cases a small sample size can produce a misleading outcome. In such a case both variance and item means should be examined together in order to avoid possible misinterpretation of the results (Roberts and Russo, 1999).

It was already outlined that variance cannot be a significant indicator of good and bad items in this study and although the item means were also presented, they will not be considered as a significant factor, due to the same reason – too few respondents. However a combination of both provides a reasonably acceptable measure in this case and indicates that only items 3, 8, 9, 10, 15 and 16 are statistically poor. Nonetheless, because the aim of this project is to assess opinion, such items provide valuable information in terms of high level of agreement or disagreement on certain issues within the industry.

### Table 10.2 Item Means and Variances

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Mean</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.83</td>
<td>1.171</td>
</tr>
<tr>
<td>2</td>
<td>2.83</td>
<td>0.829</td>
</tr>
<tr>
<td>3</td>
<td>1.81</td>
<td>1.075</td>
</tr>
<tr>
<td>4</td>
<td>2.08</td>
<td>0.879</td>
</tr>
<tr>
<td>5</td>
<td>2.94</td>
<td>1.311</td>
</tr>
<tr>
<td>6</td>
<td>2.89</td>
<td>1.359</td>
</tr>
<tr>
<td>7</td>
<td>3.36</td>
<td>1.209</td>
</tr>
<tr>
<td>8</td>
<td>1.78</td>
<td>0.978</td>
</tr>
<tr>
<td>9</td>
<td>1.67</td>
<td>0.686</td>
</tr>
<tr>
<td>10</td>
<td>1.64</td>
<td>0.694</td>
</tr>
<tr>
<td>11</td>
<td>2.81</td>
<td>1.590</td>
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<tr>
<td>12</td>
<td>3.19</td>
<td>0.733</td>
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<td>13</td>
<td>2.77</td>
<td>1.123</td>
</tr>
<tr>
<td>14</td>
<td>3.03</td>
<td>0.828</td>
</tr>
<tr>
<td>15</td>
<td>1.47</td>
<td>0.256</td>
</tr>
<tr>
<td>16</td>
<td>4.23</td>
<td>0.417</td>
</tr>
<tr>
<td>17</td>
<td>2.81</td>
<td>0.733</td>
</tr>
</tbody>
</table>

10.8.5 COEFFICIENT ALPHA

Coefficient alpha (sometimes referred to as Cronbach’s alpha) is one of the main indicators of scale quality and reliability. Loewenthal (2001) defined it as

*the estimated correlation of the test with another test of the same length with similar items* (p11); and DeVellis (1991), as ‘*an indicator of the proportion of variance in the scale scores that is attributable to the true score*’ (p83).
Theoretically the value of alpha can vary between 0 and 1, but in some extreme cases, where many items have negative correlations, alpha may be negative. In the assessment of scale reliability, the alpha value of 0.7 is usually considered to be satisfactory (Loewenthal, 2001, Nunnaly 1978), however according to different authors, this figure varies. For example DeVellis provides the following classification: below 0.6 unacceptable, between 0.6 and 0.65 undesirable, between 0.65 and 0.7 minimally acceptable, between 0.7 and 0.8 respectable and between 0.8 and 0.9 very good.

Following correlation analysis, the established cluster of seven inter-correlated items was used to assess the reliability and the result was alpha = 0.636 (see appendix 14), which would fall into the ‘undesirable’ category.

There may be several reasons for a low coefficient alpha, one of which is ‘when there were too few items initially’ (http://www.forest.edu/stats2000/tests/likert3.htm). Other reasons include too many items of poor quality, weak conceptual framework for the construct (Black, 1999) as well as

‘a non central mean, poor variability, negative correlations, and weak inter-item correlations’ (DeVellis, 1991, p83)

It is very likely that in this case major factors influencing low coefficient alpha were the small number of items, poor variability and weak inter-item correlations, because the conceptual framework was clearly defined using content analysis.

10.9 STEP 7: SELECT THE BEST ITEMS AND OPTIMIZE THE LENGTH

At this point, after all items have been analyzed and the reliability measures obtained, the decision should be made about the length of the scale. A number of factors have to be considered in this process, such as how the length of the scale affects its reliability (DeVellis, 1991), what impact will the dropping of ‘bad’ items have, as well as more
practical issues, including who will be included in the actual sample and will they be willing to complete a very long questionnaire.

In this case, it was not appropriate to drop any of the items, despite the fact that some of them were indicated as statistically 'poor'. The reasons for such a decision were as follows: the pool of items was derived from the content analysis results, which indicated the most important issues in the industry and each one of them required an opinion of the experts; and the questionnaires completed by the experts at the earlier stage of scale construction also had to be used in the actual analysis, because it was not possible to select a different sample from a limited number of people, who in the opinion of the author could have been considered to be experts in the Lithuanian oil industry. Therefore, this scale consists of 17 items and was admitted to 43 experts.

10.10 SUMMARY

Construction of the Likert scale in this study was not perfect, however every attempt was made in order to follow the theoretical instructions. In this case, the scale development was only a part of the study, however it should never be underestimated that

'creation of a valid Likert protocol to test some abstract is a large dissertation project in and of itself' (http://www.forest.edu)

Some of the scale development aspects had to be adjusted to fit the purpose of this study and due to numerous limitations in the application process, i.e. the number of participants, but nonetheless the technique helped to collect very important data and therefore is one of the essential components of this research.

Due to the highly political nature of the research, which resulted in some of the experts refusing to participate, and the unstable situation in the industry, the data collection had to be completed in a very short period of time, in order to ensure that the opinion of every
respondent was provided under the same circumstances and not influenced by any major change in the industry during the survey.

The classical item analysis has shown, that in this case scale does not have the required level of internal consistency, mainly because a set of different issues within the industry was addressed, rather than various aspects of one particular issue, which would have constituted a unifying theme.

In the end it can be stated that under the given circumstances, and considering the advantages of the Likert scale, it was the most appropriate method to use, despite all difficulties encountered during the construction of the scale. The next chapter includes full analysis of the results and their interpretation.
CHAPTER 11

ANALYSIS OF THE SURVEY RESULTS

11.1 INTRODUCTION

After the scale construction has been completed, this chapter presents the analysis of survey results. It includes the theoretical description of the approach to data analysis using SPSS and its application.

SPSS (Statistical Package for Social Sciences) was used to conduct this analysis because it offers a wide range of functions including data examination, reliability tests, ANOVA, descriptive statistics, correlation, MANOVA, graphics and graphical interface, cluster analysis and many more (Punch, 1998). It is a very widely used statistical package and has been applied in various fields, including psychology experiments, marketing research, business projects and maritime sector analysis (Armstead, (2001), Punch, (1999), Pieczek (2000)).

Before the actual analysis of the Likert scale results is presented, it is necessary to introduce and explain a number of concepts related to it.

11.2 DESCRIPTIVE AND INFERENTIAL STATISTICS

First of all it is important to explain the basic concepts of descriptive and inferential statistics. As the name implies, descriptive statistics are used to describe or summarize the characteristics of the data set and although they do not provide a lot of complex information, they are very useful in the early stage of analysis (Kerr, Hall and Kozub, 187
Descriptive statistics include: mean, median, mode, variance, range and standard deviation. Most of these measures will be presented and analyzed later in this chapter.

On the other hand, inferential statistics can provide a slightly broader perspective, as they may be used to generalize and make inferences from a sample to a wider population (Foster, 1998) or to test a hypothesis. Inferential statistics include: analysis of variance, correlation, repeated measures ANOVA, multiple regression, factor analysis and many others. Only some of these inferential statistics will be applied in this study, with the reasons outlined later in this chapter.

11.3 VARIABILITY AND FREQUENCY DISTRIBUTIONS

Variability and frequency distributions are part of descriptive statistics, which will be used in the analysis of data for this study.

The most common measure of variability is the standard deviation, which is a square root of the variance (Foster, 1998). The importance of variance was already outlined in the previous chapter, during the scale construction process, however at this point it will be used for a slightly different purpose.

It is necessary to outline that standard deviation is usually presented alongside the mean, because

\[ \text{'the deviations involved are the deviations of individual measurements form the mean of the distribution. (...) In one number, it summarizes the variability in a set of data'} \] (Punch, 1998, p114)

Although the standard deviation and mean are mainly used to interpret the distribution of a set of scores, they are also constructive indicators when interpreting more general quantitative data.
In addition to that, frequency distributions are also a ‘useful way to summarize and understand data’ (Punch, 1998, p115). When presented in the form of histograms they provide a clear picture of collected data in the early stages of the analysis.

All three indicators – mean, standard deviation and frequency distribution will be used to analyze the data collected on the Lithuanian industry. These descriptive statistics will be very useful when each item of the scale is analyzed individually. In particular the frequency distributions will help to determine opinion of the experts, their level of agreement/disagreement and will provide basis for the further development of the policies.

11.4 DEPENDENT AND INDEPENDENT VARIABLES

In most research projects, especially in the experimental design, the researcher manipulates the independent variable, this way measuring the consequential alterations on the dependent variable and aims to test a hypothesis (Foster, 1998). However it does not necessarily have to be an experimental design, for example a clear distinction between dependent and independent variables has to be established in the analysis of variance and in correlation studies (Kerr, Hall and Kozub, 2002).

In this study the type of respondent is the independent variable. It has three ‘levels’: Government officials, academic representatives and experts from the oil industry.

The dependent variables will be defined during the analysis, because they might vary according to the type of test. For example depending on the circumstances the dependent variable may be an item, a total score or a group of variables.
11.5 WITHIN-SUBJECTS AND BETWEEN-SUBJECTS COMPARISONS

When the collected data is analyzed, it is important to ensure that a correct test is applied. There are two types of comparisons, which determine the type of statistical test.

‘If scores on two or more variables come from the same respondents, comparing the scores involves related (within subjects) comparisons’.

However, if the

‘scores being compared were obtained from different respondents, they are compared using independent groups (between subjects) procedures.’ (both quotes are from Foster, 1998, p7).

In many occasions, only one of these procedures is applied in the statistical test, but in some situations both comparisons – within and between subjects – are needed (Field, 2002). This issue will be further addressed in the following sections of the chapter, as it is one of the fundamental elements of this analysis.

11.6 STATISTICAL INFERENCE AND SIGNIFICANCE

In the data analysis, descriptive statistics (such as variance, standard deviation, ANOVA etc) are used to summarize and describe the data. However in many cases, some kind of tool is required in order to decide whether the acquired statistical figures are true. Statistical inference is such a tool, which helps in the decision making process whilst analyzing data using descriptive statistical techniques (Coakes and Steed, 1999).

When a result is said to be 'statistically significant' it means that it is true and has not occurred by chance or was due to irrelevant extraneous variables. In the social sciences the most widely accepted significance level is 0.05, or in other words the probability that an observed event occurred by chance is less than 5 times in one hundred (Field, 2002; Kerr, Hall and Kozub, 2002; Punch, 1998).
Although statistical significance levels are useful indicators of the true results, they should be used based on understanding of their meaning (Punch, 1998). For example sample size plays an important role in determining statistical significance. Punch (1998) stated that

`the bigger the sample size, the smaller the numerical value of the statistic required in order to reach significance. Conversely, the smaller the sample size, the bigger the numerical value of the statistic required in order to reach significance` (p134)

Theoretically there are a lot of conditions for the nature of the samples, (i.e. correct representativeness), that should be satisfied, however in real world research very often they cannot be met. Nonetheless, statistical inference remains an important decision making tool, but its application requires `common sense and judgement` (Punch, 1998).

11.7 CHOICE OF ANALYSIS OF VARIANCE

There are various types of ANOVA (analysis of variance) and the most appropriate one is usually determined by the design of the study. Foster (1998) outlined two questions, which could be helpful when making the choice:

1. How many independent variables there are?

2. Taking each variable in turn, was it between-subjects or within-subjects variable?

Depending on the answers to these questions, table 12.1 shows the types of analysis required. This table does not provide all possible options, but despite that presents a useful overview.
There was one independent variable in this study – type of respondent. The dependent variables were selected depending on the type of test, in some occasions they were all 17 items, in others – total scores or even groups of items, such as ‘privatization and oil supply’, ‘Butinge and its competitors’ and ‘EU and modernization’.

There were two types of analysis applied in this study – one-way ANOVA and MANOVA (repeated measures ANOVA). However first of all, because analysis of variance is a parametric test, it is necessary to ensure that certain conditions are satisfied, before it can be conducted.

11.8 Conditions of a parametric test

There are four conditions, which should be met in order to carry out a parametric test. According to Field (2002) and Foster (1998), they are:

1. **Normally distributed data.** The population should have a normal distribution. In most cases the distribution of a sample is reviewed and if it meets the requirements, it is assumed that it came ‘from a normally distributed population’ (Field, 2000, p38).
The most common statistical tests, which assess whether data is normally distributed, are the Kolmogorov-Smirnov and Shapiro-Wilk tests; the latter is performed when sample is smaller than 50 (Coakes and Steed, 1999). If the result of the test is a significant value (less than 0.05), it indicates 'a deviation from normality' (Field, 2002, p48), however in this case, the Kolmogorov-Smirnov test result was not significant and was confirmed by Shapiro-Wilk test result (see appendix 15). Therefore it can be concluded that the condition of normal distribution was satisfied.

2. **Homogeneity of variance.** It means that variance should remain the same in the sets of compared data. Homogeneity of variance can be tested using a number of statistical packages. SPSS uses Levene’s test. This condition will be checked throughout the analysis process.

3. **Interval data.** The data should be collected using interval or ratio scale. In was established in the previous chapter that for this study an interval scale was constructed.

4. **Independence of observations.** Data from different subjects should be independent, which means that 'the behavior of one participant does not influence the behavior of another' (Field, 2002, p38). As there are no statistical ways to test this assumption except by common sense, every effort was made to ensure the independence of observations for this study.

Homogeneity of variance and normal distribution are the most important assumptions that should be met before conducting one-way ANOVA (Coakes and Steed, 1999).

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11.9 One-way Analysis of Variance (ANOVA)

There are many types of analysis of variance, however one-way ANOVA can be explained as the simplest form, where groups are compared on the dependent variable. The groups can emerge from the design of the study, as an experiment, or be formed by partitioning of the sample in data analysis (Kerr, Hall and Kozub, 2002).

In this study groups were formed as part of the study design, during the process of data collection. Three groups of experts were identified: Government officials, academics and industry representatives.

There are two possible sources of variance –

'variance of scores within the groups, and variance of scores between the groups' (Punch, 1998, p117).

One-way ANOVA aims to establish which difference is larger. The outcome of the analysis can either confirm that groups differ (if variance between groups is larger than within groups), or show that there is no difference (Cramer, 1994). The indicator of existing difference is the F-ratio, which can be calculated using this formula:

\[ F = \frac{\text{between groups variance}}{\text{within groups variance}} \]

When F is large, it indicates significant differences between the groups (Kerr, Hall and Kozub, 2002). It is statistical inference that helps to decide whether F is large or small. In technical terms the

'F-ratio is compared with a critical value, stored in a statistical table or computer, to determine the likelihood that it could have come about by chance' (Punch, 1998 p118).

It is also important to decide whether

'there is a significant difference in the two sets of results that can be attributed to the influence of the independent variable, or whether the difference is due to irrelevant extraneous variables' (Kerr, Hall and Kozub, 2002, p43).
Unfortunately in the real world research the extraneous variables can have a very considerable influence over the results of analysis. This is where statistical inference plays a major role, because where the result is identified as significant, it shows that it was not due to chance and thus was not influenced by extraneous variables.

A small F-ratio usually indicates a large within-groups variance, which may occur due to one of these reasons:

1. The adopted measure was very good and the result was expected by the researcher, because non significant result means that there were no individual differences and hence the industry representatives clearly agreed upon major issues.

2. Such large within-groups variance could also occur when a measure is poor, because of lack of internal validity.

These issues were seriously addressed throughout the scale construction chapter and they will be considered further. Under ideal circumstances, it would have been beneficial to have more items and more respondents, because that would have increased the internal validity of the scale. Nonetheless, because the researcher is aware of this shortcoming, all results are interpreted with caution, without making any radical assumptions.

An additional attempt to increase the validity of results will be made by presenting the analysis of the qualitative data (comments from the experts) in addition to statistical data, because it will provide a different perspective, which could help to understand whether the measure identified correct concepts.

11.9.1 APPLICATION

It was necessary to conduct two one-way ANOVA tests for this study. The first test was carried out to find out differences between the groups of experts for the seven items (1, 6,
9, 10, 12, 13 and 17) selected in the previous chapter. In the reliability analysis these items were identified as highly correlating items forming a uniform scale. The main underlying issue for these statements is mainly concerned with Williams and their influence upon Lithuanian oil industry, including various concerns, such as whether privatization had a positive effect, and how Williams's management could affect transit volumes via Butinge, provided that Russia does not reduce their overall exports.

Results of this test are shown in the appendix 16, where all required descriptive statistics for the total score of those seven items are presented. Further more, appendix 17 presents the homogeneity of variance (Levene's statistic) table, which tests the most important assumption for ANOVA. The result shows that Levene's statistic is non-significant (p = 0.363) and therefore meets the assumption.

The ANOVA table in appendix 18 presents F-ratio (F = 0.346) and its significance statistic (p = 0.71), which indicate that there is no significant difference between the groups (result is regarded as non-significant) and therefore shows that all respondents hold similar views upon these issues. The mean rank table 11.2 indicates that experts strongly agree with statements 9 and 10, which emphasize that Russian oil exports will grow in the future and therefore Williams should try to increase the amount of oil exported via Butinge. Further more, they expressed a varied opinion about items 1, 6, 13 and 17, but overall showed a marginal agreement. These items underline concerns about positive influence of Williams, confirm that sale of shares should not be related to oil supply issues, once again highlight the importance of Williams's management where transit volumes for Butinge are concerned and finally emphasize that 'MN' refinery could become very profitable in the future, provided modernization is completed before Lithuania joins the EU.
The operator of 'Mazeikiu Nafta' should find the required funds for the modernization of the refinery, so all the production will comply with the EU requirements and it would be possible to export the production to any EU country

Operator of 'Mazeikiu Nafta' should try to increase Russian oil transit through Butinge terminal, in order to make sure that it will become a profitable economic unit

At the moment crude oil delivered to Butinge from other countries is more expensive than Russian oil and it would result in higher oil product prices in Lithuania

Security of oil supply should be the base for arrangements and negotiations with suppliers

The rest of the 'Mazeikiu Nafta' shares should be sold to the company, which exploits oil fields and would be able to supply all the required crude oil to the Mazeikiai refinery

Lithuanian Government's rejection of the investment proposals for 'Mazeikiu Nafta' by the Russian companies, which exploit large oil fields, has resulted in shortage of crude oil during 2000-2001

Russia will not reduce the amount of transit oil, because the Baltic States' ports are ice-free all year round and could offer a flexible tariff policy

There is a probability, that Russian oil transit through Butinge could pollute the Baltic Sea and the liquidation of the accident effects as well as the cost of the damage would be greater than possible profit

'Mazeikiu Nafta' refinery has a lot of potential of becoming the most profitable refinery in the Eastern Europe, capable of delivering products that meet the EU standards, when Lithuania joins the EU

'Williams International' investment had a positive influence on the company

After the partial privatization of 'Mazeikiu Nafta', the rest of the shares will be sold profitably

Oil supply and sale of 'Mazeikiu Nafta' shares should not be related

When the privatization of 'Mazeikiu Nafta' is complete, the State should keep a block of shares, in order to control the strategic object

The economists in Russia have calculated that if Russia could use only BPS and Primorsk terminal for oil export, the country would save 1-1.5 billion (USD) per year on transit tariffs. Therefore oil transit through the Baltic States should fall significantly

<table>
<thead>
<tr>
<th>TABLE 11.2 MEAN RANKS</th>
<th>ITEM</th>
<th>ITEM NUMBER</th>
<th>ITEM MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>The operator of 'Mazeikiu Nafta' should find the required funds for the modernization of the refinery, so all the production will comply with the EU requirements and it would be possible to export the production to any EU country</td>
<td></td>
<td>15</td>
<td>1.47</td>
</tr>
<tr>
<td>Operator of 'Mazeikiu Nafta' should try to increase Russian oil transit through Butinge terminal, in order to make sure that it will become a profitable economic unit</td>
<td></td>
<td>10</td>
<td>1.64</td>
</tr>
<tr>
<td>At the moment crude oil delivered to Butinge from other countries is more expensive than Russian oil and it would result in higher oil product prices in Lithuania</td>
<td></td>
<td>9</td>
<td>1.67</td>
</tr>
<tr>
<td>Security of oil supply should be the base for arrangements and negotiations with suppliers</td>
<td></td>
<td>8</td>
<td>1.78</td>
</tr>
<tr>
<td>The rest of the 'Mazeikiu Nafta' shares should be sold to the company, which exploits oil fields and would be able to supply all the required crude oil to the Mazeikiai refinery</td>
<td></td>
<td>3</td>
<td>1.81</td>
</tr>
<tr>
<td>Lithuanian Government’s rejection of the investment proposals for 'Mazeikiu Nafta' by the Russian companies, which exploit large oil fields, has resulted in shortage of crude oil during 2000-2001</td>
<td></td>
<td>4</td>
<td>2.08</td>
</tr>
<tr>
<td>Russia will not reduce the amount of transit oil, because the Baltic States’ ports are ice-free all year round and could offer a flexible tariff policy</td>
<td></td>
<td>13</td>
<td>2.77</td>
</tr>
<tr>
<td>There is a probability, that Russian oil transit through Butinge could pollute the Baltic Sea and the liquidation of the accident effects as well as the cost of the damage would be greater than possible profit</td>
<td></td>
<td>11</td>
<td>2.81</td>
</tr>
<tr>
<td>'Mazeikiu Nafta' refinery has a lot of potential of becoming the most profitable refinery in the Eastern Europe, capable of delivering products that meet the EU standards, when Lithuania joins the EU</td>
<td></td>
<td>17</td>
<td>2.81</td>
</tr>
<tr>
<td>'Williams International’ investment had a positive influence on the company</td>
<td></td>
<td>1</td>
<td>2.83</td>
</tr>
<tr>
<td>After the partial privatization of 'Mazeikiu Nafta', the rest of the shares will be sold profitably</td>
<td></td>
<td>2</td>
<td>2.83</td>
</tr>
<tr>
<td>Oil supply and sale of 'Mazeikiu Nafta' shares should not be related</td>
<td></td>
<td>6</td>
<td>2.89</td>
</tr>
<tr>
<td>When the privatization of 'Mazeikiu Nafta' is complete, the State should keep a block of shares, in order to control the strategic object</td>
<td></td>
<td>5</td>
<td>2.94</td>
</tr>
<tr>
<td>The economists in Russia have calculated that if Russia could use only BPS and Primorsk terminal for oil export, the country would save 1-1.5 billion (USD) per year on transit tariffs. Therefore oil transit through the Baltic States should fall significantly</td>
<td></td>
<td>14</td>
<td>3.03</td>
</tr>
</tbody>
</table>
The overall Russian oil export will increase in the near future and therefore the amount of exported oil through the Baltic States ports will not change

<table>
<thead>
<tr>
<th>Statement</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuanian Government should be interested in receiving the highest possible price for the rest of the shares, irrespectively of who will buy them</td>
<td>7</td>
<td>3,36</td>
</tr>
<tr>
<td>The modernization of the refinery should not be an issue now, because it is not known if EU countries would buy the production of 'Mazeikiu Nafta' and if the company will be able to return the credits. It is possible to continue to produce oil products, which can be exported to the FSU countries.</td>
<td>16</td>
<td>4,23</td>
</tr>
</tbody>
</table>

Source: the author

In many cases a non-significant result could be interpreted as not important for the study, however such an approach would only eliminate another factor, which may indicated something very important. In this case it confirms that all three types of experts agree upon these issues.

The second between-groups one-way analysis of variance includes all 17 items and aims to identify the opinion differences between three groups of experts for each one of them. Although this is a very thorough analysis, it was required in this case, because there were relatively few items in the scale and such details could be easily overlooked in other tests, when dealing with more complex phenomena. Appendix 19 includes all relevant descriptive statistics, appendix 20 shows homogeneity of variance test (Levene’s test) for all 17 items, appendix 21 presents ANOVA and appendix 22 contains the post-hoc tests.

In this case the test of homogeneity of variances shows a significance level for each item of the scale. Most of the items met the assumption for ANOVA, except items 3, 4, 9, 11 and 12, where p is significant (p < 0.05) and indicates a broken assumption. Further results for these items will be discarded, as they would be misleading.

Next, the analysis of variance results are presented. At this point it was necessary to identify the items with high F-ratio and significant p value, in order to assess whether there
was any difference of opinion between the groups of experts upon specific issues. Only item number 5 had those specifications ($F = 6.918; p = 0.003$), however another two – item 2 ($F = 3.164; p = 0.055$) and item 13 ($F = 3.158; p = 0.056$) were very close to those requirements and will be considered appropriately. All the rest had non-significant results, which suggests that the three groups of experts had very similar views (this applies only to the items, which met the homogeneity of variance assumption). Further discussion about opinion differences on items 2, 5 and 13 will be presented later in the chapter, when all items are analyzed individually.

The last part of this analysis was to perform a post-hoc test, which would help to identify where the differences of opinion lie. The Least Significant Difference (LSD) test was chosen for this purpose, because it is the only one that could be applied in a study with three groups of participants (Armstead, 2001). The outcome of the test implied that for item 2 the Government officials agreed with academics, the opinion slightly differed from the industry experts and that there was a significant difference of opinion between the academics and industry representatives. The result for item 5 strongly suggested that industry and Government experts shared the same views, however academics disagreed; and where item 13 was concerned, the Government officials agreed with academics, but in this case industry experts expressed a different point of view. These results will be considered further in the individual item analysis.

### 11.10 REPEATED MEASURES ANALYSIS OF VARIANCE

The repeated measures ANOVA is a subset of multivariate analysis of variance (MANOVA) and it is used when

> 'we have one independent within-subjects variable with more than two levels and want to compared the scores on the levels' (Foster, 1998, p166)
The repeated measures ANOVA can deal with more complicated tests than one-way ANOVA and therefore 'provides greater power to detect effects' (Field, 2002, p323). It incorporates both, between and within-subjects designs.

Statistically, the within-subjects design (typically used in MANOVA) is considered to be a slightly better approach, than between-subjects, because in such cases each person is compared to himself/herself and this removes individual differences, which can be viewed as a source of statistical error (Armstead, 2001). Nonetheless, both designs were included in this study to ensure that none of the important statistical indicators were overlooked.

The main disadvantage of this design is that it violates the homogeneity of variance assumption, and therefore can produce an inaccurate F-test (Cramer, 1994). Violation of this condition means that an additional assumption has to be made and therefore it is assumed that 'the relationship between pairs of experimental conditions is similar' (Field, 2002, p323). It is called the assumption of sphericity.

SPSS produces Mauchly's test, which measures sphericity, testing the hypothesis that 'the variances of the differences between conditions are equal' (Field, 2002, p323). If the result of this test is shown as significant, it indicates considerable differences between conditions and the assumption of sphericity is violated. However, if Mauchly's test statistic is non-significant, it means that the variances of differences are roughly equal (Kerr, Hall, and Kozub, 2002) and therefore the assumption is met.

11.10.1 APPLICATION

The Likert scale questionnaire was divided into three clusters, with eight items in the first one, six in the second one and only three in the last one. In order to carry out the analysis, it was necessary to create a total score for each cluster, however because each one of them had a different number of items, the total score would have reflected the number rather
than the average value. Therefore it was necessary to introduce equivalence between the groups. In order to do that, the mean value was calculated for each total, which was used for the repeated measures ANOVA.

The first table in appendix 23 outlines that in a within-subjects design the dependent variable is the question category, which has three themes. As mentioned before, there was a need to equalize data and thus the themes are represented by the mean value of each Likert scale cluster and are marked as Mean_1, Mean_2 and Mean_3 throughout the analysis. The second table introduces between-subjects factor – the type of respondent.

Appendix 24 contains the descriptive statistics table, which contains the means and standard deviations for each variable. Appendix 25 presents Mauchly’s test of sphericity, which was performed, in order to assess whether further analysis can be carried out. The result was not significant (p = 0.063) and therefore the assumption was met.

Further more, the tests of within-subjects effects are presented in appendix 26. Because the sphericity assumption was met, the result of the test can be found in the line, which states ‘sphericity assumed’. Data in the first row indicates that experts were responding differently to each cluster of statements (F = 7.296; p = 0.001), however when they were separated into Government, academics and industry representatives, these groups responded in the same way towards the three clusters of items. Therefore it can be assumed that although each cluster was treated differently, there was no interaction between type of expert and the clusters of items. The latter is indicated by the non-significant result in the second row (F = 1.257; p = 0.296).

Next, Levene’s test of equality of variances was performed and all three results are non-significant and thus meet the assumption for analysis of variance between-subjects (see appendix 27).
The test of between-subjects effects (see appendix 28) shows that the F-ratio is very small and \( p = 0.453 \), which indicates that there is no difference in the way a type of expert responded to each item cluster, and therefore the groups were not significantly different. In other words all experts shared similar views towards the main issues within the industry.

The last step in repeated measures ANOVA was to perform a follow-up test and therefore appendix 29 presents a follow up test for within-subjects effects result (Pairwise Comparisons) to find out where the differences lie in the way clusters of items were treated. It shows that the third group of items concerned with modernization of ‘MN’ refinery and EU accession (earlier referred to as Mean_3) was responded to differently if compared with the other two. This was indicated by the mean differences and significance statistics presented in the table.

### 11.11 Analysis of Statements

The next section provides detailed analysis for each of the statements. It was already established in the earlier stages of the thesis, that this project combines two methods – quantitative and qualitative. Therefore in addition to the quantitative data, which includes the most important descriptive statistics – frequency distribution chart, mean and standard deviation, the comments from the experts are also included in the analysis, as they provide a very important qualitative perspective.

The quantitative data or descriptive statistics will be presented first, to provide the background for statistical inferences and then comments from the experts will be summarized and presented for each statement. In some cases, where very different opinions were expressed, the comments will be divided into positive and negative sections. Such combination of methods will complete the optimum analysis required for this study.
At this point it is necessary to remind that response options in the Likert scale questionnaire represented the following:

1 – Strongly agree
2 – Agree
3 – Neutral
4 – Disagree
5 – Strongly disagree

All statements will be presented in their content areas, defined during the Likert scale construction.

11.11.1 THE FIRST CONTENT AREA: PRIVATIZATION AND RUSSIAN OIL SUPPLY

In 1999 'Mazeikiu Nafta' was partially privatized, when US based company 'Williams International' acquired 33% stake and management rights. At the moment negotiations for the sale of the rest of the shares continue.

At the same time, there are two ways for the Russian companies to make profit. First of them is to sell the crude oil for 'Mazeikiu Nafta' and the second one is to receive dividends for the owned 'Mazeikiu Nafta' shares. From the economic point of view, it would be logical for the Russian oil companies, which exploit the oil fields, to buy a number of shares in 'Mazeikiu Nafta', as this would ensure profitability in both ways. However, such solution would not ensure Lithuania's political independence from Russia.
1. ‘Williams International’ investment had a positive influence on the company.

Mean = 2.83

Std.Dev = 1.082

N = 36

The mean for this statement indicates that overall, the experts expressed a marginally positive attitude towards the issue.

The frequency distribution graph shows that the sample has been divided, with a relatively large number of experts choosing the neutral position (3). Only six respondents expressed strong agreement (1) or disagreement (5) and the rest were split between options 2 and 4. Such division of the sample occurred due to very different perception of the privatization process within the industry (as discussed in chapter 7). More specific reasons will be outlined next, where the comments are analyzed.

**POSITIVE COMMENTS**

Those experts that agreed with the statement outlined some quite specific reasons to support their point of view. Some strongly emphasized that Williams International introduced positive changes in the management system. For a long time production and management in the company were not related, however since partial privatization, the management team started to dictate production quantities, depending on the level of actual demand. Also, a lot of effort was made to increase the understanding between various
departments in the company, for example regular seminars were organized, where the
management team were able to explain their duties and plans to the rest of the employees.

The other participants mentioned more general reasons, such as that private ownership is
usually better for the company because it is more efficient.

**NEGATIVE COMMENTS**

The group of experts that disagreed with the statement, stated the there were no signs of
any positive effect. They emphasized that the required modernization programme was not
completed due to financial reasons, and there were major problems with oil suppliers,
which could have been solved by more efficient management. Poor results in the
‘Mazeikiu Nafta’ annual reports were also identified as a factor of negative influence.

**2. After the partial privatization of ‘Mazeikiu Nafta’, the rest of the shares will**
**be sold profitably.**

Mean = 2.83

Std.Dev = 0.91

N = 36

In this case only three response options were
chosen by the experts. This indicates that
although the majority have shown their agreement or disagreement, nobody expressed a
strong point of view over the subject. The sample once again was split, and based on the
summarized questionnaire data in the appendix 12, it can be stated that it was due to the same reasons as for statement one. Despite some exceptions, the majority of participants have either agreed or disagreed with both statements.

Descriptive statistics for one-way ANOVA indicated that opinion of the industry representatives differed from the rest, as they showed a positive attitude towards the statement (mean of their responses was 2.33), while the Government officials chose a neutral position (mean = 3.00) and academics marginally disagreed (mean = 3.17) with the assumption that the rest of ‘MN’ shares could be sold profitably after the partial privatization (see appendix 19).

**COMMENTS**

There were very few comments about this statement, however half of the respondents (mainly industry representatives) agreed with it, which shows a positive attitude. The experts emphasized that although the ‘top price’ for the shares is important, it is not what the state should look for, because there could be other issues related to the sale, for example after the purchase of shares the investor might decide to close down the refinery.

It was also mentioned that in 1999, the price of ‘MN’ shares was approximately 30% higher than at the time of survey (February 2002). During that period the price dropped and at the same time capital reduction took place (2 shares became 1). Therefore the price looks higher, but to get the real value it has to be divided by two.
3. The rest of the ‘Mazeikiu Nafta’ shares should be sold to the company, which exploits oil fields and would be able to supply all the required crude oil to the Mazeikiai refinery.

Mean = 1.81

Std. Dev = 1.037

N = 36

The frequency chart as well as the mean show a very positive attitude towards this statement. In two previous items the mean indicated only marginal agreement, however in this case it shows a very clear trend, this statement was ranked fifth in terms of highest agreement (see mean rank table 11.2). Over 50% of the sample chose ‘strongly agree’ option and only four participants disagreed.

This statement has an indirect connection with the first one, as one could assume the following: if someone thought that it is necessary for the investor to have oil deposits, he/she would be likely to disagree with the first statement, which emphasizes the positive influence of Williams (a company which does not have oil deposits).

COMMENTS

Although the experts have reached consensus and showed a very high level of agreement, they provided only important comment in support of their opinion. It was stated that all significant oil companies, which make a profit, are vertically organized and integrated and therefore an investor, which exploits oil fields would give ‘MN’ a great advantage.
4. Lithuanian Government’s rejection of the investment proposals for ‘Mazeikiu Nafta’ by the Russian companies, which exploit large oil fields, has resulted in shortage of crude oil during 2001-2001.

Mean = 2.08

Std.Dev = 0.937

N = 36

The mean for this statement indicates agreement of the experts and it can be clearly seen in the frequency distribution graph that only five respondents expressed a negative attitude as opposed to 30 that agreed.

POSITIVE COMMENTS

There were not many comments, which would indicate specific reasons for agreeing with this statement, however it is very self-explanatory and was already discussed in charter 7, amongst other issues related to oil supply.

NEGATIVE COMMENTS

There were some very interesting remarks made by experts who disagreed, as they stated that there was no lack of oil during 1999-2001, however there were issues between ‘MN and their suppliers concerning the price. It was suggested that Russian suppliers refused to
sell oil at a discounted rate and at the same time ‘MN’ management expected the prices to stay the same as prior to privatization.

5. When the privatization of ‘Mazeikiu Nafta’ is complete, the State should keep a block of shares, in order to control the strategic object.

Mean = 2.94
Std. Dev = 1.145
N = 36

In this case the mean is very close to the middle point and the histogram shows a variety of opinions. The sample was almost equally divided (except eight participants who chose a neutral position), which indicates that a significant difference of opinions exists within the industry.

Descriptive statistics for one-way ANOVA (see appendix 19) showed that three groups of experts expressed different opinions in this case. Industry representatives disagreed with the statement, Government officials chose a neutral position (response means for these groups were 3.67 and 3.00 respectively) and academics indicated a relatively high level of agreement (mean of their responses was 2.17). This information leads to an assumption that theoretically the State could keep a block of shares in order to control ‘MN’, however practically the industry would prefer to avoid such interference.
POSITIVE COMMENTS

Most of the comments emphasized that because 'Mazeikiu Nafta' is an important strategic object and has a significant contribution to a country's GDP, it should be controlled by the Government, at least to some degree, whether it would be by keeping a block of shares or any other means. This position was mainly adopted by the academics.

NEGATIVE COMMENTS

A number of experts from the industry suggested that it is not necessary for the state to keep a block of shares, as there are many other ways to control the object, for example by keeping only one share (the 'golden share').

At the same time Government officials emphasized that considering the agreement terms with Williams, the Lithuanian Government could be very restricted in their exercise of any kind of control over the company, even if the state was a significant shareholder.

6. Oil supply and sale of 'Mazeikiu Nafta' shares should not be related.

Mean = 2.89
Std.Dev = 1.166
N = 36

The histogram once again shows that sample was divided and the mean is very close to the middle point, although indicating a very marginal overall agreement.
The experts noted that in the ideal case, the sale of shares should not be related to oil supply issues, however under the existing circumstances ‘MN’ will always be a target of political considerations, not only economic logic. Therefore it is highly unlikely that an unrelated sale would occur, especially when considering that Russian companies still serve as a tool of political influence.

7. Lithuanian Government should be interested in receiving the highest possible price for the rest of the shares, irrespectively of who will buy them.

Mean = 3.36

Std.Dev = 1.099

N = 36

In this case over 50% of the experts disagreed with the statement, and for the first time the mean value indicates a negative attitude.

The majority of experts disagreed with this statement, because ‘MN’ is a strategic object and is very important for the country. The price of shares is not the only value in such a situation, other factors should also be considered. Some suggested that when a company is considered as a possible strategic investor, it is necessary to ensure its long-term viability.
as well as other specifications (i.e. experience in the oil industry) in order to avoid possible problems in the future.

In addition to the above, experts outlined that oil supply has been a major issue during 1999-2001 and therefore it could be beneficial to eliminate such and similar problems by selling a block of shares to the oil producing company.

All of these comments indicate that the highest price is not the main objective in this situation and it is important to take into account who could become a shareholder in ‘MN’.

8. Security of oil supply should be the base for arrangements and negotiations with suppliers.

Mean = 1.78
Std.Dev = 0.989
N = 36

This was one of the few statements that reached a very high level of consensus in the opinion. It is clearly shown in the histogram and confirmed by the value of the mean, which was ranked fourth in terms of agreement (see mean rank table 11.2).

COMMENTS

Almost all experts agreed that oil supply is a very important issue and that guarantees are required, however some stated that although the majority of the oil supply needs to be
secured, between 25-40% of oil should be bought for the best price available on the market. Such an arrangement would be strategically and financially beneficial for ‘MN’ as it would have guaranteed a minimum supply to keep the refinery open and at the same time the company could benefit from oil price fluctuations.

11.11.2 THE SECOND CONTENT AREA: BUTINGE OIL TERMINAL AND BPS

_Butinge oil import/export terminal_ was built for Russian crude oil transit and in order to ensure crude oil supply to the ‘Mazeikiai’ oil refinery. It also ensures Lithuania’s political independence from Russian oil suppliers.

At the same time, Russian Government is building a new Baltic Pipeline System and oil terminal in Primorsk, which will re-route Russian oil export from the Baltic States. The opening of the Primorsk terminal will allow Russia to eliminate its dependence on exporting oil via Latvia, Lithuania and Estonia.
9. At the moment crude oil delivered to Butinge from other countries is more expensive than Russian oil and it would result in higher oil product prices in Lithuania.

Mean = 1.67
Std.Dev = 0.828
N = 36

The descriptive statistics show that many of the experts have strongly agreed with this statement and this is one of very few items where 50% of the experts chose the 'strongly agree' option. This statement was ranked third in terms of strongest agreement (see table 11.2).

It is also interesting to notice that such high level of agreement upon this statement indicates that to some degree Lithuania remains dependent on Russia despite having Butinge terminal to ensure its political independence. The statistical outcome for this item confirmed such dependency in terms of imported oil price. Theoretically the required amount of oil could have been imported via Butinge, however in practice it proved to be too expensive.

**COMMENTS**

Despite such a high level of agreement, two participants representing the industry disagreed and emphasized that there are other factors, which could be more influential,
because the cost of crude oil constitutes a very small percentage of the refined product price.

10. Operator of 'Mazeikiu Nafta' should try to increase Russian oil transit through Butinge terminal, in order to make sure that it will become a profitable economic unit.

Mean = 1.64
Std. Dev = 0.833
N = 36

Descriptive statistics show that once again the experts have reached consensus in their opinion and 19 of the participants (just over 50%) indicated that they strongly agree. This statement was ranked second in the mean rank table 11.2, which indicates that Butinge oil terminal is very important for Lithuania and oil industry experts have high expectations for the operator of the terminal, to make it a profitable economic unit.

COMMENTS

There were two very extreme points of view expressed towards this statement. Most of the participants agreed with the concept and some even suggested that if Butinge were to load six or more tankers a month, it would have been a profitable economic unit in 2002.

At the same time, the minority that disagreed, implied that Butinge was built purely as a political project and it was not expected that it would make profit. Also, the experts noted
that considering the costs of building the terminal, it would take many years for the investment to pay dividends, even if under unlikely circumstances it made a profit.

11. There is a probability, that Russian oil transit through Butinge could pollute the Baltic Sea and the liquidation of the accident effects as well as the cost of the damage would be greater than possible profit

Mean = 2.81
Std.Dev = 1.261
N = 36

The frequency distribution chart shows that opinion on this subject was very varied. The mean value is very close to the middle point and therefore does not indicate any particular type of attitude.

A significant number of experts chose the neutral position, possibly because of the nature of the statement. This was the only statement concerned with environmental issues.

Such an outcome makes it very difficult to make any inferences about the opinion within the industry, especially as none of the experts commented upon the issue.
12. The overall Russian oil export will increase in the near future and therefore the amount of exported oil through the Baltic States ports will not change.

Mean = 3.19

Std. Dev = 0.856

N = 36

The descriptive statistics indicate a slightly negative attitude towards this statement, and it can be clearly seen in the chart that almost half of the respondents chose a neutral position.

COMMENTS

There were some very interesting comments about this statement. It was emphasized that it is difficult to predict the pattern of Russian export growth and therefore a lot could depend upon the time scale (whether it would be in 5, 10 or 15 years time). Russian oil deposits are very large, but at the same time they are finite and because of that in the future, the Government might try to preserve stocks and reduce exports.

It was also mentioned that the new port of Primorsk will become a strong competitor and that Russian Government might try different ways to encourage oil exporters to use Primorsk instead of Baltic States ports. The majority of these comments imply that amount of oil exported via the Baltic States could be reduced in the future.
13. Russia will not reduce the amount of transit oil, because the Baltic States’ ports are ice-free all year round and could offer a flexible tariff policy.

Mean = 2.77

Std. Dev = 1.06

N = 35

This statement had a range of opinions, with almost half of participants indicating that they agree. The mean shows a marginally positive attitude, however it will be necessary to analyze the comments, in order to make any further inferences, as the descriptive statistics do not provide enough information.

The one-way ANOVA results indicated that experts from the industry had a slightly different opinion from the rest. Academics and Government representatives had a general tendency to agree (means of responses for these groups were 2.33 and 2.67 respectively), however experts from the industry expressed uncertainty towards the statement that Russia will not reduce the amount of transit oil (mean of their responses was 3.36).

COMMENTS

The experts emphasized that in the case if economic logic prevails, due to established trade relations between Russian oil companies and Baltic States terminals, the amount of transit oil should not decline, however because the situation is highly political, it is very difficult to make such predictions.
The new terminal in Primorsk has one main disadvantage - it freezes in the winter, but despite that it is strongly supported by the Russian Government. The Baltic States ports might try to reduce their tariffs to stay competitive, but that could only be a temporary solution, as they need to cover their expenses.

Experts made another interesting point about the competition issues when they suggested that the new terminal at Primorsk would intensify the competition between Baltic ports (more specifically, between Butinge and Ventspils). If this assumption is correct, the Russian exporters could benefit significantly, as intense competition usually results in better service and lower tariffs.

14. The economists in Russia have calculated that if Russia could use only BPS and Primorsk terminal for oil export, the country would save 1-1,5 billion (USD) per year on transit tariffs. Therefore oil transit through the Baltic States should fall significantly.

Mean = 3.03

Std.Dev = 0.91

N = 36

The frequency distribution clearly indicates difference of opinion within the industry, with slightly higher number of experts disagreeing with the statement. Although the descriptive statistics were not very informative, there were a few comments concerning the matter.
Some experts expressed their uncertainty about Russia’s new terminals and their construction date, mainly because of a long approval process, unstable schedule and very large financial obligations (the fact that construction was under way and some stages were completed, was acknowledged by the participants, but some were uncertain about when all stages of the project will be finished). It was emphasized that due to very large investments, Primorsk and BPS may not be as profitable as it was estimated and also the existing pipeline infrastructure as well as Baltic states ports will have a significant advantage, while investments to the new facilities start earning dividends.

In addition to that, Primorsk has a slight geographical disadvantage, as it is further away, and it freezes during the winter.

11.11.3 The third content area: Modernization and EU accession

For a number of years ‘Mazeikiu Nafta’ has been in need of modernization, because it is necessary to ensure that its production reaches the highest possible standards, in order to comply with the EU requirements, when Lithuania becomes a member of the European Union.
15. The operator of ‘Mazeikiu Nafta’ should find the required funds for the modernization of the refinery, so all the production will comply with the EU requirements and it would be possible to export the production to any EU country.

Mean = 1.47
Std. Dev = 0.506
N = 36

This was the only statement in the scale that yielded only two types of responses – strongly agree and agree. It had the lowest mean (see mean rank table 11.2) and therefore the most positive attitude towards the issue. Such uniformity of opinion implies that Lithuanian oil industry is ready to accept the new requirements, however in many instances the issue of financial means to implement them remains unsolved.

COMMENTS

Some of the experts pointed out that half of the required modernization for the Mazeikiai refinery was already carried out (worth approximately 7 million USD), and the other half is planned, however it needs a very large investment – possibly over 200 million USD.

The ‘export of oil products to any EU country’ is another important aspect of this topic and was emphasized by some participants. They suggested that many EU regulations on petrol quality could be based on political reasons, for example they need to prevent cheap imports this way protecting the existing producers within EU. Therefore the quality of oil products
is not the only issue, other factors such as political issues and possibly export quotas will have to be considered in the future.

16. The modernization of the refinery should not be an issue now, because it is not known if EU countries would buy the production of ‘Mazeikiu Nafta’ and if the company will be able to return the credits. It is possible to continue to produce oil products, which can be exported to the FSU countries.

Mean = 4.23
Std.Dev = 0.646
N = 35

This statement has the highest mean, and very small standard deviation, which indicate a very negative attitude. The frequency chart shows that almost all experts have disagreed with the statement, except four, who chose a neutral position. Such a tendency clearly confirms the opinion of the industry representatives, that modernization will be necessary.

COMMENTS

The experts expressed some interesting opinions to support their point of view. Some stated that the EU is already buying ‘MN’ production, however the majority commented upon the issue of small market for lower quality products. They stated that even in Russia, the lower quality product market is bound to decline in the future because of environmental
regulations and negative effect on car engines. These comments imply that modernization is necessary, because ‘MN’ will not be able rely on the exports of low-grade products.

It may be concluded that the modernization process will be inevitable, whether Lithuania becomes a part of the EU or not, because the marked demand is changing towards cleaner oil products and will continue to change in the future.

17. ‘Mazeikiu Nafta’ refinery has a lot of potential of becoming the most profitable refinery in the Eastern Europe, capable of delivering products that meet the EU standards, when Lithuania joins the EU.

Mean = 2.81

Std. Dev = 0.856

N = 36

The response range for this statement had an unusual pattern, where the majority of experts have either agreed or chose a neutral position. The overall mean shows that the statement had a marginally positive attitude, however it is necessary to analyze the comments, in order to identify more specific aspects of the opinion.

COMMENTS

This statement could be regarded as an extension of the two previous ones, which summarizes the underlying issues and makes extreme assumption about the profitability of
the refinery. A relatively large number of experts chose a neutral position for this particular issue. This could have been due to the specificity of the statement, as in some cases participants of the survey may prefer to express their opinion on slightly more general issues.

Despite the specificity of the subject, some very interesting comments were made about this matter. It was suggested that ‘MN’ could benefit if Lithuania does not join the European Union, as it would ensure the minimum investment and maximum profitability for the refinery. In the provided scenario, ‘MN’ could still carry out the necessary modernization, to improve production quality, however they would not have to comply with high safety and environmental requirements imposed by EU membership and would avoid penalties for producing low quality products. Therefore ‘MN’ would be able to sell their high quality production to the EU countries and lower grade products to the FSU countries, without any obligations, which would ensure the highest possible profit.

Other comments included suggestions that profitability of the ‘MN’ refinery will depend upon factors such as: timing and success of modernization, security of crude oil supply at market prices and development of other refineries in Eastern Europe.

11.12 RECOMMENDATIONS AND POLICIES

After all quantitative and qualitative information for Likert scale results was presented, next step will be to summarize the findings and derive a set of composite policies and recommendations for the region.

The overall results from repeated measures ANOVA showed no significant difference of opinion between the three types of experts towards the clusters of items, and although this was statistically non-significant result, in this case it indicated uniformity of opinion within the oil industry in Lithuania.
There was one instance, where one-way ANOVA for individual items established some difference of opinion between groups of experts for items 2, 5 and 13, however it was only marginal and does not affect the previous result.

The analysis of individual items also provided a considerable amount of information, as it analyzed both – quantitative and qualitative survey results.

The first content area in the questionnaire addressed the privatization and oil supply issues in Lithuanian oil industry.

The main concern addressed in this context was the foreign investment issue and its relation to oil supply. Likert Scale statements addressed various aspects of the situation and it was established that private investment is necessary for Lithuania’s oil industry, however the fact that an investor from the USA was chosen, caused a lot of problems related to oil supply.

The second content area dealt with Lithuania’s oil import/export terminal at Butinge and its new competitor the Baltic Pipeline System. The underlying issues concerning Butinge terminal are related to Lithuania’s political independence from Russia, as it provides a possibility to import crude oil for ‘MN’ refinery from other countries. When operating in full capacity the Baltic Pipeline System and Russian oil terminal at Primorsk on the Baltic Sea coast could significantly reduce transit volumes via Lithuania, especially if politics rather than economic logic prevails.

The third content area addressed issues of ‘MN’ modernization and EU accession. A uniform opinion was obtained from the experts, who agreed that modernization of the refinery is necessary and that ‘MN’ has potential to establish itself in the European market, when Lithuania joins the EU.

Next, policies and recommendations will be presented for the main issues of the industry.
Lithuania's political dependency on Russian oil supply has been one of the most significant problems since 1991. Since then the Lithuanian Government took some very important steps to reduce such dependence, because it could have become one of the obstacles for country's accession to the European Union.

The country built a crude oil import/export terminal in Betinge, to ensure oil supply and sold 33% of 'Mazeikiu Nafta' shares to Williams International, despite clearly expressed interest by the Russian companies, which have their own oil fields and have many years of experience in this region. Williams has experienced a lot of difficulties since they acquired the shares, and it could be strongly suggested that some kind of investment from a Russian oil producing company was necessary for 'MN'.

Although Russian influence was considered to be an obstacle in the process of EU accession, at this point it is necessary to mention that EU itself is highly dependent on energy imports (including oil) and since 2001 is trying to establish cooperation with Russia, which would increase Russian crude oil and natural gas imports to the EU in the future. This leads to an assumption that Lithuania's cooperation with Russian crude oil suppliers could be a very convenient and beneficial solution.

Since the breakup of the Soviet Union, Lithuania has had interesting relations with Russia, because of the Kaliningrad region (it is a part of Russia, but lies on the coast of the Baltic Sea, see map in appendix 7). Such circumstances placed both countries into position where a common understanding had to be found and good relations were necessary. There were some difficulties during the first years of Lithuania's independence, however most of them were resolved and Russia has become a reliable partner.

One of the Lithuanian oil policy suggestions would be to develop cooperation with Russia, this way securing the oil supply and creating trade relations, which would be beneficial for both countries. Although Russia built an oil export terminal on the Baltic Sea coast, it
froze during winter and is not established in the market, while Lithuania's Butinge terminal has been operating for a number of years, and is ice-free. Therefore creating a legal form of communication based on agreements between the countries could be a possible solution for the future, where Lithuania would be able to buy required amount of oil and could offer the services of Butinge terminal for Russian oil transit.

On the other hand, another possibility for Lithuania, Latvia and Estonia could be to develop the regional policy for cooperation between the countries, because the Baltic Pipeline System will create enough competition and the Baltic States on their own are too small in order to compete with Russian terminal. Once again it should be mentioned that Lithuania's and Latvia's oil terminals are ice free, while Primorsk is not. Furthermore, the Baltic States should become a part of the European Union in 2004, which might put them into stronger position in terms of competition with Russia. It is difficult to predict, however such an advantage could be expressed in terms of allocated EU funds for port expansion and service improvement in the Baltic States.

In addition to the above, the EU is hoping to increase the Russian oil imports in the future and the main Russian oil export routes are the Druzb pipeline (which is getting old and requires a lot of maintenance) and two sea routes - the Baltic Sea and the Black Sea. Baltic Sea routes have a lot of potential to develop, while Black Sea exports must pass through the increasingly crowded Bosporus Straits. Considering the possible advantage of the EU membership and cooperation between the Baltic States, the Lithuanian oil industry could have great possibilities to establish themselves as a transit point between Russia and Western Europe.

Furthermore, where the production of 'MN' refinery and its realization in the EU countries is concerned, it could be assumed that when Lithuania joins the EU it should be able to establish itself in the new market. However, EU has strict regulations about the quality of production and thus the process of modernization might be of a vital importance for the
‘MN’ in the near future. It should be encouraged and supervised by the Government, as it still has a large number of 'MN' shares.

The next chapter presents conclusions and implications of this study.
CHAPTER 12

CONCLUSIONS AND STUDY LIMITATIONS

12.1 OVERVIEW OF THE RESULTS

The most important issues within Lithuania’s oil industry were considered to be:

1. Its dependency on Russian oil, which could be accepted as an obstacle or as the most rational solution for the problem of future oil supply. The latter was derived from the fact that cooperation between EU countries and Russia is steadily increasing (Ninth EU-Russia Summit, 2002). Therefore the first policy suggestion was to establish a legal base for cooperation between Lithuania and Russia.

2. The second policy suggestion was to try to reduce such dependency by establishing some kind of cooperation between the Baltic States, which are too small to compete with Russian ports and between themselves at the same time. In such case, all three countries would require support for the EU and could expect to handle more transit oil when EU increases its imports from Russia.

3. The third policy could contain regulations for the modernization of ‘MN’ refinery, which will have to comply with EU production standards when Lithuania becomes a member.

12.2 POST RESEARCH EVENTS

After the survey for this research was conducted, a number of significant events happened in the oil industry. In June 2002, U.S. based strategic investor Williams International
announced that they were willing to sell ‘Mazeiki Nafta’ shares to Russian oil company Yukos (Veidas, 2002a). This declaration was not regarded as a final decision, as negotiations between these companies continued since 1999. Nonetheless, on the 15 August 2002 Williams and Yukos signed the agreement whereby Yukos would buy ‘MN’ shares for 85 million USD and take over management rights of the company, which were granted exclusively to the strategic investor Williams by the Lithuanian Government in 1999 (Respublika, 2002). In addition to the above, Yukos would also become entitled to increase their stake in ‘MN’ to 53.7% (Kauno Diena, 2002). Williams stated that the main reason for selling ‘MN’ shares to Yukos was the crisis in the U.S. energy sector, which influenced the company’s financial state, rather than problems in Lithuania (Lietuvos Rytas, 2002).

The Lithuanian Government was informed about this agreement after both companies signed it, however Yukos announced that they would not object if the Lithuanian Government decided to buy the shares from Williams (Respublika, 2002). The Government rejected this offer on the grounds that the State already has 40.66% of the ‘MN’ shares and could not bear the financial burden of such purchase. Therefore Yukos became a new strategic investor of ‘Mazeiki Nafta’ (Respublika, 2002).

After privatization Yukos announced that their experience in the oil industry will allow them to solve existing efficiency problems and modernize ‘MN’ refinery as well as ensure its profitability. The Russian company will be able to refine crude oil in Mazeikiai refinery and sell its production to their existing customers, this way eliminating numerous problems, which were encountered by Williams (Kauno Diena, 2002).

In 2003 the volume of transit oil in Butinge terminal was steadily growing and Yukos announced that the capacity of the terminal will be increased from 8 million tonnes to 14 million tones per year until the end of 2003 (Klaipeda, ‘Jura’, 2003). During the first six months in 2003 the terminal loaded over 6,5 million tonnes of crude oil, 50% of which was
delivered by Yukos (Klaipeda, ‘Jura’, 2003). The terminal officials also announced that they already signed a number of agreements for 2004 with various Russian companies to ensure further growth of transit volumes (Klaipeda, ‘Jura’, 2003).

Although this is a very influential factor for this research, it would have been very difficult to incorporate it in the context after the main survey was conducted. It was not possible to alter the questionnaire or contact the experts for a second time. However, despite that one should accept that in real world research, it is inevitable that industry changes and unexpected events happen.

12.3 STUDY LIMITATIONS

There were some limitations applied whilst conducting this research project. Some of them could have been avoided under different circumstances and some were inevitable consequence of the work.

12.3.1 RELIABILITY OF INFORMATION

One of the main concerns during the research process was the lack of reliable information sources. There were a lot of newspaper articles and Internet websites used to collect the required data, mainly because it was not possible to find up-to-date information in books or academic journals.

In order to improve the quality of data, the researcher attended relevant conferences in Paris (European Conference of Ministers of Transport, Transport Policies in the Countries of Central and Eastern Europe, ‘A Decade of Integration: Results and New Challenges’, 26-27 February, 2001) and Moscow (10th Moscow International Oil & Gas Conference
MIOGE 2001, 20-21 June), where some important contacts were established and interesting notes made about current events in the industry.

An attempt was made to contact some of the oil industry journals (Eastern Block Energy, Russian Oil and Gas Law Journal and FT Business), which have a very good reputation and other institutions (DTI Export Publications and Center for Global Energy Studies), which carry out projects in the CIS and Baltic regions, in order to receive a permission to photocopy some of their reports found in the British library, but only with limited success.

Every attempt was made to ensure the reliability of used sources, however it does not eliminate a possibility of genuine mistakes.

12.3.2 SAMPLE SIZE

Further problems were encountered including a small sample of respondents for the Likert scale questionnaire, which preferably would have included over 100 experts. However in real world research, many theoretical requirements cannot be met. In this case only a certain number of people could have been regarded as experts, the list included Government officials from appropriate sections, well-established academics from relevant institutions and industry representatives, who occupy a respectable position in companies, which deal with oil. It would be misleading to state that every possible expert was included in this survey, because one should bear in mind that some individuals refused to participate and it was not possible to establish a contact with others.

The issue of confidentiality was also very important for this survey, as many of participants insisted on remaining anonymous.

Nonetheless, the survey results more or less met the requirements of the employed technique, which consequently produced interpretable results.
12.4 RECOMMENDATIONS FOR FURTHER RESEARCH

This project presented a detailed analysis of the Lithuanian oil industry and effects of EU accession upon it. The researcher has attempted to explain a number of complex phenomena related to this topic, however it was not possible to cover every possible aspect and therefore many issues remain unresolved. It would for example be interesting to compare this transformation of the Lithuanian oil industry to a similar process in another country.

A possible comparison study could be carried out for all three Baltic States – Lithuania, Latvia and Estonia, and development of oil policy in each one of them. All countries, despite being closely related, are very different, and such a study would provide an interesting opportunity to compare the oil sectors in these countries in terms of development, Russian influence, common problems and their solutions, EU requirements and ways of their implementation and possibly in terms of regional cooperation.

Otherwise, a similar study could be carried out to assess the impact of EU accession on other sectors in Lithuania, using the same approach.

In the future, provided that Lithuania becomes a member of the European Union in May 2004, further research could be conducted to assess the effects and implications of accession upon the oil industry. Nonetheless one should be aware of all the implications and possible problems encountered in this study, when starting a new project.

In the end, this thesis attempted to present an original approach to an analysis of a particularly significant commercial sector in Lithuania. Despite all the difficulties and shortcomings of this project, impact of EU accession upon Lithuanian oil industry is a very wide, but at the same time interesting and challenging topic, which has a lot of potential for the future.
APPENDIX 2

MAIN COMPANIES OF THE ENERGY SECTOR IN LITHUANIA
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<td>LT-4761, Visaginas</td>
<td>V. Sevaldin</td>
<td><a href="mailto:info@mail.iae.lt">info@mail.iae.lt</a></td>
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<td>Zveju 14, LT-2600, Vilnius</td>
<td>R. Juozaitis</td>
<td><a href="mailto:info@lietuvosenergija.lt">info@lietuvosenergija.lt</a></td>
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*Source: The Lithuanian Energy Agency, [http://www.ena.lt](http://www.ena.lt)*
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CONSUMPTION OF NATURAL GAS IN LITHUANIA, 1990-2001
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*Source: The Ministry of Economy, Republic of Lithuania, [http://www.ena.lt](http://www.ena.lt)*
APPENDIX 5

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*Source: The Ministry of Economy, Republic of Lithuania, http://www.ena.lt*
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*Source: The Ministry of Economy, Republic of Lithuania, http://www.ena.lt*

* - Including Stock Changes
** - Including Net Imports of Electricity
APPENDIX 7

ENERGY MAP OF THE REGION
LAW
ON
PUBLIC COMPANY
"L I E T U V O S N A F T A"

Article 1. Objective of the Law

1. Public company “Lietuvos Nafta” shall be established with a view of implementing a comprehensive industrial, economic, financial and investment policy in the enterprises of the oil sector of Lithuania.

2. Public company “Lietuvos nafta” shall be established by forming its authorised capital from the shares of the enterprises in the oil sector - public company “Mazeikiu nafta”, public company “Butingės nafta”, public company “Lietuvos kuras” and a special purpose public company “Naftotiekis”, belonging to the state of Lithuania by the right of ownership, after the valuation of the property of these companies in a manner prescribed by the Government of Lithuania.

Article 2. Exclusion of the Public Companies from the List of Enterprises Open for Privatisation

The State shall exclude public company “Lietuvos kuras” (code 2005933) and public company “Mazeikiu nafta” (code 6645172) from the list of objects open for privatisation in 1996 (zin., 1996, No. 28-683).


1. The formation, activities and management of public company “Lietuvos nafta” shall be regulated by Company Law of the Republic of Lithuania unless this Law provides otherwise.
2. Decisions on the liquidation of public company “Lietuvos nafta” shall be taken only by the Seimas of the Republic of Lithuania, and on the restructuring - only by the Government of the Republic of Lithuania. Under the provisions of paragraph 3 of Article 4 the block of shares belonging to the State by the right of ownership shall not be less than 34 percent of votes. Each from the other shareholders, together with the companies under his control, shall not own a block of shares giving him more than 33 percent of votes. The blocks of shares of each of the public companies - “Mazeikiu nafta”, “Butinges nafta”, “Lietuvos kuras” and “Naftotiekis” - belonging to public company “Lietuvos nafta” by the right of ownership, shall not be less than 34 percent of votes.

3. The functions of the founder of public company “Lietuvos nafta” shall be undertaken by the Government. In a manner established by laws, the Government shall manage, make use and dispose of the shares of public company “Lietuvos nafta” belonging to the State by the right of ownership. When appointing chairpersons of the board and the supervisory board of public company “Lietuvos nafta”, the Government shall have the veto right.

4. The general meeting of the shareholders of public company “Lietuvos nafta” may adopt decisions other than those referred to in paragraph 2 of this Article provided the meeting is attended by shareholders with over 2/3 of the votes. In the event of no quorum, a repeat meeting shall be convened within 15 days and it shall have a right to adopt decisions in accordance with the agenda, irrespective of how many shareholders should attend it.

5. A resolution of the general shareholders’ meeting shall be required for the adoption of decisions of the board of public company “Lietuvos nafta” on the sale, conveyance, lease, or mortgage of long-term assets valued at over 1/20th of the company’s authorised capital, also on using the assets as a pledge or a guarantee to secure the performance of obligations by other subjects. The total value of contracts made without a resolution of the general shareholders’ meeting during a business year shall not exceed 1/20 of the value of the authorised capital of public company “Lietuvos nafta”.

6. Without a resolution of the general shareholders’ meeting the board shall have no right to pledge to sell or convey in any other manner all or a part of the shares of any public company belonging to the public company “Lietuvos nafta” by the right of ownership, nor to take decisions to increase the authorised capital of those public companies if such a contract or a decision resulted or might result in the loss of a qualified (two-thirds) or a simple (half)
majority of votes of the subsidiaries, also a right of veto (one-third) of the total number of votes.

7. Decisions of the general shareholders' meeting of public company "Lietuvos nafta" in the cases specified in paragraphs 5 and 6 of this Article shall be taken by a two-thirds majority vote of those present at the meeting.

8. Public company "Lietuvos nafta" shall be prohibited from taking credits and obtaining guaranties from its subsidiaries.

9. Public company "Lietuvos nafta" as the owner of the shares of its subsidiaries belonging to it by the right of ownership shall be represented at the general shareholders' meetings of those companies by its authorised persons. The authorised representatives shall be appointed by the board from among the nominees approved by a general shareholders' meeting. The procedure of representation, the rights and duties of the authorised representatives shall be established by regulations approved by a general shareholders' meeting of public company "Lietuvos nafta. Mandates for participation at a specific general shareholders' meeting shall be signed by chairperson of the board of public company "Lietuvos nafta".

Article 4. Privatisation and Increase of the Authorised Capital of Public Company "Lietuvos nafta"

1. Public company "Lietuvos nafta" may be privatised in accordance with the procedure prescribed by Law on the Privatisation of State-Owned and Municipal Property of the Republic of Lithuania.

2. The authorised capital of public company "Lietuvos nafta" shall be increased in accordance with the procedure prescribed by Company Law of the Republic of Lithuania.

3. For three years after the establishment of the public company, the part of shares belonging to the state by the right of ownership may not represent less than 51 percent of voting rights.

4. During the period referred to in paragraph 3 of this Article, the shares of public company "Lietuvos nafta" to Lithuanian and foreign investors shall be sold by a public tender, a public auction or a public sale of shares. Terms of reference of the tender must have
a provision to the effect that priority to acquire the shares of public company “Lietuvos nafta” shall be given to the highest bidder, also taking regard of the obligations to comply with the following terms:

1) to guarantee transit of oil imports and exports through the Butinge Oil Terminal;

2) to guarantee oil supply to public company “Mazeikiu nafta”; 

3) to secure credits for the development and reconstruction of the enterprises of the Lithuanian oil sector.

5. The regulations of the tender shall be approved and the procedure of compliance, the scope, terms and criteria of the requirements referred to in paragraph 4 of this Article shall be established by the Government.

6. The investors who comply with the requirements of paragraph 4 of this Article shall be given priority to acquire shares of later emissions of public company “Lietuvos nafta” in two years time.

7. Control of and responsibility for the obligations specified in paragraph 4 of this Article shall be executed in the subscription for shares (sale-purchase) contract.

I promulgate this Law passed by the Seimas of the Republic of Lithuania.

ALGIRDAS BRAZAUSKAS
President of the Republic

Vilnius
September 24, 1996
No I-1536
APPENDIX 9

CONTENT ANALYSIS: THE LIST OF PUBLICATIONS
# Content Analysis: The List of Publications

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<td>Eastern Block Energy Journal</td>
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<td>Lietuvos Rytas (Lithuanian)</td>
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PRIVATEISATION AND RUSSIAN OIL SUPPLY

In 1999 'Mazeikiu Nafta' was partially privatised, when US based company 'Williams International' acquired 33% stake and management rights. At the moment negotiations for the sale of the rest of the shares continue.

In the current situation, there are two ways for the Russian companies to make profit. First of them is to sell the crude oil for 'Mazeikiu Nafta' and the second one is to receive dividends for the owned 'Mazeikiu Nafta' shares. From the economic point of view, it would be logical for the Russian oil companies, which exploit the oil fields, to buy a number of shares in 'Mazeikiu Nafta', as this would ensure profitability in both ways. However, such solution would not ensure Lithuania's political independence from Russia.

1. 'Williams International' investment had a positive influence on the company.
   
   
   
   Comments:
   
   
   
   
   2. After the partial privatization of 'Mazeikiu Nafta', the rest of the shares will be sold profitably.
   
   
   
   Comments:
   
   
   
   
   3. The rest of the 'Mazeikiu Nafta' shares should be sold to the company, which exploits oil fields and would be able to supply all the required crude oil to the Mazeikiai refinery.
   
   
   
   Comments:
4. Lithuanian Government’s rejection of the investment proposals for ‘Mazeikiu Nafta’ by the Russian companies, which exploit large oil fields, has resulted in shortage of crude oil during 2000-2001.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:
..........................................................................................................
..........................................................................................................

5. When the privatization of ‘Mazeikiu Nafta’ is complete, the State should keep a block of shares, in order to control the strategic object.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:
..........................................................................................................
..........................................................................................................

6. Oil supply and sale of ‘Mazeikiu Nafta’ shares should not be related.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:
..........................................................................................................
..........................................................................................................

7. Lithuanian Government should be interested in receiving the highest possible price for the rest of the shares, irrespectively of who will buy them.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:
..........................................................................................................
..........................................................................................................

8. Security of oil supply should be the base for arrangements and negotiations with suppliers.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:
..........................................................................................................
..........................................................................................................

261
Butinge oil import/export terminal was built for Russian crude oil transit and in order to ensure crude oil supply to the ‘Mazeikiai’ oil refinery. It also ensures Lithuania’s political independence from Russian oil suppliers.

Russian Government is building a new Baltic Pipeline System and oil terminal in Primorsk, which will re-route Russian oil export from the Baltic States. The opening of the Primorsk terminal will allow Russia to eliminate its dependence on exporting oil via Latvia, Lithuania and Estonia.

9. At the moment crude oil delivered to Butinge from other countries is more expensive than Russian oil and it would result in higher oil product prices in Lithuania.

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Comments:

10. Operator of ‘Mazeikiu Nafta’ should try to increase Russian oil transit through Butinge terminal, in order to make sure that it will become a profitable economic unit

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Comments:

11. There is a probability, that Russian oil transit through Butinge could pollute the Baltic Sea and the liquidation of the accident effects as well as the cost of the damage would be greater than possible profit

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
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Comments:
12. The overall Russian oil export will increase in the near future and therefore the amount of exported oil through the Baltic States ports will not change.

1  Strongly agree  
2  Agree  
3  Neutral  

Comments: 


13. Russia will not reduce the amount of transit oil, because the Baltic States' ports are ice-free all year round and could offer a flexible tariff policy.

1  Strongly agree  
2  Agree  
3  Neutral  

Comments: 


14. The economists in Russia have calculated that if Russia could use only BPS and Primorsk terminal for oil export, the country would save 1-1.5 billion (USD) per year on transit tariffs. Therefore oil transit through the Baltic States should fall significantly.

1  Strongly agree  
2  Agree  
3  Neutral  

Comments: 


For a number of years ‘Mazeikiu Nafta’ has been in need of modernization, because it is necessary to ensure that its production reaches the highest possible standards, in order to comply with the EU requirements, when Lithuania becomes a member of the European Union.

15. The operator of ‘Mazeikiu Nafta’ should find the required funds for the modernization of the refinery, so all the production will comply with the EU requirements and it would be possible to export the production to any EU country.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:


16. The modernization of the refinery should not be an issue now, because it is not known if EU countries would buy the production of ‘Mazeikiu Nafta’ and if the company will be able to return the credits. It is possible to continue to produce oil products, which can be exported to the FSU countries.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:


17. ‘Mazeikiu Nafta’ refinery has a lot of potential of becoming the most profitable refinery in the Eastern Europe, capable of delivering products that meet the EU standards, when Lithuania joins the EU.

1 Strongly agree 4 Disagree
2 Agree 5 Strongly disagree
3 Neutral

Comments:


264
APPENDIX 11

LIKERT SCALE QUESTIONNAIRE (LITHUANIAN VERSION)
PRIVATIZACIJA IR RUSIJOS NAFTOS TIEKIMAS


1. „Williams“ investicija turėjo teigiamą įtaką „Mažeikių Naftos“ veiklai.

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<thead>
<tr>
<th>Visiškai sutinku</th>
<th>Neturiu nuomonės</th>
<th>Nesutinku</th>
<th>Visiškai nesutinku</th>
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Komentarai:

2. Po „Mažeikių Naftos“ dalinio privatizavimo, likusių akcijų dalis bus parduota pelningai

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<th>Visiškai sutinku</th>
<th>Neturiu nuomonės</th>
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Komentarai:

3. Likusios „Mažeikių Naftos“ akcijos turėtų būti parduotos kompanijai, eksploatuojančiai naftos telkinius, kuri galėtų pilnai aprūpinti įmonę žaliva.

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<th>Visiškai sutinku</th>
<th>Neturiu nuomonės</th>
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Komentarai:

266

1. Visiškai sutinku
2. Sutinku
3. Neturiu nuomones
4. Nesutinku
5. Visiškai nesutinku

Komentarai:


1. Visiškai sutinku
2. Sutinku
3. Neturiu nuomones
4. Nesutinku
5. Visiškai nesutinku

Komentarai:


1. Visiškai sutinku
2. Sutinku
3. Neturiu nuomones
4. Nesutinku
5. Visiškai nesutinku

Komentarai:

7. Lietuvos Vyriausybė turėtų būti suinteresuota gauti didžiausią kainą už likusias akcijas, neatsiliepsiant į kam jos bus parduotos.

1. Visiškai sutinku
2. Sutinku
3. Neturiu nuomones
4. Nesutinku
5. Visiškai nesutinku

Komentarai:

8. Derybų su tiekėjais ir sutarčių pagrindu turėtų būti naftos tiekimo užtikrinimas.

1. Visiškai sutinku
2. Sutinku
3. Neturiu nuomones
4. Nesutinku
5. Visiškai nesutinku

Komentarai:
Būtingės naftos importo/ekspporto terminalas buvo pastatytas Rusijos naftos tranzitui ir Mažeikių naftos perdirbimo gamykliai aprūpinti žaliava, kad Lietuva taptų politiškai nepriklausoma nuo Rusijos naftos tiekėjų.

Rusijos Vyriausybė stato naują Baltijos vamzdynų sistemą ir naftos terminalą Primorske, per kurį Rusijos naftos ekspporto srautai bus nukreipti nuo Pabaltijos Respublikų. Primorsko terminalas panaikins Rusijos priklausomybę eksportuojant naftą nuo Estijos, Latvijos ir Lietuvos.

8. Šiuo metu kitų šalių nafta atgabenta į Būtingą yra brangesnė už Rusijos naftą ir to pasekoje Lietuvoje pakiltų naftos produktų kainos.

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<th>Nr.</th>
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Komentarai:

9. „Mažeikių Naftos“ operatorius turėtų dėti visas pastangas, kad padidintų Rusijos naftos tranzitą per Būtingės terminalą ir šis kaip ūkinis vienetas taptų pelningas.

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Komentarai:

10. Yra tikimybė, kad Rusijos naftos tranzitas galėtų užtersti Baltijos jūrą ir avarijų padarinių likvidavimas bei padarytos žalos kaina būtų didesnė nei galimas pelnas.

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Komentarai:
12. Kadangi bendras Rusijos naftos eksportas artimiausioje ateityje didės, eksportuojamas naftos kiekis per Pabaltijo Respublikas nepakis.

1 Visiškai sutinku 4 Nesutinku
2 Sutinku 5 Visiškai nesutinku
3 Neturiu nuomonės

Komentarai:


1 Visiškai sutinku 4 Nesutinku
2 Sutinku 5 Visiškai nesutinku
3 Neturiu nuomonės

Komentarai:

14. Pagal Rusijos ekonomistų paskaičiavimus, eksportuojant naftą tik per BVS ir Primorsko terminalą, Rusija sutaupytų 1-1,5 milijardų JAV dolerių per metus. Todėl naftos tranzitas per Pabaltijo Respublikas turėtų ženkliai sumažėti.

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2 Sutinku 5 Visiškai nesutinku
3 Neturiu nuomonės

Komentarai:

MODERNIZACIJA IR EUROPOS SĄJUNGA

Jau kelią metus, kaip Mažeikių naftos perdirbimo gamykla reikalinga modernizacija, kad būtų užtikrinti aukščiausios gaminamų produktų standartai, atitinkantys Europos Sąjungos reikalavimus, kuo metų Lietuva taps ES nare.

15. „Mažeikių Naftos“ operatorius turėtų ieškoti finansinių išteklių įmonės modernizacijai, kad visi gaminami produktai atitiktų ES reikalavimus ir juos būtų galima parduoti bet kurioje ES šalyje.

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3 Neturiu nuomonės

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Komentarai:

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APPENDIX 12

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* Type shows that a respondent represents the following groups: Gov = Government; Ac = Academics; Ind = Industry;

** 99 is a missing value, where a respondent did not give a clear answer
APPENDIX 13

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* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).
APPENDIX 14

SPSS ANALYSIS: RELIABILITY ANALYSIS (COEFFICIENT ALPHA)
**Item-total Statistics**

| Item | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Mean if Item Deleted | Corrected Item-Variance if Item Deleted | Corrected Item-Correlation | Reliability Coefficients
|------|---------------------------|-------------------------------|-------------------------------------|----------------------------------------|---------------------------|-------------------------|
| ITEM_1 | 14.9143 | 10.4924 | 0.3718 | 0.9143 | 0.3718 | N of Cases = 35.0
| ITEM_6 | 14.9143 | 8.9042 | 0.5793 | 0.5069 | 0.5793 | Alpha = 0.6360
| ITEM_9 | 16.1143 | 13.4571 | 0.0227 | 0.6827 | 0.0227 |
| ITEM_10 | 16.1429 | 13.2437 | 0.0561 | 0.6751 | 0.0561 |
| ITEM_12 | 16.5429 | 11.5496 | 0.3557 | 0.5981 | 0.3557 |
| ITEM_13 | 15.0000 | 8.8824 | 0.6799 | 0.4730 | 0.6799 |
| ITEM_17 | 15.0000 | 11.4706 | 0.3708 | 0.5939 | 0.3708 |

**Reliability Coefficients**

N of Cases = 35.0

Alpha = 0.6360

N of Items = 7
APPENDIX 15

SPSS Analysis: Normal Distribution Test
Tests of Normality

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<sup>*</sup> This is a lower bound of the true significance.

<sup>a</sup> Lilliefors Significance Correction
SPSS Analysis: Descriptive Statistics (Alpha Total)
### Descriptives

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SPSS ANALYSIS: HOMOGENEITY OF VARIANCES (ALPHA TOTAL)
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APPENDIX 18

SPSS ANALYSIS: ANOVA (ALPHA TOTAL)
## ANOVA

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APPENDIX 20

SPSS ANALYSIS: HOMOGENEITY OF VARIANCES (17 ITEMS)
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*Items in red do not meet homogeneity of variance assumption (p<0.05)*
APPENDIX 21

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Results highlighted in **red** were discarded, because of broken homogeneity of variance assumption.

Results highlighted in **bold** are significant.
APPENDIX 22

SPSS ANALYSIS: MULTIPLE COMPARISONS LSD (17 ITEMS)
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* The mean is significant at the 0.05 level

* Results highlighted in red were discarded, because of broken homogeneity of variance assumption

* Results highlighted in bold are significant
General Linear model

Within-Subjects Factors
Measure: MEASURE_1

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Between-Subjects Factors

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APPENDIX 24

SPSS ANALYSIS: DESCRIPTIVE STATISTICS (REPEATED MEASURES)
## Descriptive Statistics

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APPENDIX 25

SPSS Analysis: Mauchly’s Test of Sphericity (Repeated Measures)
Mauchly's Test of Sphericity
Measure: MEASURE 1

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<th>Sig.</th>
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Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b Design: Intercept+TYPE □ Within Subjects Design: GROUPS
APPENDIX 26

SPSS ANALYSIS: TESTS OF WITHIN-SUBJECTS EFFECTS (REPEATED MEASURES)
Tests of Within-Subjects Effects
Measure: MEASURE 1

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APPENDIX 27

SPSS ANALYSIS: LEVENE’S TEST (REPEATED MEASURES)
Levene's Test of Equality of Error Variances

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<td>0.446</td>
</tr>
<tr>
<td>MEAN_3</td>
<td>0.647</td>
<td>2</td>
<td>33</td>
<td>0.530</td>
</tr>
</tbody>
</table>

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a Design: Intercept+TYPE
APPENDIX 28

SPSS ANALYSIS: TESTS OF BETWEEN-SUBJECTS EFFECTS (REPEATED MEASURES)
Tests of Between-Subjects Effects
Measure: MEASURE_1
Transformed Variable: Average

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
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<tbody>
<tr>
<td>Intercept</td>
<td>748.086</td>
<td>1</td>
<td>748.086</td>
<td>4710.026</td>
<td>0.000</td>
</tr>
<tr>
<td>TYPE</td>
<td>0.258</td>
<td>2</td>
<td>0.129</td>
<td>0.811</td>
<td>0.453</td>
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<tr>
<td>Error</td>
<td>5.241</td>
<td>33</td>
<td>0.159</td>
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<td></td>
</tr>
</tbody>
</table>
APPENDIX 29

SPSS Analysis: Pairwise Comparisons (Repeated Measures)
<table>
<thead>
<tr>
<th>(I) GROUPS</th>
<th>(J) GROUPS</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval for Difference</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>0.051</td>
<td>0.086</td>
<td>0.556</td>
<td>-0.124 - 0.226</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>-0.249</td>
<td>0.067</td>
<td>0.001</td>
<td>-0.385 - 0.113</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>-0.051</td>
<td>0.086</td>
<td>0.556</td>
<td>-0.226 - 0.124</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>-0.300</td>
<td>0.096</td>
<td>0.004</td>
<td>-0.496 - 0.104</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0.249</td>
<td>0.067</td>
<td>0.001</td>
<td>0.113 - 0.385</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.300</td>
<td>0.096</td>
<td>0.004</td>
<td>0.104 - 0.496</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
REFERENCES


Andersson, B., (1974), ‘The Quantifier or Qualifier’, Publication No. 3, University of Gothenburg, Department of History


Baltenergy, (2001e), ‘Lithuania has enough of its own oil for next 30 years’, 22 May, http://www.baltenergy.com


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Company News in CIS/Russia, (1999g), ‘Lithuania wants to renegotiate key terms of Williams oil deal’, Vol.4, issue 17, 8 October, http://www.gasandoil.com


Council of the European Union, (1993), Presidency Conclusions: Copenhagen European Council, Brussels


Financial Times (2001), ‘Refined problems receive crude solutions’, April 27, p16


Financial Times, (2001b), ‘Progress report shows Lithuania on course to joining EU in 2004’, November 15, p3


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Free Port of Ventspils Authority, (2001), the official brochure, published by McAbols A.S., Riga


George, A.L., (1959), 'Trends in Content Analysis', a study prepared for the RAND Corporation, University of Illinois Press


Henderson, K., (1999), 'Back to Europe: Central and Eastern Europe and the European Union', UCL Press, UK


Holloway, I., (1997), 'Basic Concepts for Qualitative Research', Blackwell Science

Hosti, O.R., (1968), 'Content Analysis'. In: Lindzey, G., Aronson, E. (Eds.), The Handbook of Social Psychology, Addison-Wesley, Reading, MA

http://europa.eu.int, official site of the European Union
http://europa.eu.int/comm/eurostat, official statistics of the European Union

http://munshi.sonoma.edu/working/LIKERT.html


http://www.cultsock ndirect.co.uk/MUHome/cshml/psy/likert.html, Society and Culture on the web

http://www.ekm.lt, the official home page of the Ministry of Economy of the Republic of Lithuania

http://www.ena.lt, the official website of the Energy Agency in Lithuania

http://www.forest.edu, the official website of the Forest Institute of Professional Psychology

http://www.lrs.lt, the official home page of the Seimas of the Republic of Lithuania

http://www.lrvk.lt, the official home page of the Government of the Republic of Lithuania

http://www.manifoldas.lt, the official home page of UAB ‘Manifoldas’


http://www.ndu.edu, the official website of the National Defence University

http://www.online.lt/transport.htm, Lithuania on line, the official website, transport review

http://www.port.lt, the official website of the Port of Klaipeda

http://www.president.lt, the official home page of the President of the Republic of Lithuania

http://www.regula.is.lt, the official web page of the National Control Commission for Prices and Energy in Lithuania

http://www.urm.lt, the official site of the Ministry of Foreign Affairs in Lithuania.

http://www.vatesi.lt, the official website of the State Nuclear Safety Inspectorate
http://www.vot.lv, the official home page of ‘Ventspils Nafta’ oil terminal

http://www.writing.colostate.edu, the official website of Writing Centre at Colorado State University


Klaipedos Nafta, (2001), the official brochure, published by UAB Juru Informacijos Centras, Lithuania

Komorita, S.S., ‘Attitude Content, Intensity and the Neutral Point on a Likerd Scale’, (1963), No.61, pp 327-334


Lietuvos Rytas (1999b), ‘Stringa derybos ir su Lukoil ir su Yukos’, 7 December, p17
Lietuvos Rytas, (2001a), 'Vyriausybe netiki “Williams” pazadais', 15 January, p10


Lietuvos Rytas, (2001c), 'Sutarti su “Williams” ivertino teisinnkai’, 21 February, p11


Lietuvos Rytas, (2001e), 'Rusijos “Lukoil” rengiasi ikelti koja i “Mazeikiu Nafta”', 31 May, p10

Lietuvos Rytas, (2001f), 'Valstybes kontrole gasdina ‘Mazeikiu Naftos’ bankrotu’, 29 May, p12


Lietuvos Rytas, (2001h), 'TNK kovoja del itakos Mazeikiu Naftai’, 12 July, p7

Lietuvos Rytas, (2001i), 'Sutarciai su Jukos lieka vis maziau barjeru’, 28 July, p16

Lietuvos Rytas, (2001j), 'Jukos ir Williams susitarimai – galvosukis Vyriausybei’, 18 October, p10

Lietuvos Rytas, (2001k), 'Williams ir Jukos santykiuose – atsalimas’, 14 December, p11

Lietuvos Rytas, (2001m), 'Baltijos juroje – naftos deme’, 8 March, p3


Lithuania in the World, (2001b), 'The Baltic States: from Political Rivalry to Economic Integration’, Vol. 8, No. 2, pp 4-7


Lloyd’s List (2000), ‘Terminals Beefing up the Buffer Zone’, 8 September, p 17


Lloyd’s List, (1999), ‘Lithuania’s Premier Minister to quit over oil industry privatisation’, 23 Ocober, p3

Lloyd’s List, (2000), ‘Russian oil pipeline will hit terminals in Baltic States’ 14 February, p 2


Muskens, G.J., (1980), ‘Frames of Meaning – Are They Measurable?’ a methodological critique of the content analysis of illustrated periodical magazines, published by Instituut voor Toegepaste Sociologie, Nijmegen


Oil and Gas Journal, (1999), ‘Russian oil major Yukos implements western-style reorganization’, by Dean E. Gaddy, 14 June


Regular Report (2002), on Lithuania’s Progress Towards Accession, Commission of the European Communities, Brussels, 9 October

Respublika, (2001a), Pinigai, ‘Mazeikiu Naftos laukia nemalonumai’, 24 January, p1


Respublika, (2001c), ‘Geonafta pirmaji ketvirti uzdirbo 3,8 mln. litu pelno’, 10 May, p10


Saudargas, A., (2000), Minister of Foreign Affairs of the Republic of Lithuania, Opening Statement in the Conference on Accession to the European Union, Brussels, 15 February


Smith, C.P., (1992), (Editor), 'Motivation and Personality: Handy Book of Thematic Written Analysis', City University of New York, Cambridge University Press


The Association Council, (2001), Fourth Meeting of the Association Council between the European Union and Lithuania, Brussels, 27 February

The Baltic Times, (1999), 'Beginning of the end for Ignalina', 22 September, p1

The Baltic Times, (2001), 'Lithuania’s Geonafta to Increase Investments', 25 January, p11


The politics of oil in Lithuania: strategies after transition
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Received 31 July 2000

Abstract
This paper examines the political context of oil refining and supply in Lithuania in the period following the initial phase of transition from a Soviet planned to a largely free-market economy. It begins with a short overview of the Russian oil market, exports and transport issues and the major players and then moves on to review more specifically the Lithuanian oil industry. Given the highly political and qualitative nature of oil logistics policy in the region, and in particular the ownership framework, a 'Delphi' technique was used to gather expert opinion on strategy in a formalised way. The results are presented in the second part of the paper. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Oil; Politics; Lithuania

1. Introduction
The significance of Russia and Russian oil exports to the oil infrastructure of Lithuania is hard to over-emphasise as until very recently, it was the only source of oil for the refining and exporting facilities in Klaipeda and Butinge in Lithuania. This situation had derived from the political situation prior to 1991 when Lithuania was part of the Former Soviet Union and as such not only could rely upon the supply of Russian oil but also had little economic fear in resting upon Moscow and nowhere else. This situation has now changed. However, to begin to understand the political context for oil in Lithuania today, we need firstly to examine the Russian oil industry and its allies in oil transport.

2. Russian oil exports and transport
The process of economic reorganisation and privatisation in Russia started just after the break-up of the Soviet Union in 1991, and the results in the Russian oil sector were that the industry was divided between vertically integrated companies (VIC) and a smaller number of regional independent producers (mainly consisting of foreign joint ventures) (Locatelli, 1999).

2.1. Vertically integrated companies
Each Vertically Integrated Company usually includes up to five upstream units, up to three refineries and a marketing chain encompassing multiple regions. The state owns stakes in a number of these companies, although a lot of them had been sold by 1998 as a result of the removal of the 1992 decree that limited foreign ownership of privatised oil companies to only 15% (Table I). Twelve VICs were established, consisting of the following: Lukoil, Yukos, Surgutneftegas, Sibneft, Sidanko, Slavneft, Osako, Eastern Oil Company, Tyumen Oil Company, Chechen State Oil Company, Komitek and Rosneft. The largest company in terms of production is Lukoil, with crude oil output of 1.1 million bbl/d in 1997. Yukos and Surgutneftegas are also very large producers, each producing around 0.7 million bbl/d in 1997.1

The country's largest oil company Rosneft is still entirely State owned, but Russia's State Property Committee has already approved its privatisation plan. Nevertheless, this plan has already been postponed twice because of a lack of the bidders.
Table 1
Capital structure of the main Russian oil joint stock companies (1998)*

<table>
<thead>
<tr>
<th>Shareholders</th>
<th>Company</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lukoil</td>
<td>Lukoil</td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>State</td>
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</tr>
<tr>
<td></td>
<td>Prop.</td>
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<tr>
<td></td>
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<td>11.57</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>4.07</td>
</tr>
<tr>
<td>Sinoeiff</td>
<td>FINASNOJ</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>NEFENAJA</td>
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<tr>
<td></td>
<td>KOMPANYA</td>
<td></td>
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<tr>
<td></td>
<td>SINS</td>
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<td>REFINEOIL</td>
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<td>15</td>
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<tr>
<td>Sidanko</td>
<td>Inicero,</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>subsidia of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unezeimbank</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MENATEP</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>11</td>
</tr>
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<td>Slavneiff</td>
<td>Russian</td>
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<tr>
<td></td>
<td>state</td>
<td>11</td>
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<tr>
<td></td>
<td>employees</td>
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<td></td>
<td>Mosyr Refinery</td>
<td>6</td>
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<td></td>
<td>others</td>
<td>7.8</td>
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<tr>
<td>Surguinelfgas</td>
<td>Pension</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>fund of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surguinegas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nesfInvest</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>others</td>
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</tr>
<tr>
<td>Tyumen Oil Company</td>
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<tr>
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<td>state</td>
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<td></td>
<td>Cadet</td>
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<td>Yukos</td>
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<tr>
<td></td>
<td>Yukos</td>
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</tr>
<tr>
<td></td>
<td>others</td>
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<tr>
<td>Osako</td>
<td>Russian</td>
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<tr>
<td></td>
<td>state</td>
<td>51</td>
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<tr>
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<td>Russian</td>
<td>41</td>
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<td></td>
<td>investors</td>
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<td>Eastern Oil Company</td>
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<td>state</td>
<td>15</td>
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<td></td>
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<td></td>
<td>for</td>
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<tr>
<td></td>
<td>State</td>
<td>38</td>
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<tr>
<td></td>
<td>Property</td>
<td>38</td>
</tr>
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<td></td>
<td>VYKOVENOL</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>SIB TRUST</td>
<td>29.3</td>
</tr>
<tr>
<td></td>
<td>MENATEP</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>7.8</td>
</tr>
<tr>
<td>Yuniko</td>
<td>Local authorities</td>
<td>100</td>
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<td>Tainneiff</td>
<td>Tartarac.</td>
<td>46.6</td>
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<tr>
<td></td>
<td>Authorities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>employees</td>
<td>41.3</td>
</tr>
<tr>
<td></td>
<td>private investors</td>
<td>12.1</td>
</tr>
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</table>

Table 2
Russian oil exports 1998

<table>
<thead>
<tr>
<th>Seaports</th>
<th>10^4 tons</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novorossijk</td>
<td>3026.5</td>
<td>23.0</td>
</tr>
<tr>
<td>Ventspils (Latvia)</td>
<td>14180.8</td>
<td>12.0</td>
</tr>
<tr>
<td>Odessa (Ukraine)</td>
<td>8341.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Trumpo (Russia)</td>
<td>4444.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Rostock (via Belarus, Poland and Germany)</td>
<td>2004.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Germany (other)</td>
<td>13482.9</td>
<td>11.0</td>
</tr>
<tr>
<td>Poland</td>
<td>8778.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>5277.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5056.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Hungary</td>
<td>4812.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Railways</td>
<td>Finland</td>
<td>159.1</td>
</tr>
<tr>
<td>Total export non-FSU</td>
<td>97907.8</td>
<td></td>
</tr>
<tr>
<td>Export to FSU countries</td>
<td>Belarus</td>
<td>11586.3</td>
</tr>
<tr>
<td>Ukraine</td>
<td>8006.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>3094.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1430.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Total export to FSU</td>
<td>24507.3</td>
<td></td>
</tr>
<tr>
<td>Total export from Russia</td>
<td>243596.0</td>
<td></td>
</tr>
</tbody>
</table>


2.2. Joint ventures

The second main organisations created during the oil industry’s restructuring and presently responsible for 6% of aggregate crude oil output are the foreign joint ventures. The major joint ventures are as follows: Vanyorganneft (58,000 bbl/d), Vastoil (52,000 bbl/d) and LUKoil.

2.3. Exports and transportation

Oil and gas exports generate nearly half of Russia’s hard currency revenue and therefore they are the most important industrial sectors in the country (Institute of Energy in Lithuania, 1998). As a consequence they are highly politicised and subject to constant interference. Whilst aggregate crude oil exports declined between 1989 and 1998, Russia’s overall export structure also underwent drastic changes.

Oil exports to countries outside the former Soviet Union (FSU) increased from 1.85 bbl/d in 1992 to 3.2 bbl/d in 1998. The main reason for this increase was the higher prices available in these markets and therefore increased hard currency earnings. For example, an average export price for Russian crude oil shipped to other countries of the FSU in 1996 was US$88 per ton, whilst...
Table 3

Russian oil exports outside the former Soviet Union (× 10^6 bbl/day)

<table>
<thead>
<tr>
<th>Year</th>
<th>Druzhba pipeline</th>
<th>Novorossiysk (Russia)</th>
<th>Tuapse (Russia)</th>
<th>Odessa (Ukraine)</th>
<th>Klaipeda (Lithuania)</th>
<th>Tallinn (Estonia)</th>
<th>Ventspils (Latvia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>890</td>
<td>590</td>
<td>187</td>
<td>360</td>
<td>130</td>
<td>0</td>
<td>483</td>
</tr>
<tr>
<td>1991</td>
<td>686</td>
<td>338</td>
<td>89</td>
<td>219</td>
<td>152</td>
<td>9</td>
<td>386</td>
</tr>
<tr>
<td>1992</td>
<td>728</td>
<td>479</td>
<td>121</td>
<td>245</td>
<td>93</td>
<td>0</td>
<td>308</td>
</tr>
<tr>
<td>1993</td>
<td>716</td>
<td>591</td>
<td>160</td>
<td>259</td>
<td>136</td>
<td>0</td>
<td>333</td>
</tr>
<tr>
<td>1994</td>
<td>818</td>
<td>531</td>
<td>133</td>
<td>212</td>
<td>91</td>
<td>0</td>
<td>382</td>
</tr>
<tr>
<td>1995</td>
<td>834</td>
<td>660</td>
<td>178</td>
<td>218</td>
<td>55</td>
<td>30</td>
<td>360</td>
</tr>
<tr>
<td>1996</td>
<td>877</td>
<td>630</td>
<td>208</td>
<td>212</td>
<td>72</td>
<td>47</td>
<td>464</td>
</tr>
<tr>
<td>1997</td>
<td>903</td>
<td>679</td>
<td>187</td>
<td>206</td>
<td>43</td>
<td>95</td>
<td>496</td>
</tr>
<tr>
<td>1998</td>
<td>1029</td>
<td>813</td>
<td>232</td>
<td>223</td>
<td>43</td>
<td>157</td>
<td>164</td>
</tr>
</tbody>
</table>

*a Source: http://www.eia.doe.gov/emeu/scah/russia.html

The export price to other countries outside the former Soviet region was around US$132 per ton. Most Russian oil exports are destined for Western European customers, including the United Kingdom, France, Italy, Germany and Spain (Table 2). About 60% of Russia's crude exports are shipped by tankers and nearly 50% of these shipments depart from the Novorossiysk terminal (Black Sea). The rest go via another two Black Sea ports — Tuapse (Russia) and Odessa (Ukraine) — or the Baltic Sea ports of Ventspils (Latvia), Tallinn (Estonia) and Klaipeda (Lithuania). The remainder (40%) of the crude oil is exported via the 'Druzhba' (Friendship) pipeline, which passes through Ukraine on the way to Slovakia, the Czech Republic, Poland, Hungary and Germany (Table 3). During 1993 and 1997 the utilisation of the pipeline ranged from 70 to 75% and rose to 85% in 1998 (Institute of Energy in Lithuania, 1998).

3. An introduction to Lithuania

In the post Second World War period, Lithuania was one of the Soviet Union republics and the entire economy was structured along Soviet lines with collectivisation of agriculture, Soviet style industrialisation and central planning from Moscow.

In 1991 Lithuania became independent and since then has achieved a number of goals. The Government adopted comprehensive stabilisation and reform programmes, which led to the rapid development of a market economy. An extensive privatisation programme has transferred almost 50% of small and medium enterprises from state property to the private sector and most trade has gradually shifted from former Soviet to western markets. During the period of transition Lithuania faced many difficulties in adjusting to a market economy, but nevertheless most of the major problems have been solved. One of the major problems that Lithuania had to face was that the country was heavily dependent upon external energy, mainly Russian oil and gas. In response to Lithuania's declaration of independence Russia refused to supply energy, but eventually a compromise was found. Lithuania has also been penalised by Russia for not joining the Commonwealth of Independent States (CIS), by charging it a world price for oil instead of the lower price charged to CIS members.

In 1992 Lithuania suffered severe shortages of energy and consequently very high inflation as well as economic recession. By 1994 the country appeared to have pulled out of recession but in early 1995 a banking crisis hindered the recovery. Despite all difficulties, since 1995 Lithuanian GDP has continued growing and inflation has been reduced substantially.

3.1. The energy sector

The main energy suppliers in Lithuania are Mazeikiai oil refinery and Ignalina nuclear power station. Mazeikiai refinery supplies all oil products required by Lithuania and receives crude oil from Russia's Siberian oil fields. There were many problems after Lithuania became independent, which emerged during trade negotiations with the CIS and during 1991–1992 the output of the refinery temporarily ceased. However problems were resolved and Mazeikiai refinery reopened (Master Plan, 1993).

In 1998 the Government decided that private investments were necessary for the oil sector and therefore at the end of 1999, 33% of Mazeikiai oil refinery was sold to the USA company Williams International. The issues stemming from this will be discussed in a later section.

Ignalina nuclear power station is also a very important energy supplier in Lithuania. It came into operation in 1984 and since then half of its generated electricity output provides 80% of Lithuania's domestic needs and the remainder is exported to Latvia and Belarus.

However since Lithuania gained independence and started negotiations to join the EU, the European Commission (EU's executive body) has put a lot of pressure on
the Lithuanian Government to set the date for closing Ignalina (The Baltic Times, 1999). The main reason is that Ignalina is modelled on the same design as the Chernobyl plant in Ukraine and could constitute a considerable danger for the region.

On 8 September 1999, Lithuania and the EU reached agreement that one of the two nuclear reactors will be closed by 2005 at a cost of around US$2.5 billion. The final date for closing the second reactor has not been set yet, but according to Jurgis Vilemas, director of Lithuanian Energy Institute, it is possible that it will be closed by 2010 (The Baltic Times, 1999).

4. The oil industry in Lithuania

4.1. Historical background

Oil exploration in Lithuania began in 1958 and over the last forty years more than 300 wells have been drilled and nineteen oil fields discovered. Nevertheless, oil resources in Lithuania are too small to meet the country's demands for oil products.

During Soviet Union times, Lithuania was an important region, mainly because of its oil facilities. It retains a number of these facilities which were built in order to provide the Soviet Baltic region and its local allies with a variety of required oil products (Institute of Energy in Lithuania, 1999).

The main oil facility during Soviet Union times was the Mazeikiai oil refinery, which has a capacity of refining 14 million tons of crude oil per annum. Russia supplied the majority of the crude oil through a branch of the Druzhba pipeline. Refined products were distributed mainly by rail to Latvia, Estonia and part of Belarus as well as some exported to other countries, through the oil terminal in the Lithuanian port of Klaipeda.

However, since Lithuania became independent, the oil industry has faced tremendous changes. The branch of the Druzhba pipeline became a separate company named Birzu Naftotiekis and the Lithuanian oil industry, even though it remained State owned, was effectively split into three sectors — Mazeikiai oil refinery, Klaipeda Nafta (oil terminal), and Birzu Naftotiekis (pipeline).

4.2. Facilities of the Lithuanian oil industry

4.2.1. Mazeikiai oil refinery

Mazeikiai crude oil refinery commenced operations in 1980, but it is still one of the most modern refineries in the region. According to the Mazeikiai Refinery Research Department, the refinery is equal in status and quality of output to other refineries in Finland, Poland, Czech Republic, Slovakia, Hungary, Belarus, Russia and Ukraine (Lloyd's List, 1999a). Mazeikiai has a capacity of producing 14 million tons per annum.

Until 1991 (under the Soviet Union) Mazeikiai oil refinery supplied all the oil products required by Lithuanian consumers and a large Soviet hinterland, including distillate required by Latvia and most of the gasoline required by Estonia (Lloyd's List, 1999b). Around 14% of the refinery's product mix was also exported to other neighbouring regions (mainly Belarus — then part of the USSR). Due to its convenient location and technological advantages, Mazeikiai oil refinery was competitive with other regional refineries and had captured a reasonable market share, provided the market for oil products in neighbouring countries was liberalised.

Mazeikiai is the only crude oil refinery in the Baltic States and was designed to achieve a greater conversion of crude oil to higher value distillates than any other refinery in the FSU west of the Urals. Operating in the 'conversion mode' at 8 million tons per annum, it is the only refinery in the region, which could be viable at Western Europe refinery-grade product and crude oil prices.

Since Lithuanian independence there was a number of problems arising mainly from the fact that the only crude oil supplier for the refinery was Russia, through a branch of the Druzhba pipeline. This left the refinery highly susceptible to the political, financial and economic vagaries of the East European (and particularly Russian) oil market. A solution was thought to have been found in 1996, when the Lithuanian Government took a strategic decision to build a new oil import/export terminal at Butinge on the Lithuanian coast close to the Latvian border and a pipeline connecting it with the Mazeikiai refinery. In 1999 the new oil import/export terminal in Butinge started operating.

At present, oil products refined at Mazeikiai refinery meet the standards of Western Europe and there are opportunities for exporting naphtha, jet kerosene and low sulphur diesel to this region. Until now all the exports of gasoline, diesel, kerosene and fuel to Western Europe have been through the Latvian port of Ventspils using railway transportation. However, it has been clear for some time now, that Mazeikiai refinery needs investments in order to expand its capacity and exports to Western Europe.

4.2.2. Butinge terminal

Butinge terminal is the most modern branch of Mazeikiai Nafta, and was designed to meet the most recent American Petroleum Institute (API) and Lithuanian standards. It is a reverse oil import/export terminal built on the Baltic Sea coast, which is ice-free all year and offers significant opportunities for exporting oil from CIS (Commonwealth of Independent States) countries and importing light or medium oil from Western
countries. The Single Mooring Buoy (SPM) with the Catenary Anchor Leg Mooring (CALM) system is located 7.5 km from shore and in 20 m water depth. It is connected to the Butinge terminal by a 36 in diameter oil pipeline, which was designed for reverse flows thus releasing Lithuania from the grip of Russian oil supplies.

The terminal consists of the onshore pipeline connecting Mazeikiai oil refinery and Butinge terminal, Mazeikiai pump station, terminal facilities and tank farm at Butinge, an offshore pipeline and SMS buoy. The tank farm capacity is about 130,000 m³, but there are plans to extend it by another 150,000 m³ and build an oil product import/export pipeline.

The main competitor to Butinge oil terminal is Ventspils port in Latvia, where the oil terminal is owned by Ventspils Nafta, which continues to be used for the export of Soviet crude oil to various Western countries. It can accommodate tankers up to 12.4 draft and its total export capacity is about 30 million tons per annum (Master Plan, 1993). However, in 1999 Ventspils Nafta managers were very concerned about growing exports through Butinge terminal and stated that in the year 2000, they will reduce their tariffs by US$0.2 per ton in an attempt to attract more traffic (Lietuvos Rytas, 1999b). Nevertheless, Butinge oil terminal would still be competitive, as Lithuania can reduce their pipeline tariffs whilst Latvia does not have such an opportunity.

Given this situation, at the end of 1999 Ventspils port introduced a new crude oil pipeline project for the development of infrastructure in the Latvian Oil Transit Corridor (LOT4). The programme involves the construction of a new oil pipeline connecting Polotsk or Nevel and Ventspils. The possibilities of success have been improved as both the EBRD and Lukoil have already shown interest in becoming involved.

4.2.3. Birzai Naftoliekis pipeline

The pumping station in Birzai (Lithuania) and oil pipeline connecting Polock (Russia) and Mazeikiai started operations in 1980 as a branch of the Druzhba pipeline providing crude oil for Mazeikiai refinery.

After Lithuania became independent, the pumping station in Birzai and the oil pipeline became a state owned Transportation Company named Naftoliekis. At the moment, the company operates around 500 km of crude oil and product pipelines which includes 87.4 km of crude oil pipeline between Polock–Ventspils, 225.5 km of crude oil pipeline between Polock–Mazeikiai and 91.5 km of crude oil pipeline between Mazeikiai–Butinge. There are also plans to build a product pipeline connecting Mazeikiai and Butinge.

In 1998 Naftoliekis transported 14.5 m tons of crude oil, 3 m tons of diesel to Ventspils and 6.3 m tons of crude oil directly to Mazeikiai (Institute of Energy in Lithuania, 1999). The main companies using Naftoliekis are Lukoil, Ozako Tupeks, Sidanko and Yukos.

4.2.4. Klaipeda oil terminal

Until 1999, the oil terminal in Klaipeda was used only for exporting fuel oil from refineries in Russia, Belarus and Ukraine. The requirement for terminal capacity at Klaipeda mainly depends upon the choices made with respect to the output of the Mazeikiai oil refinery and the markets it will supply. However, it also depends on the export of fuel oil refineries in Russia and Belarus (Master Plan, 1993).

During 1999 Klaipeda oil terminal was modernised in order to be able to work as an import terminal as well, again as part of the Lithuanian strategy of releasing energy supplies from the Russian stranglehold.

5. The Lithuanian oil industry

Since Lithuania became independent, most of its crude oil and oil products have been imported from the Former Soviet Union (FSU). Crude oil is mainly supplied by Russia through a branch of the Druzhba pipeline and processed at Mazeikiai oil refinery. This refinery produces a wide range of products which are sold to local consumers and exported to other Baltic States as well as to some other FSU and Western countries.

Russian crude oil prices have risen considerably between 1996 and 2000 and have almost reached world price levels. Russian economic instability, lack of long-term supply contracts and problems with payments, encouraged the Lithuanian Government to increase the security and diversity of oil imports. One of the primary ways to solve the problem was to build an oil import/export terminal at Butinge and to construct a pipeline connecting it to Mazeikiai refinery.

5.1. Structure of the oil industry and privatisation

In 1996 Lithuanian Government took a decision based on world-wide experience, that only those oil industry structures which have oil exploration, transport, processing, distribution, wholesale and retail departments are likely to survive and prosper. The structure of the Lithuanian oil industry at that time did not correspond with these requirements. Therefore, in 1996 the Government decided to create a public company, Lietuvos Nafta, which consolidated the efforts of the four main players outlined above (Mazeikiai refinery, Birzu Naftoliekis, Klaipèdos Nafta and Lietuvos Kuras). The ultimate objective was that the Lithuanian State, a number of Russian oil companies and a series of Western oil companies would each hold one-third ownership of Lietuvos Nafta.
Nevertheless, the Lietuvos Nafta plan never came into effect for although the creating the company came into force in September 1996, one-month later, elections to the parliament were held, where the opposition Conservative Party won the majority of votes and Lietuvos Nafta and its associated plans were cancelled.

At the beginning of 1998, the Lithuanian Government started negotiations with the US based company Williams International, over privatisation of the Lithuanian oil sector. Williams International specialised in the building of pipelines and telecommunications (Lloyds List, 1998) and had investments in more that 29 countries in Asia, Latin America and Europe.6 On 20th February 1998 Williams and the Lithuanian Government signed an agreement in principle for investment in and operation of, several oil and gas infrastructure projects in Lithuania.

On the 16th July 1998, Williams offered to buy a 33% stake in the three most important Lithuanian oil companies (Mazeikiai Nafta, Butinges Nafta and Naftotiekis) for US$150 million, plus US$150 million in reinvested profits (Lloyds List, 1998). However the Lithuanian government valued the package at US$400 million and final agreement was not reached. However, price was not the only reason delaying the deal, as the Lithuanian Government was also threatened by the main Russian crude oil supplier Lukoil that they would withhold the supply of oil unless a one-third stake in the Lithuanian oil complex was sold to Lukoil’s subsidiary company Nikoil.

However, despite the disagreements with Russian crude oil suppliers, the negotiations with Williams continued. According to the letter signed by Lithuanian Economy Minister Vincas Balilis and Williams International Co. on the 31 July 1998, Williams would own 33% of each of the companies.7 Mazeikiai Nafta (oil refinery), Naftotiekis (Birzu pipeline) and Butinges Nafta (import/export oil terminal). It was also agreed that these three companies would be merged if the agreement was signed (Lloyds List, 1998). Williams would also gain the priority right to buy more shares if the Government decided to sell them.

On the 8 October 1998 the president of Lithuania Valdas Adamkus, signed a law concerning reorganisation of the Butinges Nafta, Mazeikiai Nafta and Naftotiekis companies. Reorganisation involved creation of the Mazeikiai Nafta concern, by merging all three major companies involved in the Lithuanian oil industry.

On the 14 April 1999, Lithuanian’s State Defence Council approved the Government’s plan to privatise all three enterprises by selling 66% of their shares to the foreign investor.8 In July 1999 Lithuanian president Valdas Adamkus signed amendments to the oil privatisation law allowing Williams to take up to 66% in Mazeikiai Nafta and the Lithuanian Parliament then passed the legislation. However this legislation had a very negative effect on Lithuania’s negotiations with Russian crude oil suppliers.

In July, the main oil supplier Lukoil proposed a plan for linking Nikoil (a subsidiary of Lukoil) and Mazeikiai Nafta, in order to help eliminate oil supply problems between the two countries. Nikoil offered to link the Russian oil fields with Mazeikiai Nafta in exchange for a 33% stake in the Lithuanian oil sector. However despite the clear significance of this offer and the political context for the industry, they failed to receive any response from the Lithuanian Government.

On the other hand Williams announced that they were close to signing a deal with BP Amoco to buy oil products from Mazeikiai oil refinery. They also said that they were talking with several other oil companies including Elf, Statoil and Neste about becoming customers of Mazeikiai Nafta.9 Meanwhile, the new Government announced that the review of the agreement with Williams was delaying the final closure of the deal because it had indicated that from their viewpoint, some aspects of the agreement needed to be amended.10 These proposed amendments included:

- Williams should be made liable for any losses caused by personnel problems;
- the part requiring the Lithuanian Government to be liable for any undisclosed problems at the refinery should be deleted;
- the Government should not be solely responsible for problems associated with potential cut-off of crude oil supplies from Russia.

Despite intense government pressure, Williams refused to make any of these changes, but did agree to several others, including allowing the EBRD and IFC to take equity stakes in the company.11 In September 1999 the Lithuanian Government was asked to sell 12.5% stake in Mazeikiai Nafta to another major crude oil supplier from Russia — Yukos. In return, the company offered an annual supply of 1.7 million tons of crude oil to Mazeikiai refinery and to export 2.5 million tons annually though the Butinge terminal (Lietuvos Rytas, 1999b). However, here again, the Lithuanian Government did not show much interest and the offer was allowed to lapse.

On 5 October 1999 a package of law amendments was approved by the Lithuanian parliament, which was seen as a final stage in closing the deal with Williams. The amendments allowed Williams to buy a 33% stake in Mazeikiai Nafta for US$150 million and also to double

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6 http://www.gasandoil.com/gpc/company/cnr1452.htm
7 http://www.gasandoil.com/gpc/company/cnr64093.htm
8 http://www.gasandoil.com/gpc/company/cnr92279.htm
9 http://www.gasandoil.com/gpc/company/cnr93267.htm
10 http://www.gasandoil.com/gpc/company/cnr94156.htm
11 http://www.gasandoil.com/gpc/company/cnr94277.htm
12 http://www.gasandoil.com/gpc/company/cnr93267.htm
such as EBRD, IFC or crude oil suppliers. This could result in Williams owning only a 51% stake in seven years instead of a 66% stake, which was originally agreed. The requirement for the Lithuanian State to retain a 25% stake was removed in the amendments and the Government was also: authorized to back US$650 million in loans with state guarantees needed for the refinery’s reconstruction, working capital shortfall and completion of the Butinge oil terminal (Lloyds List, 1999a).

In the middle of October 1999, Lithuania’s Prime Minister Rolandas Paksas announced that he intended to resign his post due to his opposition to a controversial oil industry privatisation

At that time the president Valdas Adamkus was on a working visit to the USA and Rolandas Paksas promised to ensure stable Government until the president returned. Before the return of the president the Prime Minister personally rejected the deal and stated that Lithuania:

could not afford to finance some US$350 million in long-term loans to Mazeikiai Nafta, raising the fiscal deficit to some 9.8% of GDP and jeopardising a new precautionary agreement with the IMF (Lloyds List, 1999a).

He finally handed in his resignation on 27 October 1999 along with six other cabinet officials. Even though the main reason for his resignation was the privatisation and overseas sale of Mazeikiai Nafta, Rolandas Paksas continued to emphasise that he was in favour of privatisation, but not on the terms offered by Williams (Lietuvos Rytas, 1999a). The deal was finally closed on 29 October 1999 when Williams International President John Bumgarner and the new Lithuanian Prime Minister Irena Degutienė, signed the protocol.

6. The research framework

One of the objectives of this research was to analyse the opinion of a number of Lithuanian experts in the oil sector on the privatisation of Mazeikiai Nafta and its possible consequences. An approach using a Delphi technique was selected, involving the opinion of 26 experts from the oil and related industrial sectors on this matter. The Delphi technique has been selected in preference to the other main qualitative research approaches — in-depth interviews and group discussions — for this research for a number of reasons. First of all there is a confidentiality problem, because most of the experts selected were not willing to give an interview or meet in discussion where their identity is likely to be revealed, as the subject remains an important economic and political issue. Furthermore, in-depth interviews are very time consuming and hence costly and therefore could not be selected, even if some experts would have been willing to give an interview. The Delphi technique overcomes both these problems. Table 4 presents the main advantages and disadvantages of all three techniques.

It can be clearly seen in the Table 4 that the Delphi technique has many advantages over depth interviews or group discussions.

There are three types of Delphi technique which can be applied to estimate unknown parameters, make decisions and analyse policy. This research centred around the analysis of experts’ opinions on policy issues and therefore a Policy Delphi method was applied.

6.1. The policy Delphi technique

The original Delphi technique, which dealt with technical topics and was used to obtain consensus between the groups of experts, has been used since 1948, when it was first performed in order to “improve betting scores at horse racing” (Woudenberg, 1990). In the 1950s its use was extended as a forecasting technique in the USA. Policy Delphi was introduced in 1970 and it has a different objective from the original method. Policy Delphi “seeks to generate the strongest possible opposing views on the potential resolutions of major policy issues” (Abdel-Fattah, 1997). Examples of its application elsewhere in the maritime policy, logistics and transport policy fields can be found in a variety of publications from Linstone and Turoff (1975), Kapoor (1987), Cranfield University (1992) and Technology Foresight (1995).

6.2. The process of the Delphi technique

The first stage of the Delphi technique involves four elements identified by Hakim and Weinblatt. First of all the problem has to be identified, then the type of information required should be determined, furthermore the variables that have to be assessed have to be identified and finally the questionnaire has to be designed. The latter is the main instrument of the Delphi technique (Hakim and Weinblatt, 1993).

The research method involves a number of rounds of questionnaires, which have to be completed by the selected panel of experts of the industry. The experts are asked to make judgements and give their opinions on a specific issue. The Delphi survey has been described by Crotty, as a:

means of systematically collecting and aggregating the informed judgements of a group of experts on specific questions or issues (Crotty, 1990).
The choice of experts participating in the survey is crucial for the success of the research. Delbecq stated, "must have a deep interest in the problem and experience to share" (Delbecq, 1975) and it was pointed out by Duffield (1998) that for the findings of a Delphi survey to be acceptable, the members of the panel should be "representative of their profession or professional organisation". The experts selected for the survey in this research were those involved in the industry, including the operators of logistics companies, academics from Klaipeda University and representatives of Mazeikiai Nafia. Both the nature of the research and the technique used suggested confidentiality and so those involved are not indicated in detail here. The ideal number of experts selected for any Delphi survey may vary from 10 to 1685, as outlined by Williams and Webb (1994). However in their own study they chose 24 experts and similar numbers were also used by Hitch and Sraden (30) in 1983 as quoted by Abdel-Fattah (1997). Kapoor (39) in 1987 and Technology Foresight (21) in 1995. As a result, some 26 experts from the industry were selected. Table 5 provides general details of those who participated in the study — full details were kept confidential as anonymity is a requirement of the Delphi approach.

Table 5

<table>
<thead>
<tr>
<th>Participants in the Delphi process*</th>
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<tbody>
<tr>
<td>Participants</td>
</tr>
<tr>
<td>Logistics industry</td>
</tr>
<tr>
<td>Academics</td>
</tr>
<tr>
<td>Government</td>
</tr>
<tr>
<td>Oil industry</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*All identities, including company affiliation, were guaranteed to be kept confidential to meet the requirements of the Delphi process.

Another important aspect of the Delphi technique is the decision concerning the number of rounds of questionnaires that will be carried out as this largely determines the degree of consensus that can be achieved. The number can be changed given different circumstances and yet its choice is commonly significant in arriving at final policy decisions.

Within a Delphi analysis, after the first round of questionnaires is completed, the statements that have not been agreed have to be reformulated following the comments of the experts. The process is then repeated and after the second round, if consensus still has not been reached, the same process can be repeated as many times

Table 4

<table>
<thead>
<tr>
<th>Advantages of other techniques</th>
<th>Delphi technique</th>
</tr>
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<tbody>
<tr>
<td>Group Discussion</td>
<td>The panel members work both individually and together as a group, through providing feedback on collective opinions and attitudes of the others</td>
</tr>
<tr>
<td>Response is encouraged in a group setting</td>
<td>The technique maintains anonymity by using postal questionnaire</td>
</tr>
<tr>
<td>All influences on attitude and behaviour are highlighted</td>
<td>The technique allows individual treatment of each panelist Easy to identify who said what</td>
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<tr>
<td>Responses in a group often spark experiences</td>
<td>Less time consuming</td>
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<tr>
<td>It is easy to observe groups</td>
<td>Cheaper</td>
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<tr>
<td>Dynamic and more creative</td>
<td>Obtain consensus</td>
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<tr>
<td>Easy to identify who said what</td>
<td>More opportunity for creativity</td>
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<td>All opinions can be captured</td>
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<tr>
<td>Overcomes recruitment difficulties</td>
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<tr>
<td>Easy to identify who said what</td>
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<tr>
<td>All opinions can be captured</td>
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<tr>
<td>Personal material can be discussed</td>
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<tr>
<td>Not easy to identify who said what</td>
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<tr>
<td>Some people do not make full contribution in a group</td>
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<tr>
<td>The panel may react negatively to the moderator</td>
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<tr>
<td>Strong personality may overawe the other members</td>
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<tr>
<td>Easy to identify who said what</td>
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<tr>
<td>Time consuming</td>
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<tr>
<td>Costly</td>
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<tr>
<td>Gives wide range of opinions</td>
<td></td>
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<tr>
<td>Less opportunity for creativity</td>
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*Source: Abdel-Fattah (1997).
as desired. There were many previous cases where three rounds of questionnaires have been conducted including Kapoor (1987), and Crotty (1996), however others maintained only two rounds, such as Duffield (1998), Cranfield University (1994) and Abdel-Fattah (1997).

This research involved two rounds of questionnaires. In many others having three rounds, the first round was only used for obtaining the opinion of the experts about the very broad issues and it was only in the second round that the main issues were presented in any detail. The main issues in this research were clearly present before the Delphi Study was initiated and had been widely discussed in the Lithuanian media making the initial, generalised round unnecessary. The statements could thus be derived without gathering expert opinion and two rounds of questionnaires were thus considered to be sufficient. (Appendix A details the statements in rounds one and two).

6.3. Characteristics of the technique

There are four main characteristics of the Delphi Technique, which give it advantages over other approaches to qualitative research. The first is anonymity, because by answering the questionnaires, panel members stay unidentified from each other and they also have an opportunity to change their opinion freely, without interference from other members (Whitman, 1990). Secondly the technique is iterative, as the number of rounds can be predetermined in advance or may be altered according to level of consensus reached (Woudenberg, 1990). Thirdly feedback can be controlled by the researcher, by asking only relevant or required information from the experts in the second or subsequent rounds (Hakim and Weinblatt, 1993). Finally, the members of the panel can receive statistical measures of agreement, “which help to screen out the biases produced by the group thinking of committees”, (Abdel-Fattah, 1997).

6.4. Means of consensus

After concluding four studies using the Delphi Technique it was pointed out by Williams and Webb (1994), that “when using the Delphi technique the meaning of consensus is uncertain”. The means of consensus is a very important issue in two types of the Delphi approach: when estimating unknown parameters and in a Decision Delphi. However, in a Policy Delphi “generating consensus is not a prime objective” and compared with the other types of Delphi Technique, Policy Delphi is a “tool for analysing issues and not a mechanism for making a decision” (Linstone and Turoff, 1995). This characteristic of Policy Delphi was the main criterion for choosing this technique as the issues surrounding the Lithuanian oil industry are highly volatile and political and consequently it is unrealistic to expect to make any decisions based on the results of the survey, rather to gain an insight into opinion.

In the research questionnaires, experts were asked to indicate their opinion in terms of agreement, disagreement or their inability to comment, following the approach of Abdel-Fattah (1997). After the first round, the statements that did not meet consensus across the experts, were revised taking into account their comments. They were then sent out as a second round. The questionnaire was applied in the Lithuanian language and hence the issues, assumptions and statements presented here are translations of the original.

Statements were considered to be agreed when more than two-thirds of the experts agreed it. This relatively low figure was chosen because the issues discussed were highly political and therefore it was difficult to reach a high level of consensus across a range of individuals. Table 6 contains details of the consensus achieved.

7. Analysis

The following section will discuss the issues which the survey covered and place some interpretation upon the Delphi results obtained.

Issue 1: State control in the Lithuanian oil industry

The most important issue affecting the Lithuanian oil industry in 1999, was that of state control in the energy industry and progress towards privatisation. As a result, the first issue and first assumption followed by three statements dealt with this issue.

Assumption 1: The state should retain a certain number of shares in Mazeikiai Nafta

1.1.1. The state should retain 67% of shares in order to have full control over Mazeikiai Nafta. Over 80% of the experts disagreed with this statement, as most of them believed that private sector involvement was crucial for the wellbeing of Mazeikiai Nafta. Some commented that the state should not be involved in the business at all, but should deal with environmental and ecological issues. It was also noted, that one of the possible solutions was for the state to keep a ‘golden share’, which would give them control of the concern when needed.

The low level of consensus meant that this statement has to be revised for the second round and returned to the experts. After analysing the responses in more detail, in the second round this statement was changed to:

The state should not have any control over a private company, and in this case over Mazeikiai Nafta, because it would restrict the company from achieving its goals.

In the second round 76% of the experts agreed with the statement. However, some mentioned that the state...
should not lose all control as Mazeikiai Nafta was a strategic enterprise.

1.1.2. The state should retain 51% of shares in order to keep partial control over the concern.

No consensus was reached about this statement, as the opinions of the experts varied considerably. Some 30% strongly agreed, by stating that if the state was to retain 51% of shares, the situation would be more stable and control over Mazeikiai Nafta would be maintained. However, a number of others (49%) disagreed and said that the state should not be involved in the business at all and the control required could be maintained through legislation. Responding to the views expressed, in the second round the statement was changed to:

The state should retain some influence over Mazeikiai Nafta; however control (or even partial control) is unnecessary.

Some 81% of the experts agreed with the statement on the second round. Some commented that the state has enough influence through the taxation system and therefore does not need to keep more than 25-30% of the shares.

1.1.3. The state should not have sold any of its share, as the energy industry is vital for the country's welfare and should have remained state owned.

Almost 85% of the experts strongly objected to the statement. Some said that only private institutions or individuals should manage Mazeikiai Nafta because state ownership is not efficient enough.

In the second round the statement was changed to:

Mazeikiai Nafta should have been privatised in order to increase efficiency (it has been proved that private companies always work more efficiently) even if it is strategically significant.
Assumption 2: The strategic investor for Mazeikiai Nafta should have been chosen using specific criteria

1.2.1. The investor should have guaranteed the supply of crude oil (not less than 6–10 million tons per year).

Some 69% of the experts agreed with this statement; however most were not able to comment on the amount of oil that should be supplied, but nevertheless, the uniform opinion was that Lithuania needs a profitable refinery, and therefore it is up to the investor to ensure a constant supply.

1.2.2. The investor should have guaranteed US$200 million investment in the refinery's modernisation programme, to reach European standards.

Some 85% of the panel members agreed that investments are necessary, however some mentioned that the amount required for the reconstruction of the Mazeikiai refinery could be as high as US$500 million. Others pointed out that this amount of money could be from reinvested profits if around 10 million tons of crude oil were refined annually. The general opinion expressed was that the refinery needs modernisation and the strategic investor should ensure that it occurs.

1.2.3. The investor should have had an established market for the refinery output.

Some 86% of the experts agreed that an established market is a very important criterion for the choice of strategic investor. Some emphasised that this should be one of the main criteria for choosing the investor. However others suggested that there would be opportunities for developing new markets in Western Europe, after the refinery was modernised.

1.2.4. The shares should have been sold to different companies to ensure that all of the selection criteria were met.

When judging this statement 35% of the experts agreed, 15% were not able to comment and the rest (50%) disagreed. Some said that Mazeikiai Nafta should be in the hands of one company, as it is so important to Lithuania's economy, however others disagreed by stating that it is possible that the split ownership would eliminate some problems, for example in terms of oil supply. As consensus was not reached, in the second round the statement was reformulated as follows:

Mazeikiai Nafta needs investment not only from Williams International, but from Russian oil companies as well.

Here only one member of the panel disagreed with the statement, while others strongly agreed. One of the experts stated that such a strategy would eliminate the problems of oil supply without affecting Lithuania's sovereignty.

Assumption 2: The importance of privatisation in Lithuania

Assumption 1: Private companies are always more efficient than those state-owned.

2.1.1. Privatisation will improve the state of the Lithuanian energy industry

Around 81% of the experts agreed that privatisation would improve the state of the Lithuanian oil industry but not necessarily with the specific Williams International privatisation programme. Some said that only those enterprises should be privatised, which do not have a strategic role within the country's economy.

2.1.2. As the Lithuanian oil industry is very dependent upon Russian crude oil supply, Williams' investment was the only option to help balance this situation.

Over 87% of the experts disagreed with this statement and expressed the general opinion that Lithuania had always been dependent upon Russian crude oil, but this did not cause any problems until Williams interfered. One of the experts assumed that when Williams had control of 66% of Mazeikiai Nafta shares, they might sell the package to a Russian company. Therefore the statement was changed to:

As the Lithuanian oil industry is dependent upon the supply of Russian oil, Williams' investment balanced this situation to a certain extent.

After the re-formulation, 61% of the experts agreed with the statement. Nevertheless, a number of experts did not agree and stated that the success of Mazeikiai Nafta still depended upon the willingness of Russian crude oil suppliers to co-operate.

2.1.3. Privatisation is a necessary condition for Lithuania to become a member of the EU and therefore the privatisation of Mazeikiai Nafta was a good decision made by the government.

65% of the experts disagreed with such statement, as they did not consider privatisation to be a necessary condition to enter the EU. Many of them thought that privatisation of Mazeikiai Nafta was not carried out in an appropriate way. In the second round the statement was changed to:

Lithuania is integrating into the EU and private investments are necessary. Therefore Mazeikiai Nafta had to be privatised sooner or later.

65% of the experts agreed with this statement. Some stated that indeed privatisation is necessary, however the conditions of the agreement should not favour any party in particular. Privatisation should be carried out in an open contest, thus providing equal opportunities for all potential investors to make their offers.

Issue 3: Lithuania's facilities to import crude oil

Assumption 1: Russia is not a reliable supplier of crude oil.
3.1.1. Lithuania had to ensure an alternative supply of crude oil.

This was the only statement that was agreed by all experts in the first round. There were many different opinions expressed stating why an alternative supply was necessary, however the most common comment was that Russia was an unreliable supplier. The experts thought that with the frequent changes of Russian Government, oil supply could not be secured as much depended upon the political situation between the countries. Furthermore the experts stated that the alternative oil supply has to be politically, economically and ecologically acceptable.

3.1.2. Construction of Butinge terminal was a necessary step to ensure Lithuania's political independence from Russia.

69% of the experts agreed that building of the Butinge terminal was a very important strategic step. They stated that it will give Lithuania more political freedom and possibly more opportunities for doing business with Russian oil companies. However, some had doubts about successful functioning of the terminal and said that it would have been a lot cheaper to reconstruct the Klaipėda oil terminal, as it already had an established business and some of the required facilities.

3.1.3. Crude oil imported through Butinge terminal will always be a lot more expensive than Russian crude oil, and this increase in price might have a negative impact on Lithuania's economy.

65% of the experts agreed and stated that it was to be expected that oil imported from other than Russia, will be more expensive, but in Lithuania's situation an alternative was necessary. Some stated that sooner or later Russia will start selling oil at world price level and therefore the prices will increase anyway. However, one expert stated that even if the higher price of oil imported through Butinge terminal negatively influenced the Lithuanian economy, the unpredicted political situation in Russia would inflict the same damage.

Issue 4: The effect of Williams's investment on the Lithuanian energy industry

Assumption 1: Williams will improve the situation for the Lithuanian energy industry

4.1.1. Williams helped Mazeikiai Nafta by lending working capital needed to buy crude oil for the refinery. Only 23% of the experts agreed with the statement; the others stated that Williams itself did not lend any money as all loans were guaranteed by the Lithuanian State. Some stated that since Williams was not responsible for any loans, its objectives should be to ensure that the work of the refinery increased in efficiency.

Therefore in the second round the statement was reformulated to:

Williams as a strategic investor, should ensure a constant supply of crude oil and constant work for the refinery.

All the experts agreed with this statement.

4.1.2. Williams as a strong and prosperous company and experienced negotiator, should be responsible for all negotiations concerning crude oil transportation from Russia and other CIS countries.

76.9% of the experts agreed and stated that it would be beneficial for Lithuania if Williams would negotiate with other companies involved in this industry. Some said that it is always easier for a big company with a good reputation to negotiate with other market players, especially if it has something to offer in return. In this case, Russia currently needs an exit to the Baltic Sea and Williams controls Butinge terminal and therefore they could make a deal with Russian crude oil suppliers and offer them reduced transportation tariffs.

4.1.3. Williams's investment will ensure constant supply of crude oil to Mazeikiai oil refinery.

Just over 69% of the experts agreed with the statement. They stated that if Williams wanted their investment to work successfully, they would have to ensure a steady supply of crude oil. However, some stated that supply of Russian oil also depends upon political relations between the countries and therefore as long as Russia is the main supplier, it is not possible to guarantee security.

Assumption 2: The contract signed between Williams and the Lithuanian Government secures only the interests of Williams International

4.2.1. With their control of Mazeikiai Nafta, Williams will be able to influence the Lithuanian economy significantly.

73% agreed with the statement. One of the experts stated that the energy sector in Lithuania is one of the most important industries, and influences the economy to a large extent and therefore if Williams is in control of Mazeikiai Nafta, it is bound to influence the Lithuanian economy. Some others mentioned that the Lithuanian economic and political situation is not very stable and therefore Williams will have many opportunities to influence it, especially when controlling such strategic facilities.

4.2.2. Williams have a good chance to expand and control other strategic investments, by manipulating oil product prices.

Here again 73% of the experts approved the statement. They agreed that the Lithuanian Government might have to accept that Williams would start manipulating oil product prices. Some stated that all energy sectors in Lithuania could be sold soon, including gas and electricity suppliers, as some foreign companies have already shown interest. The experts stated that is very likely that Williams will show interest in investing in other strategic facilities in Lithuania including Klaipėdos Nafta oil terminal.

4.2.3. Gradually Williams might influence Lithuanian politics, and thus might reduce Lithuania's chances of becoming an EU country.
Only 23% of the expert agreed with this statement. Those who disagreed said that Williams might influence the Lithuanian political situation but should not have any influence over relations with the EU. However, some stated that it is not clear yet what attitude Williams has towards Lithuania's EU membership. In the second round the statement was changed to:

Gradually Williams will influence the Lithuanian economy more and more, and thus in the future this could have a negative effect on the country's economy.

In the second round 73% of the experts agreed. Some experts stated that it is likely that the situation will depend upon relations between the EU and the USA. They stated that the Lithuanian economy was already influenced negatively in that the Government guaranteed the loans for Mazeikiai Nafta and signed the contract on terms required by Williams.

Summary of the analysis

Where state involvement in the Lithuanian oil industry was concerned, the experts' opinion was that the state should not be involved in the business and that privatisation was necessary as private companies work more effectively. There were some suggestion made how the state could control Mazeikiai Nafta, i.e. by keeping a golden share or through taxation policies. General opinion about the strategic investor (Williams) was that it should be up to the company to ensure oil supply to the refinery and to make the necessary investments, mainly by reinvesting profits. It was also emphasised that when the investor was selected, the state should have made a reliable market an important criterion. The general opinion expressed was that the state should have chosen a different way to privatise such an important strategic facility.

The second issue was the importance or privatisation in Lithuania. The majority of experts agreed that the whole privatisation process should have been undertaken in a different way because many aspects of the agreement with Williams were formulated in favour of the company.

Thirdly, Lithuania's facilities to import and export crude oil were analysed. All experts agreed that Lithuania had to ensure an alternative oil supply but many suggested that reconstruction of Klaipeda oil terminal would have been a lot cheaper than building the Butinge terminal.

Finally, the effect of William's investment on the Lithuanian energy sector was brought up as an issue. Experts reached the uniform opinion that the effect could be positive if Williams worked profitably. They also agreed that Williams could be a good negotiator with other major oil companies, even though a lot depends on the political relations between Lithuania and Russia. Experts also agreed that Williams could have a major impact on Lithuania's economy.

8. Conclusion

The Lithuanian oil industry is heavily dependent upon Russian crude oil supply, even though Lithuania has its own crude oil import/export terminal at Butinge. Russian oil remains cheaper than oil imported from the Middle East or Western Europe and therefore Butinge oil terminal is likely to remain an export terminal unless a major conflict between Lithuania and Russian oil suppliers occurs. However, the Butinge Terminal does give Lithuania potential, political leverage in negotiations with Russia over oil supplies in the future.

However since 1997, Russia has planned to build a new port on the Baltic Sea at Primorsk (Gulf of Finland, East of St. Petersburg), which will handle crude oil, oil products, gas and liquid chemical cargoes of up to 45 million tons a year. This would be the third largest Russian port on the Baltic Sea. The main reason for building this terminal is that Russia has been losing up to US$600 million annually (1997 figure) by transporting its cargoes through foreign sea ports of the Baltic Sea.

There have been many obstacles since 1997, delaying the terminal construction works but nevertheless in 1999, the Russian government announced that they were determined to complete the new oil terminal at Primorsk, convinced that Russia needs its own oil terminal, because it is heavily dependent on exports for budget revenues and at the moment the only access to the Baltic Sea is through the ports of Lithuania, Latvia and Estonia. In addition to the new terminal, the government took the decision to create a new Baltic Pipeline System, which would deliver oil to the Primorsk terminal and thus divert exports from the current arrangement using the Druzba Pipeline and the ports of the Baltic States. These developments — if they ever come to fruition, will have substantial impact upon oil logistics and politics in the region.

The Delphi research produced some interesting results. It was expected that most of the experts would agree that Mazeikiai Nafta should have remained state owned, but nevertheless a large number was in favour of some sort of privatisation. Most also stated that Lithuania needed private investments; however none approved the deal with Williams. They also realised the importance of trading with Russia and that good political relations were a necessity. This places Lithuania in a difficult position at the moment, with USA based Williams in control of the majority of the oil sector but Russian crude oil suppliers (forming the overwhelming source of oil for the Lithuanian infrastructure) dissatisfied with this decision of the Lithuanian Government. This has already resulted in some conflicts and an increase in Russian oil prices, but the future may hold other developments as parties on all sides begin to realise the commercial opportunities and political realities that exist.
Appendix A

Delphi Statements

Round 1

Issue 1. State control in Lithuanian oil industry

Assumption 1: The state retain a certain number of shares in Mazeikiai Nafta

Statements:

1.1. The state should retain 67% of shares in order to have full control over Mazeikiai Nafta.

1.2. The state should retain 51% of shares in order to keep partial control over the concern.

1.3. The state should have not sold any of its share, as the energy industry is vital for the country’s welfare and should have remained state owned.

Assumption 2: The strategic investor for Mazeikiai Nafta should have been chosen using specific criteria

1.2.1. The investor should have guaranteed the supply of crude oil (not less than 6-10 million tons per year).

1.2.2. The investor should have ensured $200 million investment in the refinery’s modernisation programme, to reach the European standard.

1.2.3. The investor should have had an established market for the refinery output.

1.2.4. The shares should have been sold to different companies in order to ensure that all of the selection criteria were met.

Issue 2. The importance of privatisation in Lithuania

Assumption 1: Private companies always are more efficient than those state owned

2.1. Privatisation will improve the state of Lithuanian energy industry.

2.2. As the Lithuanian oil industry is very dependent upon Russian crude oil supply, Williams’ investment was the only option to help balance the situation.

2.3. Privatisation is a necessary condition for Lithuania to become a member of the EU and therefore the privatisation of Mazeikiai Nafta was a good decision made by the government.

Issue 3. Lithuania’s facilities to import crude oil

Assumption 1: Russia is not a reliable supplier of crude oil

3.1. Lithuania had to ensure an alternative supply of crude oil.

3.2. Construction of Butinge terminal was a necessary step to ensure Lithuania’s political independence from Russia.

3.3. Crude oil imported through Butinge terminal will always be a lot more expensive than Russian crude oil, and this increase in price might have a negative impact on Lithuania’s economy.

Issue 4. The effect of Williams’s investment on the Lithuanian energy industry

Assumption 1: Williams will improve the situation for Lithuanian energy industry

4.1. Williams helped Mazeikiai Nafta by lending working capital needed to buy crude oil for the refinery.

4.2. Williams as a strong company and experienced negotiator should be responsible for all negotiations concerning crude oil transportation from Russia and other CIS countries.

4.3. Williams’s investment will ensure constant supply of crude oil to Mazeikiai oil refinery.

Assumption 2: The contract signed between Williams and the Lithuanian Government secures only the interests of Williams International

4.2.1. With their control of Mazeikiai Nafta, Williams will be able to influence the Lithuanian economy significantly.

4.2.2. Williams have a good chance to expand and control other strategic investments, by manipulating oil product prices.

4.2.3. Gradually Williams might interfere or influence Lithuanian politics, and thus might reduce Lithuania’s chances of becoming an EU country.

Round 2

In Round 2 a number of statements were reformulated in an attempt to achieve a higher degree of consensus. Those listed below are the revised statements

Issue 1: State control in the Lithuanian oil industry

Assumption 1: The state should retain a certain number of shares in Mazeikiai Nafta

Statements:

1.1. The state should not have any control over a private company, and in this case over Mazeikiai Nafta, because it would restrict the company from achieving its goals.

1.2. The state should retain some influence over Mazeikiai Nafta; however control (or even partial control) is unnecessary.

1.3. Mazeikiai Nafta should have been privatised to increase efficiency (it has been proved that private companies always work more efficiently), even if it is strategically significant.

Assumption 2: The strategic investor for Mazeikiai Nafta should have been chosen using specific criteria

Statements:

1.2.1. Mazeikiai Nafta needs investment not only from Williams International, but from Russian oil companies as well.
Issue 2: Importance of privatisation in Lithuania

**Assumption 1:** Private companies always are more efficient than those state-owned

**Statements:**

2.1.2. As the Lithuanian oil industry is dependent upon the supply of Russian oil, Williams’ investment balanced the situation to a certain extent.

2.1.3. Lithuania is integrating into the EU and private investments are necessary. Therefore Mazeikiai Nafta had to be privatised sooner or later.

Issue 4: The effect of Williams’s investment on the Lithuanian energy industry

**Assumption 1:** Williams will improve the situation for the Lithuanian energy industry

**Statements:**

4.1.1. Williams as a strategic investor, should ensure a constant supply of crude oil and constant work of the refinery.

**Assumption 2:** The contract signed between Williams and Lithuanian Government secures only the interests of Williams International

**Statements:**

4.2.3. Gradually Williams will influence the Lithuanian economy more and more, and thus in the future this could have a negative effect on the country’s economy.

References

Oil and Containers in Transit through Lithuania
- Research in the United Kingdom

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The future for the logistics and maritime sector of Lithuania looks extremely promising in the context of a number of changes that have taken place in recent years and the developments which are planned for the coming decade. Lithuania has a tradition within the sector including a major international trucking industry, a significant transit port in Klaipeda with the great advantage of ice-free status, good road and rail links to the east and the enormous markets of Russia, Belarus and the other Baltic States, the prospect of EU membership and all the market advantages that this will bring in the next few years and last but not least, its strategic location between the EU and the countries of the former Soviet Union which provide an opportunity for Lithuania to become the Netherlands of Central and Eastern Europe – a dynamic, fast growing and prosperous country acting as the pivotal point for trade within the region, far in excess of its physical size and population. Lithuania’s future role as the transit hub for the east and the link between the dynamic markets of Germany and Scandinavia and the growing significance of Russia and its neighbours has attracted attention in western Europe, not least at the University of Plymouth in the United Kingdom where the Institute of Marine Studies is the largest research institution concentrating on transport, shipping and logistics in Eastern and Central Europe. A dynamic, fast growing and prosperous country acting as the pivotal point for trade within the region, far in excess of its physical size and population.

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Oil Transit through Lithuania

This project provides an economic analysis of the Lithuanian crude oil sector in the light of the period of transition following the break-up of the Former Soviet Union (FSU) and the moves being made towards European Union (EU) accession. Lithuania emerged from the FSU as one of the three independent Baltic States which under the old Soviet regime had always been significant as transit countries for both imports and exports to the USSR, offering ice-free access to the Baltic all year round. As a consequence, a large quantity of the USSR’s international trade passed through the ports of Riga and Ventspils in Latvia and Klaipeda in Lithuania including substantial quantities of Soviet crude oil.

Following the break-up of the USSR, the economic and political situation for these oil movements has changed considerably and the newly independent Lithuania has inherited both a powerful position (in that Russia has only limited ice-free access to the Baltic from its own territory through the Kaliningrad enclave, which in turn is only accessible across Lithuanian territory), and a weak position in that its sole source of oil has always been Russia (and the FSU) and the infrastructure inherited (pipelines, refineries, terminals etc) was all designed uni-directionally for this source of oil. Lithuania thus finds itself both reliant upon, and one of the few providers for, Russian crude oil. This in turn has highly significant economic consequences – for example, some 30% of Lithuania’s GDP can be associated with the only oil products refinery in the Baltic States at Mazeikiai, but until very recently, this facility has been totally reliant upon Russian crude imports. In late 1999, these were interrupted by Russian suppliers during disputes over the refinery’s ownership plans and its partial sale to US interests. As a consequence, since independence in 1991, crude oil trade in Lithuania has been fundamental both to the country’s economic health and political stability.

As a consequence, the research project has the following objectives:

- to assess the impact in Lithuania, of the transition from Soviet control to independence, upon the crude oil sector;
- to assess the current pattern of crude oil movements and the nature of the infrastructure in Lithuania and its regional competitors;
- to analyse the current factors that dictate crude oil policy in Lithuania - economic, political and operational;
- to derive the opinion of economic experts within the region as to the possibilities for future regional crude oil policies;
- to develop a model of the crude oil industry in the region derived from these opinions, which accommodates both the economic and political issues and which can provide guidance to policy-makers for the future;
- to examine the effect of EU accession upon this strategy and to provide guidance for economism in the Baltic States for strategies as accession approaches.

To achieve these objectives, the project consists of the following methodology:

- a review of the transition period from the late 1980s to the moves towards EU accession today, the flow of crude oil in the region and the infrastructural facilities that exist. This will be based upon a full literature review from sources in Lithuania, Latvia, Russia and the UK, plus research into sources within the industry;
- identification of the main influences upon the industry in Lithuania at present and in the years to come as EU accession approaches;
- an analysis of expert opinion in...
Lithuania inherited a large refining facility that was the single largest generator of GDP in Lithuania by far and yet relied entirely on Russian co-operation in providing piped imports of crude oil. This has been a continued problem for Lithuania, particularly since Russia has alternative outlets - not least Ventspils in neighbouring Latvia - and also their own refining facilities, thus negating any need to depend upon Lithuania and its demand. Much of what has happened in Lithuanian oil strategy since 1991 has been driven by this dependence upon Russia and this includes the development of new import/export facilities for crude oil and products at the Butingė oil terminal on the Lithuanian coast which has provided some seriously desired, if expensive, flexibility.

**EU accession**

Since December 1999, Lithuania has been moving towards accession to the EU. Lithuania was disappointed by their failure to be included in the first wave of applicants following transition but now has the difficult task of meeting the economic requirements of the EU which include a number of issues that directly impact upon the oil industry. It is necessary in the context of this research, the emphasis placed upon the private sector and the subtle but definite stress upon moving away from Russian influence and more towards that of the West. These latter issues have had immediate impacts upon the relationship of Lithuania with Russia.

**Russian influence**

As we have seen already, Russian influence in the oil industry in Lithuania has been substantial and there have been deliberate moves by Lithuania since 1991 to reduce its influence but with limited and controversial success. The main moves have involved the sale of 33% of Mazūkiei Refinery, Butinge Oil Import/Export Facility and associated infrastructure to Williams International of the USA. This was completed in competition with Lukoil of Russia.

The sale of the fundamentally important Mazūkiei complex along with the new Butinge facility to an American company, at a low cost has created a number of economic and political problems. The research project concentrates upon the most significant of all industries within Lithuania and the region as a whole, and provides a detailed analysis of the economic and political factors.

The output from the research would be of fundamental relevance to policy-makers within Lithuania and those working upon accession in the region and with the European Union. Crude oil in Lithuania is of vital importance to the country's economic health and its progress towards EU accession is dependent upon resolving a strategy to deal with the complex set of issues noted above. There has been no fundamental research carried out on the industry up to now. The results will be of wide interest to international oil industry analysts, practitioners and academics.

**Container Transit by Rail through Lithuania**

This research project has a number of objectives:

- to review the current role of the Trans Siberian Railway (TSR) in the movement of containers from Russia, the Far East and countries of the FSU to Europe and for export elsewhere;
- to assess the potential of the network for further development and the need for infrastructural and logistical improvements to achieve this;
- to analyse the role of the ports of the Baltic States (and in particular Klaipėda) in providing an inter-modal link with shipping services in the Baltic Sea in competition with alternative port facilities in Russia and Finland;
- to assess the future of container movements by the TSR through the Baltic States in the light of their impending accession to the EU;
- to identify and recommend major policy initiatives for Lithuania in terms of transit policy for potential container traffic by the TSR.

The TSR was a development of the Soviet rail network originally constructed in the time of the USSR but supported by the Soviet state as a source of hard currency. Containised freight flows were considerable before 1991 when following the break-up of the Soviet Union, the service was partially privatised with sale of 30% to Scaland of the USA and the formation of the Trans-Siberian Express Service (TSES). This joint venture with the Russian Ministry of Railways maintained the original aim of the route to act as an alternative (and faster) service to deep-sea links from Japan, China and Korea to Europe and the USA. Following Macskr's acquisition of Scaland and new anti-trust regulations in Russia, Macskr-Scaland acquired 100% ownership of the service from the ministry. TSES revenue steadily grew from US$6 million in 1992 to around US$60 million in 1997 but then fell drastically with the Russian economic downturn. Services were reduced in contrast to the service to the affected port of St Petersburg and the port of Kalingrad which although in Russian territory, is physically separated by Lithuania and Belarus. Both ports also have security problems. Currently the main outlets to the sea for TSR movement are through the Finnish ports and the ports of the Baltic States see opportunities in competition with them particularly in the context of new or opened container terminal facilities in Klaipeda, Liepaja and Riga. Competition from rail services across Europe is limited by the difference in rail gauge once crossing the Polish border and the costs this imposes.

This research aims to analyse the potential for the Baltic States ports and particularly Klaipeda, to acquire a greater share of the TSR containerised traffic. It will be practical in its approach with the aim of offering advice to policy-makers in the Baltic States on strategies for the future derived from comprehensive literature review and the close involvement of regional experts, whilst retaining strong theoretical validity through its use of established techniques of content analysis.

Both these research projects reflect the significant and growing role that Lithuania is beginning to play in the transit market between the major eastern and western regions of Europe. This role will increase as developments within the region continue to take place. Both the crude oil and container sector are fundamental to the rise of Lithuania as a major logistics supplier in the Baltic region.