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Strategies for Entering the Russian Tank Container and Liquid Bulk Transportation Market

By

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Acknowledgements

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Abstract

This work is concerned with study of potential for Hoyer Global Transport an international tank container transpiration company to enter market for import and export of fine liquid chemicals to and from Russia. Therefore, research on the Russian market for import and export of liquid chemicals and raw materials was conducted. The main goal of this research was estimate potential for import export moves generation; however as demand for transportation is a derived demand one had to study and estimate demand for the final products and end users markets. For this purpose this final product and end users markets had to be identified by means of investigative marketing applied to the information extracted from HGT shipments data base for the period of 2007 to 2010. Successful combination of methodology, good levels of data availability and a lot of vigor for research resulted in identification and general estimation of the markets with the most potential to be the driving force behind demand generation for import and export moves of liquid chemicals in tank containers to and from Russia on behalf of HGT. Among major discoveries is that the greatest potential driving force for demand for fine chemical transportation is generated by growing consumption in the Russian domestic markets for personal care, cosmetics, household cleaning items, and detergents as well as some solvents; The second place for the potential growth is occupied by Russian pharmaceuticals market. One has to indicate an interesting finding of export import dynamics that is reflected in a basic "import some to export more" which works in both directions, as Russian plastics and rubber producers as well as paper and pulp producers import some fine chemicals used in the production of the products that will be exported from Russia afterwards. Plus there are several main stays of Russian chemical industry as fertilizers and rubber plus initial upstream production and oil and gas refining industries that might use some imports to give large amounts of exports; However, even on the export side there are interesting finding regarding potential of export of very highly sophisticated products that used in production of rubber, which were probably developed on the basis of many years of mass rubber production in Russia. Thus, those chemicals have a good potential to be exported to the Global markets including USA, EU and Asia on a rather large scale and demand for their transportation should be certainly tapped by HGT.

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List of Abbreviations

HGT – Hoyer Global Transport BV., a business unit within Hoyer Group
TC – Tank Container
ISO – International Standardization Organization
1X20 – Equals to 1 TEU or 1 TC in Container Shipping Operations

Chapter 1: Introduction

1.1 Introduction

Main research question of this work is to estimate potential of Russian market demand for import and export of liquid chemicals in tank containers. Therefore, the hypothesis is that there is a great potential demand for HGT transportation services in Russian market for export and import of fine chemicals by means of tank containers. Directions for further development of estimated market potential for the Hoyer Global Transport in Russia will be also indicated.

Shapes of global supply chains were always influenced by the production cycles of goods transferred by distribution further to the final consumers - ultimate sources of demand for these goods. Plus, as we all well aware of the fact that demand for transport is derived from the demand for goods transported and strongly influenced by dynamics of the final users markets. Therefore we have to pin point and study these markets. This research will concentrate on the finding and indication of major demand drivers for the transportation services of HGT in Russia.

Information available in the HGT shipments data base provides partial insight on producers and companies around the World that supply inputs for their production facilities in Russia as well as about Russian producers that export their products. However Russian chemical industry's export/import dynamics are not studied well due to the lack of insider's information from one side and absence of dedicated market potential study from the other. Procurement of first type of information is complicated by the Russia business patterns. Therefore, there is a need for market study to localize and study chemical final user's market demand potential in Russia.

Such a marketing study that will pinpoint the most lucrative sectors of Russian chemical import export markets sectors might enable HGT to tap into 10% of Russian tank container transportation market.

The other side of the research is a search suitable tactics that HGT has to apply in order to enter Russian Market smoothly.

Thus, HGT initial tactics for Russia should rely on incremental client's base built up and profits generation that can initially sustain office, and then provide recourses to build tank container depots and expand further into the hinterland seeking to serve fine chemicals producers import and export needs from these outposts.

There are several clusters of chemical industry concentrations in Russia around cities of Yaroslavl, Ryazan, Kazan, Kirov, Nefteyugansk etc. Potential for servicing needs of such clusters will be explored by general study of economic geography of Russia and further contacts with those chemical producing plants. However, Rising HOYER brand awareness in Russia is needed to be accelerated and participation in different economical forums as well as fairs and exhibitions sponsorships is well encouraged.

Also study of the competitor's strategy and levels of involvement into the Russian market would be of help but will be also limited in this study to listing of them and ranking but general performance parameters. However, major contribution of this study is work on estimation of market potential as well as markets with the most potential that will allow Hoyer to make initial commitment to the Russia business.

1.2 Notes on Academic Literature, Methodology and Challenges

The uses of academic literature in this work are rather limited due to very practical focus of research problem. Therefore for the purposes of this research mostly company related information and publicly available information was used. However, in such situation right methodology was an essential for the creation of an analytical link between company information about target markets.

There were several attempts to find ready made methodology for the market potential estimation for the companies in the transportation industry and especially in tank container shipment sector. However, no such readily made methodology was found. Therefore, unique research methodology model had been developed. This research methodology tri folded: first it takes makes uses of general theory about supply chains as a link between supply and demand provided by transport. Therefore full picture of supply chain was mapped by the means of planting all the information available in the shipment data base onto the origin destination based demand supply cumulative table. The second step was reconstruction of links between products and its end users markets by means of investigative marketing research technique. And finally those final consumers markets potential was estimated. In other words this teqnuique allows finding a final user of the product shipped and then making a further connection the market for the final goods in production of which this product is used intermediate. This kind of investigative or reverse marketing allows pointing out markets with the most potential to drive demand for import and export moves of fine chemicals in tank containers from and to Russia.

In the course of research for the methodology of demand potential estimation researcher came across a number of works that have a relation to the demand estimation or demand estimation for transportation services. All the works that deal with demand estimation are tangent at best to the needs of real world problem that current work was out to solve. However I would like to draw several examples of some academic works ideas that influenced and in some way created a theoretical background for the methodology invented specifically for the purposes of this study.

First in the list the work by Michel Beuthe (2009), this work focuses on estimation of marginal benefits of an airport capacity extension and estimate return on investment and major finding of this research is that demand for airport extension would increase as congestion grows. Plus author tries to estimate a user's cost of congestion. Despite the fact that this work is related to the transportation demand estimation and study of factors or variables that influence it, bears a small value in finding a model for demand

potential identification and estimation for the international transportation of liquid chemicals tank containers.

Further research leads us to take a look a into more general works on demand estimation as a paper by Lindsay Meredith (2004); This article describes a template that can help guide managers through product interactions and demand drivers in order to produce a realistic demand estimation. This work is based on author experience of analyzing wrong demand forecast and study of variables that lead to wrong demand estimation. This work is listing variables that lead to wrong market projection results. Event though this work is suppose to be concentrated on the negative side it has a very good holistic picture all the factors that created a total market demand as well as includes notion of domestic and import and export components at the core and notions and pinpoints the that direction for study of derived demand should include end-use market evaluation and analysis of demand drivers. These notions are very easeful theoretical concepts that were applied within a framework of investigative marketing teqnuique. It also serves a good confirmation of the supply and demand reconstruction on the base of historical shipments for imports and export as it pinpoints some factors that can influence a wrong reading of amount of shipments caused by temporary demand spikes as strikes or other structural shifts in supply.

The work of Clifford Winston (1981), studies factors that influence demand for the freight transport and in particular on the transpiration mode choice. His work leads to finding that rather price then service influence the choice of individual manager in decision about which mode of transportation to use. However he also emphasizes that level of service as well as price is the major driver for traffic generation. This finding has an overall implication in the analysis of price policies of HGT in Russia as well Hoyer Global Group overall pricing and cost transformation guidelines, when pricing policies require inclusion of empty container reposition costs into the prices for the customer.

AVIV NEVO (2000) advocates usage random coefficients logit models for marketing analysis especially for estimation of demand for differentiated products. Even though the fact that this work has a high academic value the model described in this academic work is not applicable to the solution of a demand potential estimation in the current thesis.

Xin Miao, Bao Xi in their joint work (2008), put an objective to study the quantitative forecasting method for agile forecasting of logistics demand in dynamic supply chain environment. In course of work they analyze characteristics of several dynamic logistics demand estimation methods and conclude that agile method is the most useful for forecasting dynamic logistics demand. The findings of this research are very useful on the operational level within certain supply chain networks operated by one company and has no direct bearing on product end used driven demand estimation for international tank container transportation of liquid chemicals.

Another classical work on modeling of freight transport demand was written by W J Baumol; H D Vinod (1970); puts shipper’s decision as central driver for the demand for transportation services. Furthermore it argues that Shipper’s decision on amount and

quality of transportation services is influenced by his concerns about receiver's inventory status, which involves safety stock and inventory in transit factors. This model of demand estimation is another example of very practical operational application for certainly known sourcing and distribution channel which need certain goods for the certain end user. In our particular case of demand estimation we are rarely have this level of precision and if we have further analysis of inventory is complicated by technicalities of production cycles and certainly not focused on inventory optimization driver of demand.

Taihyeong Lee, Patricia L. Mokhtarian (2007) investigates the aggregate relationships between the transportation and communications inputs demanded. Study found a pattern of complementarity between transportation and communications manufacturing, and substitution between transportation and communications utilities. These study findings might be only distantly applied to the informational study for a choice of office locations for HGT in countries where it operates. Sometimes those choices should be influenced by transportation and communication correlations. However this study doesn't provide any model or methodology that is applicable in this regard.

Marina Di Giacomo (2007) use Log-it model for structural demand estimation. Furthermore this work use demand estimates for the further extraction of marginal costs and price elasticities for the target product. Also it draws overall direct economic influence of new product brands introduction on welfare gains via decrease and increase in prices for the goods. This is only might be interesting from the stand point of centrality if demand estimation for the further direct marketing research way, however it also says that reverse marketing research is possible. This research is used to arrive to demand estimations via study of explicit general effects on the welfare of introduction of new products on the market in our cases on the markets of end products where chemicals used as intermediates. Plus one has to remember that we are looking for the demand of transport which is derived demand from the demand for goods transported. Therefore such direct market studies only pinpoint how far reverse marketing should go in order to reach a goals set in the current research.

One more classical study on the demand estimation by Jacques H. Dreze (1980) focuses on price elasticity of demand that has an affect on demand curve for a risk-averse firm explicitly shown by kink on that curve. Author argues that the reason for this effect is not a asymmetrical reactions of competitors but is due to uncertainty of consumers reactions estimation; This work has a little implementation for besides general theoretical background to the solution of the problem posed by current research goals.

Thomas J Zlatoper; Ziona Austrian (1989) This work confirm the fact that freight rates have a significant impact on shipment decisions were base on utilization of linear logit and probit models. This work also argues that those models can be used for studies of deregulation effects on the markets for freight transport and on demand for it in particular. Thus, being a classical study it provides and general insight on major factors that can influence demand for freight tranpsortation services. Even though that work claims that its methodology can be applied to estimation more wider macroeconomic factors on demands for freight rates it still only confirms the fact about freight rate

influence on demand for transport. However in our research we are intersted studying more about other factrors that stimulate demand for trnapsportation of certaion goods, rather then just price for their transporation.

Robert J. Thomas (1985) in his work " Problems in Demand Estimation For a New Technology", among many methodologies for demand estimation suggested work with a data base in order to trace annual demand growth and make a future demand estimates. While author made other valuable suggestions for improving the accuracy of demand estimates, work with data base for estimation of demand growth is applicable in the case of current research. In our case we can use shipments data base for 3 years and try to trace demand growth patterns for certain products in certain markets of certain countries. Therefore this approach was widely applied in current work.

Timothy J. Bartik (1986); is a classical study of effect of budget constraints on estimation of demand in Hedonic price models. This study contributes to the clarity of demand estimation models but has little value for the current research beside general notification of budget constraint significance for demand estimation results. This work might serve a good background for other classic works on transport and freight demand estimation conclusions about freight price influence on the demand for the freight transportation services.

O Z Tamin; LG Willumsen (1989); Provide an interesting notion of using Origin Destination or O-D matrices for the estimation trip making behavior for different trip purposes and time periods. This provides theoretical background for application of a origin destination matrices for the reconstruction of supply demand patterns via linking of products shipped at origin to their end uses in the port of destination. This particular methodological technique was applied for the purposes of current research.

Jeff Ferrio , John Wassick (2008); This work is a comprehensive study for optimization of chemical supply chains that deals with individual customer demand for transport and preference for certain modes of transport at each location on the production site. This is a very useful study for optimization of chemical supply chain which also crystallizes a role of transport within the chemicals production cycle. Having rather technical and practical implementation of optimization of networks it can't serve for purposes of general demand estimation but rather speculates on the methods of chemical transportation optimization.

Alan L. Erera, Juan C. Morales, Martin Savelsbergh (2005); Concentrates on the improvement of the asset management practices in the field of international logistics of the high-value chemicals transportation in the ISO tank containers within a global value chains. Interestingly this study accounts for the fluctuating demand and imbalanced trade flows but makes the main stress on effective asset management of expensive transportation equipment and focuses on such management problems faced by tank container operators as routing and repositioning decisions and their influence on total operating costs. Also argues that fleet sizes can be reduced due to effective container management. All in all this work makes a great contribution to the asset management optimization and brings value for the current research in the form of identification of a problems connected with repositioning of empty containers because big strategic

decisions about entering certain geographical market is tightly interconnected with allocation of container fleets necessary to serve the operation in the new market area.

Guido Berning, Marcus Brandenburg, Korhan Gürsoy, Jürgen S. Kussi, Vipul Mehta, Franz-Josef Tölle (2004) This work study a chemical production processes from the stand point of the chemical plant. This work has a potential to be used in the further studies of role of logistics in the chemical supply and value chains. However, the scope of this work is not correlated with the scope the current research.

Vasilious T. Voudrojis S (1996) is a work on the optimization of supply chain of a fine chemical industry by looking at dynamics of the system, simulation of an existing scheduling policy and its efficiency evaluation. As this wok majorly concerned with debottlenecking of operational processes within chemical production cycles it has only some value to the current study as it may suggest some insights on the raw materials or ingredients consumption rates calculation with regards to the production cycles. However this work brings no value in this respect.

In their work L Lei, Q Wang and C Fan (2006), introduce transportation service provider or 3rd party logistics partners associated cost into the analysis of supply chain profitability. They perceive transportation as a supplier buyer channel which provides more broad definition of logistics that includes transportation storage and distribution. This work makes us think in a holistic terms about trade in chemicals and all the intermediates involved on the way from supplier to final consumer. It's applicable to the mind mapping of the entire potential players involved into the adding a value to the product while it en-route to the final user. Involvement of lesser amount of players cause in lawyer prices to the final user of a product shipped and might influence increase of demand as well as for the demand for its transportation.

John T Gardner; Martha C Cooper (2003), introduce a concept of supply chain mapping and its visualization in order to facilitate supply chain membership and structure evaluation and its consequential application to the company strategic planning process. In general this conceptual work sheds some light and draws an attention to such current research related issues as reconstruction of all the players involved into the process of transportation of goods to the final user. Supply chain mapping is a very useful technique in the current research as one has to reconstruct a whole picture along the transportation channel of a certain good in order to be more precise in deduction of final user of the good shipped because the final user of good shipped is the major source of demand for the goods and their shipments.

Jill Kaufman Johnson in his monograph "Transforming the Chemical Supply Chain", published in Better Business magazine in April 2007, offers a new business model that can reduce cost and keep companies compliant with regulatory challenges claims disclaimer for this work, which is another work on chemical supply chain and might be used in the further theoretical research for the role of logistics and transportation within chemical supply chains and lays beyond current research scope.

Tung-Hsiung Kuo, Chuei Tin Chan (2008). This work uses A mixed-integer linear program (MILP) to create a multi-period planning strategy under the constraints of given

supplies and demands in the supply chain of light aromatic compounds, i.e., benzene, toluene, o-xylene and p xylene, in the petrochemical industries.. This allows for calculation of inventory level of every material in the production process. This is an example of a very technical article that might be applied to the solution of production process planning and if applicable to calculation of consumption rates for the inputs. However as the scope of work for demand estimation is limited and we can't estimate demand for raw material of every such production facility in Russia as we don't know particular specifics of the production processes.

Johannes Jacobus Louw (2006); This detailed study of petrochemical supply chains which include upstream feed clusters (upstream in chemical value chain), downstream product clusters (downstream in the chemical value chain), and macro logistics network clusters (within and across related logistics networks for liquid bulk, dry bulk, packaged goods and gases) is a very good guide for the location of logistics in the area of chemical production. This work might be used in the further research or the role of logistics in the chemical transportation which is indicated area of future study for the benefit of academic research.

Among other challenges that were encountered during the research besides no readily available research methodology was procurement and collection of company related information which included reconstruction of data base information on the HGT Russia moves over 3 years. For some it might seam easy task hinging on mere extraction of data from the data base in the form of pivot tables. However, if one will think of what actual information he needs for the reconstruction of full supply and value chain together with hi lighting of potential demand areas will puzzle any experienced operations, commercial or financial department manager due to the fact that some of them might not have access to whole information like operations manager, some will think that it is actually more important to talk to clients directly instead of conducting of some kind of reverse marketing investigations, and finally the one who definitely has all the information about all the shipments made and probably sees supply chain and even some of the value chain of certain products very clearly would say that it would be a crime to give up an information about company clients for the study that just might confirm what we already know and certainly not give us more knowledge. Facing this situation, researcher had to balance on very thin ropes of trust given to him by all the 3 manager types and collect information by bits searching for evidence in the operational documents as Bills of Lading, Arrival Notices and other shipment related correspondence stacked at the company archive shelves. Experience of operations manager in the shipping company became very useful in this investigation.

Of course interviews became a very valuable sorce of information for me as well. Therefore many interviews were also conducted in order to understand how Russia related business in handled within the HGT business unit of Hoyer Group. For this all the stuff of HGT and Hoyer Group walked extra mile and paid tremendous amount of time and patience and energy to answer my endless streams of questions about sales practices, operations details, structural and regional divisions and relations with agents around the world and in Russia. My interviews with such managers as Roman Blechshmidt, Andreas Essinger, and Jacko Van der Hoek from the sales department of HGT gave me a huge insight into the commercial practices of the company. Plus

knowledgeable advises from HGT commercial director and my project supervisor Menno Dekker Douwes was of great help in this time consuming business of sorting how business works in reality.

Another challenge that was faced during this work of grinding all the bits and pieces of information into the structured piece of intelligence on this transportation sector of fine liquid chemicals market potential in Russia Is that one can feel some tension without going to World Wide Web and trying to figure out what on earth is fine chemical. However after one goes and checks he gets 100 different answers because there are too many of them with even larger number of applications. The challenge than is to be precise in the matching of product finial uses because on this precision hinges all the market demand potential estimation and its further development strategy.

Findings on demand potential estimation are presented in the Chapter 7 of this work. Chapter 6 does work on methodology testing and application and prepare information for the firthe investigation in Chapter 7, Chapter 5, 4 and 3 are dealing with the description of and analysis of major trends in the secretor for the international transportation of liquid chemicals around the Globe and in Russia. Chapter 2 gives an outlook of major developments in chemical industry and trade in Russia and Globally. Introduction or Chapter 1 introduces the problem and sets up major research question, introduces methodology and includes note on academic literature and challenges that had to be faced during the research process. In short, conclusions of this study are that Russian market for export and import moves of liquid chemicals in tank containers has a great potential for HGT to tap into especially in for the import of raw materials for Personal Care market products.

Chapter 2: Chemical Industry

Literature and informational sources overview

During writing of the first part of this chapter used following articles such analytical articles on chemical industry as Global Business of Chemistry (2008) which gives a good outlook of industry development till the year 2008, for more analytic materials author also consulted a papers as Davis, Sean (2008) Petrochemical Industry Overview, Chemical Economics Handbook Program which also provides a good summary of main trends till the year 2008 and finally SRI Consulting (2008) paper closes a line of papers that provided pre 2008 trends . Such papers written by ICIS insight director Davis, Nigel (2010) Petrochemicals – a Changed World, ICIS Insight Editor, Amsterdam, February 15, Davis, Nigel (2010) a Petrochemicals – Future Trends, ICIS Insight Editor, Amsterdam, Feb-15; and Dvorocsik, Andy (2010) An Uneven Introduction: As the Chemical Industry Looks to 2010 for Better Times, Demand Will Vary Significantly By End Market and Geographic Region. Amsterdam: ICIS Chemical Business and finally APPE (2010) Petrochemicals; Describe situation in the chemical market till the present days with all the dynamics of struggle and recovery from the recent economic crisis.

2.1 Global Chemical Industry Outlook

Globalization of chemical industry began in the 1960s as a result of large sums of investments poured into production facilities, contributing into development of world markets, while prices of various chemicals have been formed by global demand and supply. In the business of chemistry world trade is an important element of globalization. Historically, many of the industrialized nations have retained trade surpluses in chemicals.

Global chemical business comprises individual companies that are concurrently suppliers, competitors, and customers and conduct the foreign trade of industrial chemicals, chemical raw materials, and chemical products.

As one can see from the table, the US is the biggest national producer of chemistry products while Asia Pacific is a leader among the largest regional markets, followed by Western European and the North American markets. Though the trade of chemical products is done on a global scale, only a dozen of countries account for volume of world's chemical output. Due to changes in currency rates, year to year changes can be noteworthy. The term "shipments" should be referred to the term turnover, or value of output.

Global chemical shipments are classified by regions as well as by countries. As a rule, the highly industrialized countries generate a large selection of chemicals varying from commodity industrial chemicals that are used to produce goods, to specialty chemicals that are specifically made for tailored applications. The national chemical industries of developed countries usually produce basic chemical products such as inorganic commodity chemicals and fertilizers, and some of them provide certain amount of specialty chemicals. Additionally, the industrialized nations own a large scope of technological knowledge in conducting

research and process engineering, a great abundance of management skills and capital labor that is highly skilled and can provide technical expertise.

Multinational chemical companies emerged as a result of globalization development, investments and markets have extended industry capital resources, provided world economic growth, decrease of tariffs, and removal of other trade barriers, as well as rapid growth of air transportation and technological achievements in telecommunications.

Over twenty years ago, the chemical market of developing nations demonstrated a moderate domestic production, thus, developed countries retained little or no competition globally. However, the situation has changed when developing countries took steps in developing comparative advantage in chemical industry. Newly industrializing countries (NICs) of Asia such as Singapore, South Korea, Taiwan and Thailand made significant investments into development of chemical business as well as larger economies of Latin America (Argentina, Brazil, Mexico and Venezuela).

As of now, North America and Western Europe are remaining to be centers of industry growth, but China and other Asia-Pacific, as well as Brazil, and Eastern and Central European countries that will collect major foreign direct investment and retain export interest in the nearest future. The advantaged-feedstock nations (with abundant and low cost natural gas) in the Middle East become rapidly advantageous as players in global petrochemical markets.

As it is seen in the table from the data that demonstrates trade balances in chemistry trade by major nations of a region, Western Europe is the largest exporting area, even after not taking into account the trade within the EU countries, which is provided in the figures.

According to the accompanied table below, Japan holds a modest surplus. Asia-Pacific block is characterized by a significant deficit in chemistry trade and has been traditionally followed by countries of Central and Eastern Europe, Latin America and Africa.

As a result of American and Western European investments, the appearance of large companies on the global chemical market originating from developing nations in the 1990s resulted in the increase of competition and shifting market positions of major companies that had foreign subsidies for many years. Over the last seven years, the US trade surplus was eroded and North America is facing a quite significant deficit. The deterioration in the trade balance was the leading cause of the United States losing its position as the world's largest exporter and being overtaken by Germany in 2003.

During the last 12 years, world trade in chemicals provided higher growth than global output which is characterized by intra-company nature and presents a third of the world trade. Such countries as Ireland, Belgium, Hong Kong, and Singapore serve as an entree port and because of re-exports often ship more than the value of their nation's chemical industry.

Table 1: Global Chemical Shipments by Country / Region in billions of USD over the period of 1998 -2008

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
United State	416.7	420.3	449.2	438.4	462.5	487.7	540.9	610.9	657.7	664.1	689.3

Canada	21.1	21.8	25.0	24.8	25.8	30.5	36.2	40.2	43.7	45.5	47.7
Mexico	19.1	21.0	23.8	24.4	24.3	23.5	25.6	29.2	32.0	33.4	37.8
North Americ	456.9	463.1	498.0	487.6	512.6	541.7	602.7	680.3	733.4	742.8	774.6
Brazil	46.5	40.0	45.7	41.5	39.6	47.4	60.2	71.1	82.8	96.4	126.7
Other	59.2	58.1	60.8	63.4	58.6	62.9	69.9	77.2	84.6	89.5	102.1
Latin Americ	105.7	98.1	106.5	104.9	98.2	110.3	130.0	148.3	167.4	189.9	228.8
France	79.1	78.5	76.5	76.8	80.5	99.6	111.1	117.5	121.3	138.4	158.9
Germany	124.9	123.2	118.9	116.1	120.1	148.1	168.8	178.6	192.5	229.5	263.2
Italy	63.9	64.6	59.5	58.6	64.5	75.8	86.6	89.8	95.3	105.9	122.9
UK	70.3	70.1	66.8	66.4	69.9	77.3	91.3	95.2	107.8	118.2	123.4
Belgium	27.1	27.0	27.5	27.1	28.7	36.1	41.8	43.5	46.9	51.6	62.6
Ireland	16.9	20.1	22.6	22.9	29.1	32.3	33.9	34.9	37.5	46.0	54.8
Netherlands	29.7	29.4	31.3	30.6	32.3	40.1	49.0	52.7	59.2	67.9	81.7
Spain	31.0	30.8	30.8	31.9	33.4	42.0	48.9	52.7	56.7	63.7	74.8
Sweden	11.1	11.4	11.2	11.0	12.5	15.9	18.2	19.3	21.2	21.2	22.6
Switzerland	22.1	22.2	19.4	21.1	25.5	30.3	33.8	35.4	37.8	42.7	53.1
Other	27.1	26.8	25.9	26.4	27.9	33.5	38.6	42.9	46.2	50.3	58.9
Western Europe	503.1	504.0	490.4	488.8	524.4	630.9	721.9	672.7	822.4	935.4	1,076.
Russia	23.8	24.6	27.4	29.1	30.3	33.4	37.5	40.9	53.1	63.0	77.6
Other	22.3	20.3	21.9	23.4	25.3	31.4	39.6	46.2	55.0	68.4	58.7
Center/Easte Europe	46.1	44.9	49.3	52.5	55.6	64.8	77.1	87.1	108.0	131.1	165.1
Asia Africa Middle East	57.2	53.2	59.2	57.4	60.4	73.0	86.4	99.3	109.6	124.2	160.4
Japan	193.8	220.4	239.7	208.3	197.2	218.8	243.6	251.3	248.5	245.4	298.0
Asia Pacific Excluding Japan	215.2	241.9	276.1	271.5	300.5	369.1	463.9	567.5	668.8	795.5	993.2
China	80.9	87.8	103.6	111.0	126.5	159.9	205.0	269.0	331.4	406.4	549.4
India	30.7	35.3	35.3	32.2	33.5	40.8	53.3	63.6	72.5	91.1	98.2
Australia	11.3	12.1	11.2	10.8	11.3	14.9	17.0	18.7	19.1	22.8	27.1
Korea	39.3	45.5	56.3	50.4	54.9	64.4	78.7	91.9	103.4	116.7	133.2
Singapore	6.3	8.5	9.5	9.4	12.5	16.1	20.0	22.0	25.8	28.9	31.6
Taiwan	21.9	23.7	29.2	26.8	28.4	34.3	44.5	49.5	53.8	57.4	62.9

Source: Global Business of Chemistry (2008)

As it is demonstrated in the chart by Nigel Davis, editor of Chemical Insight, according to the American Chemistry Council, global chemicals output including pharmaceuticals in 2008 equaled $3.7 trillion. Affected by the global economic crisis that began in 2008, manufacturing and consumer demand has collapsed, and chemical industry, in particular chemical suppliers of the raw materials, were deeply influenced by latest patterns of demand for chemicals in the situation of imbalanced crisis recovery dynamics with US GDP being on a faster recovery track than that of the European countries. Davis, Nigel (2010) Petrochemicals – a Changed World, ICIS Insight Editor, Amsterdam, February 15

It is important to emphasize that Global Business of Chemistry Production Index in 2002 equaled to 100, was characterized by sharp decline in the end of 2008 and demonstrated some revival since beginning of 2009.There was steep drop in EU chemicals production from peak of 109.6 points in the first quarter of 2008 to the lowest level in the first quarter of 2009 of 86.6 points, then slow growth to 92.7 points in the third quarter of 2009 with expected 96.7 points level by the fourth quarter of 2010.

As of 2008, share of global chemicals output was the following: Asia excluding Japan 26%. Western Europe 21%, North America 19%, China 14%, Latin America 6%, Eastern and Central Europe 4%, Middle East and Africa 4%, Japan 6%;

Share of total global chemicals output was as follows: Pharmaceuticals 23%, Bulk Petrochemicals and Intermediates 20%, Petrochemical derivatives and other industrial chemicals 18%, Other Specialties 11%, Inorganic 8%, Consumer Products 8%, Agricultural Chemicals 7%, Coatings 4%, Adhesives 1%.

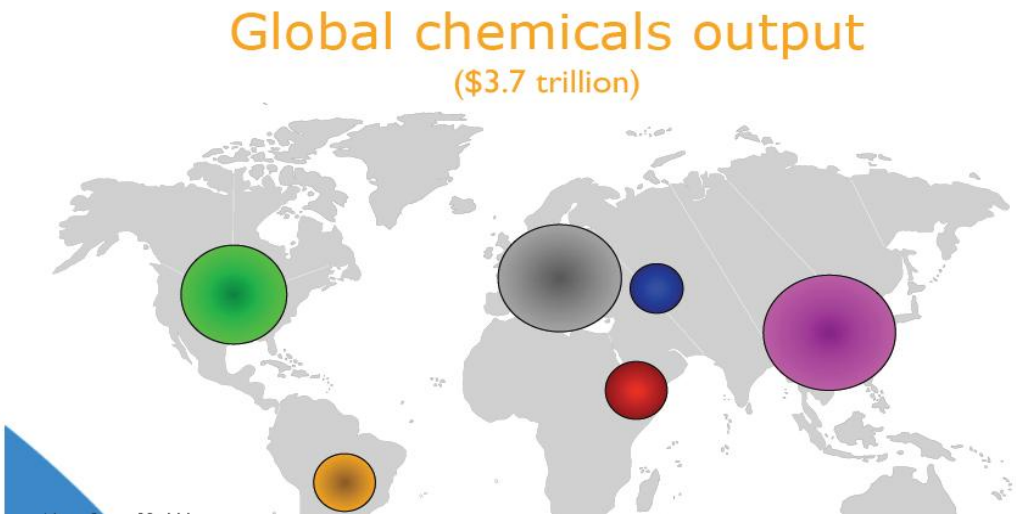


Figure 1: Global Chemicals Outlook, source: Davis, Nigel (2010) Petrochemicals – a Changed World, ICIS Insight Editor, 15th February, 2010, Amsterdam

Speaking of global chemicals demand, strong growth for polymers in China outpaced that in Northern America and Europe. In 2009 China total demand for poly olefins has been driven by government stimulus, as experts warn in their estimation, there is a possibility of a bubble burst, a demand bubble which is expected to deflate somewhat in near future.

In order to clarify, “the organic chemicals with the largest production volume in the petrochemical industry are methanol, ethylene, propylene, butadiene, benzene, toluene and xylenes. Ethylene, propylene and butadiene, along with butylenes, are collectively called olefins, which belong to a class of unsaturated aliphatic hydrocarbons having the general formula CnH2n. Olefins contain one or more double bonds, which make them chemically reactive. Benzene, toluene and xylenes are commonly referred to as aromatics, unsaturated cyclic hydrocarbons containing one or more rings. Olefins, aromatics and methanol are precursors to a variety of chemical products and are generally referred to as primary

petrochemicals". Davis, Sean (2008) Petrochemical Industry Overview, Chemical Economics Handbook Program, July.

China share in total demand for poly olefins is growing, creating a demand bubble which is expected to deflate somewhat in near future. However, China will stay on course of gaining a larger share of the total global demand for poly olefins which is forecasted to grow up to 28% of total by 2030.

There is a trend of recovery in margins since the end of 2008 and those margins are driven by costs and prices. According to the sectoral outlook for 2010: growth of 2.6% in consumer chemicals, 5.5% growth in specialty chemicals, 6% in petrochemicals, 5.3% in polymers and 5% in basic in organics growth rates are expected in EU petrochemicals. For EU chemical production, quarterly outlook suggests 4.7% growth rates starting from the first quarter of 2009 and still not reaching pre 2008 growth rates and levels. Furthermore according to the total global chemistry outlook 4.6% and 5% growth rates expected in total world chemical industry for 2010 and 2011 respectively.

However, chemical industry sector is under extreme pressure and turn up is not expected in the nearest future. Fourth quarter inventory holding losses and decline in sales volumes reached 20% for Shell Chemicals and DuPont and 17% for Dow Chemical. Volumes started to improve since second half of 2009 driven by China import demand growth.

China has overtaken Germany and Japan to become the world's second largest chemicals market. Chinese companies already became world leaders in clock, watch, furniture and air conditioners production and consequentially developed a strong demand for chemicals which took away domestic demand in EU, US and Japan. China exports 3% of world consumption of synthetic rubber, 7% of air conditioners, 4% of refrigerators etc. However, there is a trend of growing trade deficit due to rising demand for chemicals caused by industry growth.

Nevertheless, one should keep in mind notorious cyclicality of petrochemical industry. Additionally, there are growth opportunities in Asia and the BRIC nations, which have wide implications for North American, Western European and Japanese business. Petrochemicals are derived from oil and gas and are building blocks for many other products. And even if plastics producer margins were squeezed significantly over recent period they will continue replacing traditional materials such as wood, glass and metal.

Petrochemical industry is a global business with annual sales volumes estimated to reach 3.7 trillion in 2008 from 3.2 trillion in 2007 and 2.9 trillion in 2009. Among them petrochemicals, plastics, man-made fibers and rubber dominate and have a largest share of global output amounting to 1.4 billion in 2008. The leading players of chemical industry in 2008 were: BASF, ExxonMobil, Dow Chemical, LyondellBasell, Shell, INEOS, SABIC, Sinopec, DuPont, Mitsubishi Chemical, Total.

Due to recession, major companies made some dramatic adjustments, they are seeking change and some exit certain markets, for example BP sold Innovene to INEOS. Huntsman had divested from its bulk business without successful sale of it to Hexion because of credit crunch. There is an increasing focus on core competiveness and further consolidation and reshuffling by exiting some sectors and selling them to specialists. For example, Shell exited

polymers and linked chemicals and oil products business units, Total exited chlorine and intermediates with Arkema spin off, Basell (joint venture with BASF) divested to Access Industries, SABIC invested in Mid East and acquired GE plastics, Access acquired Lyondell and merged with Basell. LyondellBasell sought Chapter 11 bankruptcy protection for business in the US.

As Andy Dvorocsik emphasizes, “early in 2009, demand for most chemical products fell to five-year lows, before output stabilized and a gradual recovery began. The reduction in chemical output was driven by a decline in demand across chemical end markets and a fundamental reset of demand in two sectors - construction and automotive. In US construction, new housing starts are down by 75% from the peak. In automotive, midway through 2009, US auto production was essentially cut in half. These declines in demand were exacerbated by an industry-wide destocking cycle at the end of 2008 and the start of 2009…. Major chemical companies and key customers, notably auto giants General Motors and Chrysler, filed for Chapter 11 bankruptcy, many others teetered on the brink, while numerous smaller convertors and participants in the downstream value chain simply went out of business….On the brighter side, commodity and raw material prices decreased significantly from their 2008 highs but remained volatile compared to historical levels”. Dvorocsik, Andy (2010);

The expert predicts that beyond 2010, capacity increases in the Middle East, Asia and elsewhere will make global overcapacity almost inevitable. For the industry it will mean that chemical demand growth for 2010 will be highly end-market specific. The author examines the drop-off and recovery of demand across the chemical industry's key end-markets and identifies four end-use segment categories:

1. Recession resistant - segments with robust demand that did not experience a significant downturn, e.g. pharmaceuticals and food products and personal care.

2. Normalized - segments that bottomed out early in this downturn, and have recovered with a boost from inventory restocking, e.g. semiconductors and petroleum products.

3. New normal - segments that have experienced a permanent reset to lower demand levels with the anticipation that they will resume normalized growth form a reduced base, e.g. automotive and construction.

4. Recovery potential - segments that bottomed more recently and, in 2010, may still recover with a boost from restocking, e.g. consumer durables, computers and electronics, and apparel.

According to Andy Dvorocsik, the last category, recovery potential, is the most interesting. He forecasts that “in 2010, the recovery potential band will disappear. End-markets in that category will either return to normalized or demand will not return and these end-markets will be reset as new normal. Leading up to 2008, the average ethylene demand growth over the past 10 years in China has been 10% or greater. In established regions it has been 2% or less. This trend will only be magnified by the fact that the recession hit established regions much harder than emerging ones”. Dvorocsik, Andy (2010); General trends were a better returns search in the face of poor profitability of petrochemical industry. However, cyclical

upturn arrived in 2004 and lasted through 2007, during which oil majors were seeking stronger upstream integration and overall number of integrated players diminished due to strong influence of private equity up to 2008 when oil prices collapsed and led to wide-spread de-stocking in the industry.

Middle East is also emerging as a major player of petrochemical industry by using its competitive advantage and significant additions to capacity planned up to 2015. Thus, there are certain shifts of commodity industry centre of gravity. In regards to global natural gas costs, the year of 2008 showed that Saudi Arabia, Oman, Qatar and Iran had the lowest prices, what made this region not only the best procurement region but also a best place to build on capacity. For example, low cost of ethylene and its abundance allows forecast production of 12 mt ethylene, 10 mt polymers, 5 mt MEG in Iran by 2015. Furthermore, there are additional projects in Abu Dhabi, Bahrain, Kuwait, Qatar and Oman with the search for low cost feed stock extends to Central Asia and North Africa (Egypt, Algeria, and Libya) and lead to a global overhang of olefins capacity is expected to be as high as 30mt by 2012. This will force plant closures in Europe, North America and interestingly in North East Asia.

The following chart demonstrates the changes in pattern of geographical production for primary petrochemicals in the United States, Western Europe and Japan in comparison to the rest of the world. Davis, Sean (2008) Petrochemical Industry Overview for Chemical Economics Handbook Program

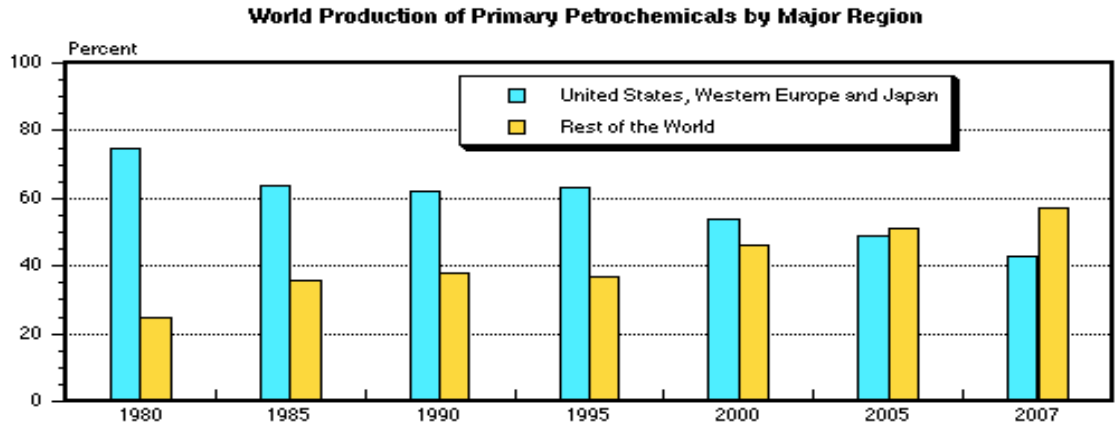


Figure 2: World Production of Primary Petrochemicals by Major Regions, Source: SRI Consulting (2008) Petrochemical Industry Overview by Sean Davis

Globalization of the world economy presents serious challenges for the chemical industry**.** Rising demand for energy has caused declines in supply, translated into skyrocketing costs, and growing environmental concerns. In order to keep up with these changes, the petrochemical industry continues to adjust through divestitures, joint ventures and other forms of partnership leading to fewer and larger producers of commodity petrochemicals with broader geographical reach.

As it can be noticed from the chart above, thirty years ago, the United States, Western Europe and Japan accumulated 80% of primary petrochemical production in the world. In 2007, their share declined to 43% as a result of production growth in other regions. Crude oil price has been on the rise since 2004 and traded for nearly $139 a barrel in mid-2008. The effect on regional downstream markets and end-user applications is significant. Situations in practically all parts of the world— North and South America, Eastern Europe, the Middle East, Asia, and Africa—have growing global implications on supply and demand for petrochemicals and raw materials.

“EU chemical industry share of the global market is likely to decline as a result of the rapid growth of chemical production in Asia-Pacific countries and the Middle East. For example, it has been predicted that over the next decade their annual growth rates for ethylene production will be respectively, 3.5 and 8.5 times faster than that of the EU. Average loss in capacity to invest could result into significant delocalization of production capacity leading to carbon leakage to regions with lower energy performance.

60% of its production costs of petrochemical industry are related to energy. Plus one has not to forget that this industry is characterized by cyclical profit margins. The major products exposed to the highest levels of competition listed in the figure below:

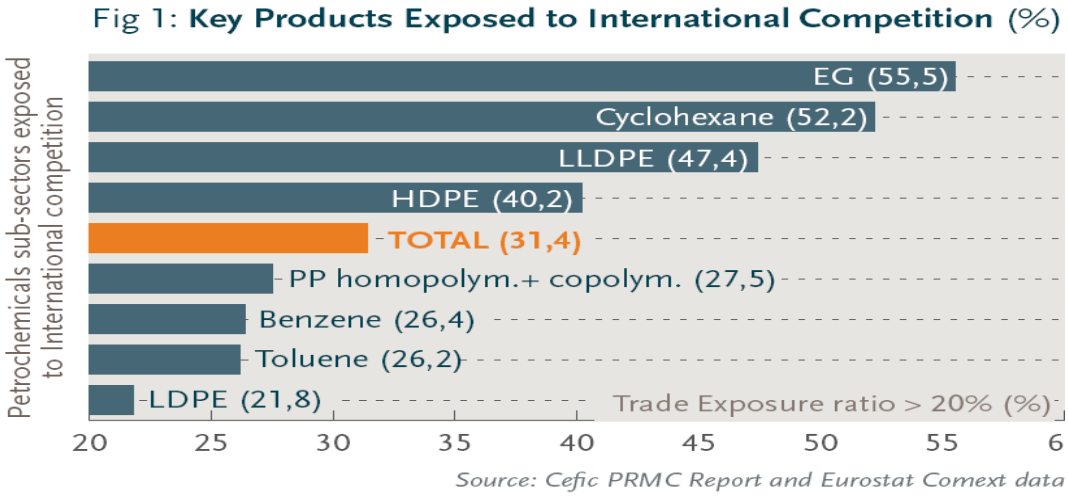


Figure 3: Key Petrochemical Products Exposed to International Competition; Source: APPE (2010) Petrochemicals;

The primary sources of basic petrochemicals are fossil fuels, i.e. coal, crude oil or petroleum, natural gas liquids and natural gas. Petrochemical prices are heavily impacted by fluctuations in the world energy market, although petrochemicals are a small subset of world energy demand.

In conclusion, developed regions respond by focusing further on added value specialties while new technology is a driving force for change. Moreover, equity partnerships are growing in importance and restructuring trend is obvious in the industry but there is still a lot of room for

consolidation with no impact in competitiveness. Rising differences in regional demand and production characteristics should be also taken into account.

As Nigel Davis, editor of Chemical Insight argues that, notwithstanding global economic slowdown, chemical industry remains to be characterized by the following features:

1) It's a big industry which supplies intermediates for products and articles we use every day and, therefore, its steady growth is assured for the foreseeable future despite the fact that longer-term margins are under pressure;

2) Major source of opportunity for growth is in Asia where increase in large-scale production in the Middle East and China is based on feedstock and market opportunities;

3) EU business has to change therefore. New capacities in Asia will drive next petrochemicals 'down cycle' and lead to possible future supply/demand balances which will cause operating rates at older European and North American plants to go down. KPMG identified 40 developed world crackers that may be forced to close because of poor plant economics and influence various 'clusters' or groups of related plants in Europe.

4) Adapting business for change will require high levels of integration, cutting costs and improving logistics and distribution. Volatility and cyclicality should be dealt with as they remain to be industry permanent characteristics. Furthermore, as manufacturing industry is more regulated in the US and Europe, there will be more investment into the Middle East and other gas rich countries and regions with more growth prospects. This will cause chemical business 'centre of gravity' to shift to Asia.

5) Developed regions and countries response to this challenge by further focusing on value added specialties in chemical industry. Special chemicals' focus needs new technology to make a change. In the face of tough times many companies are restructuring and equity partnerships become more frequent. However, this industry sector is still fragmented and very competitive. Interestingly, this global business has clear regional characteristics;

6) Riding a cycle has been "a name of the game" recently and it means that:

a) Major restructuring process is expected across the industry because producers in Asia, EU and US got heavily indebted due to a high costs and reduced earnings;

b) Companies try to preserve cash now but may be battling for market share soon;

c) Transitory factors and not a real demand growth will drive regional markets what creates concerns about sustainability of demand for chemicals in China;

d) Future growth is hard to predict due to slow recuperation from recession of the major world economies;

e) Chemical industry growth rate ratio multiple to GDP will be higher in developing world markets due to large capacity build up in Middle East and China;

7) Global recession and credit crunch had a dragging effect on global markets for olefins and polyolefin's. General drop in demand for petrochemicals and destocking in automobiles, construction and manufacturing industries also hit chemical industry. For example, LyondellBasell found themselves under chapter 11 bankruptcy protection for their operations in US and INEOS has re-negotiated debt covenant waivers. Davis, Nigel (2010) Petrochemicals – Future Trends, ICIS Insight Editor, Amsterdam, Feb-15

As a result of the downturn, developed regions will have lower growth rates and price volatility will remain prevalent as global competition will continue to become increasingly fierce. Such high levels of competition will likely result in significant industry consolidation and, notably, the shut down of old, noncompetitive plants.

Like all industries, the chemical industry has navigated an unprecedented difficult time and continues to face challenges. Based on its end markets and regional footprint, each chemical business has to come to terms with the nature of the future demand, and pending industry transformations.

2.2 Russia Chemical Industry: Regional Production Clusters, Capacity and Import/Export Patterns

Literature and informational sources overview

This sub chapter main goal is to study the nature of the Russian chemical industry in some chronological order and try to sort out certain trends in these developments as well to learn about Russian chemical and petrochemical clusters as well as to try to learn about fine chemicals export and import dynamics. In this regards a work of Yuri A.Filaleev (2005); describes development of Russian chemical industry from the collapse of Soviet Union till the year 2005. Thereafter after made an attempt to reconstruct geographical structure of Russia's petrochemical cluster and for this informational resource of Russian Federal Government web-site were used in order to create a comprehensive table included in the appendix 1 and put description of the Russia's 3 biggest petrochemical clusters into the body of this chapter. Then some attention was paid to superimposing of information from the Roman Blechshmidt (2010) presentation findings about Russia's main chemical producers on the information that was extracted from the Federal Government web site. Furthermore, materials of analysis of Russian market for Chemicals imports from U.S. were included by means of U.S. Foreign Commercial Service and U.S. Department of State (2010) investment report study; The more insight were brought by inclusion of materials from the article of the ICIS Russia reporter Sergei Blagov (2010) which described delays in many projects due to the recent economic downturn. And finally informational provision for this chapter is completed by the background study of petrochemical and chemical industry compiled by APS Review (2010)**.**

More than 1.1% of the global chemical production is manufactured by Russian enterprises that that have their productive and scientific base which allows them to control production

of more than 15% of carbamide and ammonia goods as well as manage one third of world trade in these products.

Russian chemical products industry include a large range of goods such as paints and coatings, mineral fertilizers, resins, synthetic fibers, synthetic detergents, synthetic plastics rubber products, etc. Though medium and small companies are active players on the market, the Russian industry is fully privatized and is dominated by a number of very large companies. Nizhnekamskneftekhim, SIBUR Holding, Eurokhim and Lukoil-Neftekhim are the top representatives of Russian chemical industry.

Russia has a significant potential for the development of chemical industry since, by large, there is no need to build new facilities at new sites or reconstruct non-specialized facilities. There are all kinds of raw materials available that are necessary for development of the industry such natural gas, potassium, sodium chloride, chemically pure limestone, phosphoric stuff, hydrocarbon materials in the form of oil products, etc. The production facilities are well-developed, workforce is considerably highly qualified though the labor costs are relatively low, and energy supply is rather cheap.

The cooperation between Russian and international companies has proved to be successful and contributed to modernization of existing production facilities and opening of new production lines. Fruitful cooperation between the German Chemieanlagenbau Chemnits and Sayanskhimplast Joint Stock Company accomplished upgrading of caustic soda and chlorine production lines. A new advanced membrane technology replaced the mercury-based production of soda and chlorine. Several German banks and Sberbank of Russia financed this first project of such a new production line.

Another example was production of polypropylene and polyetilene at the Nizhnekamskneftekhim. At Polypropylene Closed Company located near the city of Ufa upgraded industrial facilities for production of polypropylene were installed by Technimont, Italian company that provided equipment and it technologies. As a result of joint project with US based company ABB Lummus Global, another project was successful through the installation of equipment with the total capacity producing 100000 ton of general purpose and shock-proof polystyrol. There is perspective to install linear alkylbenzol production facility in cooperation with the Sasol of South Africa.

In the Russian chemical production industry many international joint ventures are characterized by the vast geography of locations, incorporate feasibility studies as well as turn-key production facilities. An important source of needed capital became foreign loans which was directed at modernization and upgrading of 80% of the most important chemical companies established during Soviet times. There is a great potential for cooperation with foreign companies, as new production lines will require imported technologies and equipment.

According to the Russian Chemical Union, “positive dynamics in production was stimulated by the shift of effective demand on the internal market from imported chemical goods to the goods of domestic production (first of all due to the rouble devaluation in 1998 and due to favorable international market conditions for the most important export goods of the chemical sector”. Yuri A.Filaleev (2005);

Chemical industry shares 5.5% in Russian industrial structure. More than 4.5% of capital assets belong to the industry of the country. About 5.4% of total volume of hard currency to the country is delivered by the Russian chemical companies.

Chemical and petrochemical industries supply different products like plastics, chemical fibers, tires, varnishes and paints, dyestuffs, mineral fertilizers as well as intermediate products and raw materials to most Russian industries including defense, trade, education, science, agriculture, service and culture.

There are around 800 large and medium-size industrial companies in Russian chemical industry and more than 100 research and development organizations that provide jobs for more 740 thousand employees.

As Mr. Yuri A.Filaleev, Vice-President of the Russian Chemical Union points out **"**Equipment with capacity for production of up to 120000 ton of polyetilenetereftalate used in plastic bottles production was installed at the plat of Bashkortostan based Polyef company after contract was signed with US based UOP Sinco. Akron Company from Novgorod jointly with the Russian – Chinese Shandong Company completed a project for installment composite fertilizers producing equipment, which enhanced Russian company's plant capacity up to 200000 tons.

Another Russian company Phosagro prepares to start production of new types of commodities in cooperation with BASF of Germany. 440000 ton production capacity for linear sorts of polyetilene was reached by Kazanorgsyntez as result of successful partnership with American Univashe Technologies". Yuri A.Filaleev (2005)

Most of the chemical manufacturers are located in Volga Federal District, Central Federal Russia and Urals.

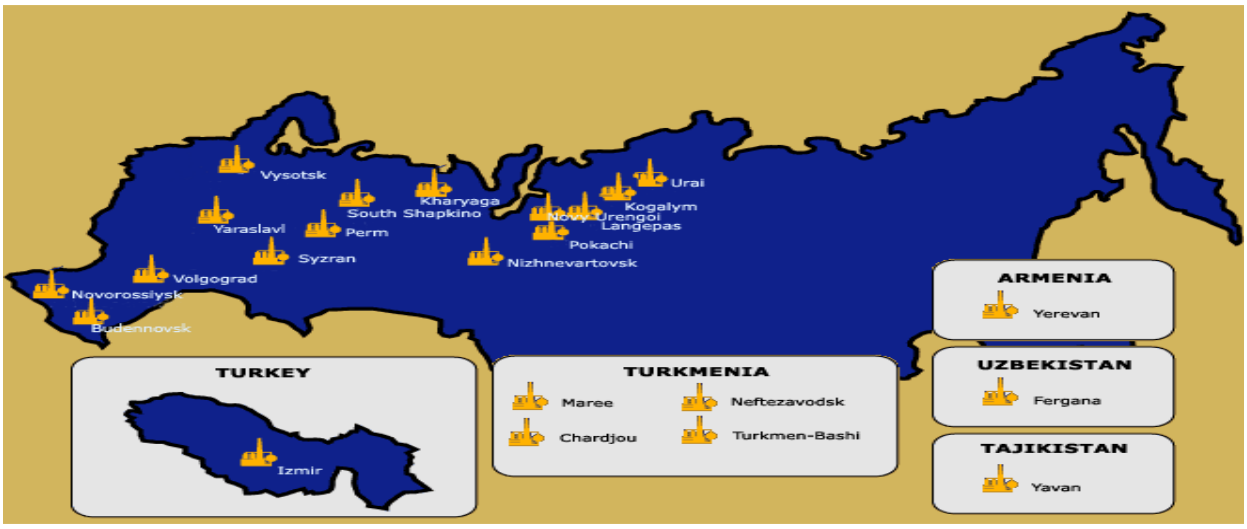
Map1: Map of Russia, Source: Roman Blechshmidt (2010) Russia, Presentation for the Hoyer Global Transport, February 2010

The largest region for the Chemical production is Volga Federal District includes: Republic of Bashkortostan, which is Russia's largest producer of oil refining, petrochemicals and half of chemicals including: butyl and isobutyl alcohols, caustic ash and pest killers, plasticizing agents, polystyrene, ¼ of PVC, caustic soda, and synthetic rubbers; Republic of Mari EI produces paint and varnishes, plastics and plastic foil at the Savier plant; Republic of Mordovia with its Saransk Rezinotekhnika plant, which produces some 15,000 rubber technical goods used in automobile manufacturing; Republic of Tatarstan mainly produces synthetic resins and plastics, polyethylene, synthetic rubber, tires, film, polymer, components for medicine and pharmaceuticals; Samara Region is location for artificial fibres production, mineral fertilizers and sulfuric acid production; The Chuvash Republic, which still within Volga Federal Region has such plants as Khimprom that produces polyether polyols, chlorines, phosphorus and silicons; Vurnar Compounding Plant, and Lakokraska plant are also there; The Perm Territory has 27 medium size enterprises; Kirov Region has Konstantinov Kirovo-Chepetsky Chemical Plant that produces fertilizers, plastics etc; Kirov tire factory produces different types of tires for automobiles; Niznij Novgorod Region plants produce fuel for engines , lubricating oils, petrochemical synthesis material, polyurethane PVC pipes, plastic products and polymer film;

The 2nd largest is Central Federal Region which includes: Kursk Region with its production of rubber, artificial fibers and polymers at Kurskrezinotekhnika plant; Vladimir Region has such chemical producers as Vladimir Chemical Plant, Vladimir Sheeting Plant, Profil, Research and Production Company Macromere, and Membranes that produce such products fiberglass, fertilizers and plastics; Moscow region has plants that produces fertilizers, plastics, varnishes, fibers and paints; Ryazan Region has Ryazan Chemical Fibre Plant (Ryazanskoye Khimvolokno), and Ryazan Carton-Rubberroid Plant (Ryazansky Kartonno-Ruberoidny Zavod) that produce soft roofing. Ryazan Oil Refining Company is also located in Ryazan; Smolensk Region has Dorogobuz that produces products of chemical synthesis and fertilizers; Tambov Region has Pigment plant that produces aniline dyes, Biokhim Plant that produces plastic products, ferments and fertilizers, Kotovsky LKZ that produces varnishes, solvents and pints, Kotovsky Plastics Plant and Tambovmash that produces polyethylene pipes; Tver Region enterprises specialize in production of polyester threads, reinforced plastics and polygraphic resins. Redkinsky Testing Factory produces corrosion inhibitors, and temperature resistant materials; AKVA-KhIM specializes on water reactant treatment systems production, MNPK Biotekhindustria and Tver Pharmaceutical Factory produce pharmaceuticals, Tverstekloplastik and the Nelidov Plastics Plant produce reinforced plastics; Tula Region largest enterprise Azot and Shchekinoazon company produce fertilizers, ammonia and methanol as well as household chemicals; Yefremov Synthetic Rubber Plant specializes in production of synthetic rubbers, polymeric compounds and latex; In the Yaroslavl region specializes on refining of crude oils delivered from neighboring regions;

The 3rd largest is Urals Federal District which is abundant in feedstock from the Tyumen region provided by its oil and gas complex; The Kurgan region serves a location for such a health care products manufactures s as Sintez, the largest one in Russia's pharmaceutical industry; Ural Industrial Rubber Products Manufacturing Plant, located in the Sverdlovsk region together with Uralplastik, which is one of Russia's largest

polymer packing and foam material suppliers; as well as for Ural Chemistry Company that produces artificial resins, special plastics, rubbers and pentaerythritol. The Yamalo-Nenets Autonomous region is reach in gas and oil and with 90% of Russian gas produced there finalizes this petrochemical cluster.



Map 13: Russia and Neighboring Counries Petrchemical Inustry Clusters Locations
Source: World Without Borders (2010)

For the references about chemical industries of other federal regions of Russia and their petrochemical clusters please refer to the table “Russia Regions with developed Petrochemical, Chemical, Fuel, Oil industrial clusters” provided in the appendix 1, which was constructed on the base of information provided on the Russian Federal Government web-site.

Analyzing petrochemical industry in Russia, one can conclude that from a technological point of view, there is a considerable gap in development in comparison with major developed countries, though a wide range of petrochemical are produced inside the country. “But chemical output amounts to just 8% of total industrial production, much lower than in Western economies where the figure stands at 14-15%”. APS Review (2010) Russia LPG Production Downstream Trends, August 30 2010

Russian producers are currently concentrating on exports to West Europe and the Far East, mainly China. Before the global economic recession of 2008, this market orientation brought some positive results, mostly on account of strong world demand. Nevertheless, to a great extent Russia is a self-sufficient country. Although there is an import of some petrochemicals, dependence on foreign sources is remaining weak for years.

In 2008, 60% of domestic chemical production was occupied by fertilizers, synthetic plastics and resins, Russia chemical exports and imports were in balance in regards of volumes, however Russia exported bulk commodity chemicals a styrene, methanol,

and synthetic rubbers) and imports high technological products (PVC, polystyrene, paints and coatings and chemical fibers);

Russian domestic producers of chemical and plastic materials cover only 50% of domestic market demand. As result more and more polymers are imported and Polyethylene became a deficit and rather expensive item in Russia over the recent years. In 2009, chemical exports from Russia declined faster than imports import rates grew. Production volumes of polyethylene materials, PVC sheets, PVC films (furniture, posters), Polyolefin films, PET films, Polypropylene sheets, Geomembranes will grow steadily.

As one can see from the table below, a certain level of recovery of total chemical production is expected in 2010.
Table 2: Market Statistics for Chemical Production, Export and Import from Russia 2008-2010;

Millions of USD	2008	2009	2010
Total Market Size	41,385	31,998	35,197
Total Local Production	44,366	34,428	37,870
Total Exports	21,630	15,980	17,587
Total Imports	18,650	13,550	14,905
Imports from the U.S.	497	357	445

Source: U.S. Foreign Commercial Service and U.S. Department of State (2010) Country Commercial Guide for U.S. companies 2010: Doing Business in Russia;

As it is pointed out in the APS Review, “Russia is a net exporter of commodity chemicals, and the country is not utilizing existing capacities to the maximum. It is a major world producer of butadiene. But aside from that its capacities for monomer production are similar to those of relatively small producing regions like Latin America. More than two-thirds of Russian butadiene capacities are based on n-butane rather than on ethylene. As other regions like South-East Asia have built capacities, the Russian position in the world market on monomers like butadiene, ethylene and propylene have become weaker. The Asian countries are in a better position to export to large nearby markets like China, where Russia has been selling in recent years. Many of Russia's monomer production facilities rely on outdated technology and equipment. Modernization has been a pressing need”. APS Review (2010) Russia LPG Production Downstream Trends

At present, the country's biggest PE producer Kazanorgsyntez seeks a bailout by the government and still is under threat of becoming bankrupt. In past few years the company relied on foreign and domestic loans to expand its PE and other petrochemical capacities. It is predicted that the chemical sector in Russia will experience a continued downturn. Russian Economic Development Ministry forecasts optimistic and pessimistic scenarios for industry’s development in 2010-2012.

“In the pessimistic scenario, Russia's total chemical output in 2012 is expected to fall by 6.4% compared with 2008, but plastic and resin production will rise by about 1%. However, an optimistic scenario involves 6% growth in plastic and resin output between 2008 and 2012, although total chemical production would still be 4% down”. U.S. Foreign Commercial Service and U.S. Department of State (2010)

"Whilst Russia's market conditions are difficult, internally and externally, production of petrochemicals, organic chemicals and plastics is mostly on the rise," Sparshott argues. "Whether domestic demand can absorb this production will depend largely on how quickly Russia's GDP grows, but it does seem for the short to medium term that export activity will play a key part in keeping plants running at good utilization levels," he adds.

The largest petrochemical projects in Russia remain behind the original schedule of implementation, Russia's petrochemical output was mixed in 2009, though there have been signs of recovery and potential growth in 2010. *Sergei Blagov (*2010)

Chapter 3: Containerized Transport of Liquid Chemicals

Literature and Informational Sources Overview

Information Sources used in the writing of this chapter are open source of Wikipedia (2010) and Shipping Container Housing Guide (2010) on tank containers. This part of the article informational was also upgraded by the general insight of the author about distinctive features of the tank containers transportation from other modes of transportation used for transport of liquid chemicals;

3.1 General Concept of Containerized Transport of Liquid Chemicals: how it differs from other modes of liquid chemical transportation

Tank containers were invented in London by Bob Fossey in cooperation with Wiliams Fairclough in the mid 1960 as a response for the improvements in movement of bulk liquids. This first tank was a beam type designed in 1967 built onto a swap body design from Fossey in 1966. The eighties and early nineties saw two different trends. From 1980 to 1999 there was a trend towards making of tank container both lighter and but also to increase its cargo product carrying capacity. This majorly resulted in a lighter and more space efficient tank containers as means of transporting bulk liquids. Wikipedia (2010) Tank chassis;

Therefore one can easily understand that tank containers were invented to satisfy the need of moving the bulk liquids. Nowadays tanks are available in many types and shapes: vertical and horizontal cylindrical, open top and closed top, flat bottom, cone bottom, slope bottom and dish bottom. Large tanks are usually vertical and have rounded corners. Most container tanks are designed to handle varying degrees of pressure. Steel remains one of the most used materials for tanks containers. They offer lower costs and better chemical resistance. In tank constructions there are some relevant standards that must be respected: wall thickness, quality control procedures, testing procedures, accreditation, and design criteria.

Tank containers are used for liquid cargoes, such as foodstuff (fruit juices, oils etc.) and chemicals (corrosion agents, fuels, toxic substances etc.). Tanks intended for transporting foodstuffs must be labeled "Potable Liquids only". Hazardous materials must be transported in tank containers with no openings below the surface of the liquid.

If the temperature control is needed, the tank containers must be equipped in addition with insulation, heating or cooling system. The temperature must be very well controlled using temperature sensors. The heaters heat and cool the tank’s cargo by circulating brine or synthetic oil around external cooling coils on the tank. Generally, the heat transfer medium is glycol and the synthetic oil is used for higher temperatures.

Tank containers are very important sector of shipping business as they allow quick delivery by intermodal means of transportation. They ensure an efficient distribution of the liquid cargoes. The tank container meets the requirements for both a storage

container and a transportation container for dangerous cargo, which contributes at simplifying the procedures for moving the dangerous cargos.

These containers have special equipment for charging or discharging of dangerous cargos and keeps cargo quality in perfect condition during transportation. They are resistant to repetitive use, have big unit capacity, and require no extra-packing materials and this make them very economic.

A big variety of additional options such as tank linings or electric heating and cooling systems can be installed on tanks at the time of production or on existing equipment. This gives a prominence to value added services introduction. Shipping Container Housing Guide (2010) Tank Container;

Overall tank containers became a separate type of transportation for liquids. What makes it different from other types of liquid transportation is not all the good qualities of reliability, standardization and speed that might be or not available in other types of transportation of liquids as pipelines, tankers and drums. Tank container is also defining a category of products that will be transported. Fore example for crude oil one will think of using pipelines or tankers, for TDI, MDI and other very toxic plasticizers would be traditionally shipped in drums and will fall more into the wholesale bulk category. Tank containers are more suitable for shipment of rather refined products that are produced a bit further downstream from refinery then bulk chemicals.

Tank container is suitable for a group of chemicals that falls into rather sophisticated category of fine and specialty chemicals, or food stuffs. These products have a higher value per ton then those that are considered to be bulk liquid chemicals and are comparatively inexpensive and have price dynamics resembling that of commodities. Therefore, shipping of fine and specialty chemicals falls into the sophisticated category of tank container shipments that can guarantee high levels of safety and a range of value added services during the period of shipment. This quality brings tank container shipment into the category of high margin transportation services and entails special expertise based on the equipment owned by tank container service provider.

Tank container shipping business also requires frequent cleaning of empty containers at specially equipped tank container depots, which are usually also owned and operated by tank container operating companies.

3.2 Position of HOYER GROUP versus competing companies

Literature and Informational sources overview

Most of the information about companies was obtained from the open sources mainly corporate sites of the companies as well as news articles. However a good insight on the initial ranking of the companies by the sizes of their fleets was provided by the combinatory and analytical paper called “tank container operators and their fleets for

June 2009". This intelligence paper includes information on all the types of containers each tank container had at that moment.

Major tank container transportation companies and Hoyer Group position among them will be studied in this subchapter. Among direct competitors to HGT are such companies as Stolt-Nelsen N.A., VOTG, Balkhaul and United Transport. Hoyer is 2nd largest tank containers operator after Stolt-Nielsen S.A. Companies market share is measured by amount of tank containers it owns and operates. Also a good and stable measurement of the performance of the company in the tank container transportation sector besides its market share and amount of containers is equipment utilization level. Overall container utilization among the companies in the sector is 70% percent. Over 80% of utilization is regarded as a very high performance indicator. Most of the companies utilized their containers fleets rationally even during economical downturn period from 2008 to 2009 and most are back to a very high utilization levels of up to 80%, like it is current situation with Hoyer Global Transport business within Hoyer Group.

Further we would like to present 10 major companies in the sector ranked by amount of containers they possess as well one will discuss major performance indicators and market strategies.

3.2.1 Stolt-Nielsen S.A. Norway (23400 tank containers)

Stolt-Nielsen S.A. is global leader in provision of integrated transportation solutions for bulk liquid chemicals, edible oils, acids, and other specialty liquids through its three largest business divisions, Stolt Tankers, Stolthaven Terminals and Stolt Tank Containers. Stolt-Nielsen Gas transports liquefied petroleum gas (LPG) with its growing fleet of very large gas carriers (VLGCs). Stolt-Nelsen Corporate web-site (2010)

Stolt Tank Containers reported an operating profit of $18.4 million, up from $12.9 million, reflecting higher revenues driven by increased shipments combined with a decrease in operating expenses. Blue Pulz.com (2010), Stolt-Nielsen reports good Q2 result

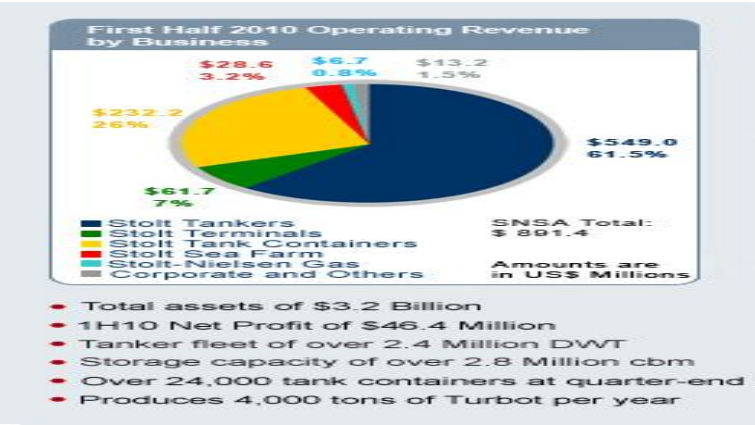


Figure 4: Stolt Nelsen First Half 2010 Operating Revenue by Business, Source: Report Linker (2010) Stolt-Nielsen S.A. (SNI) - Financial and Strategic Analysis Review; http://www.stolt-nielsen.com/

3.2.2 HOYER GROUP (13000-20000 tank containers)

Thomas Hoyer, a chairman of the chairman of the Hoyer Group, said that European tank container transportation market sector is on the brink of major consolidations and reshuffling period, and that his company currently perusing expansion opportunities as via organic growth as well as via merger acquisition opportunities. Among other strategic moves Hoyer Group is planning acquisitions in Russia in 2010. ICIS.Com (2009) EPCA logistics Special: logistics firms are expanding in readiness for new trade flows, but the economic crisis leaves the sector facing many headwinds;

The HOYER Group is world's leading bulk Logistics Company headquartered in Hamburg Germany. Close ties to its customers in Europe among which are BASF, SHELL and several other European chemical giants. In 2008 Hoyer Group had 5,408 employees in 30 countries. HOYER celebrated its 60th birthday in 2006.

HOYER Group showed 12% year on year growth during 2007 financial year and showed total turnover to EUR 935 million the rise of approximately EUR 100 million from year 2006. Thus in 2007 Hoyer growth levels were the fastest among all the industry players. The chemical industry is HOYER Group's main customer, saw tremendous slow down in a second half of 2008. However this kind of cyclicality is a common feature of global trade in chemicals and 2008 was also a profitable year for HOYER. Hoyer’s earnings before taxes rose by EUR 6.5 million to EUR 17.3 million, although the EBIT margin, at three percent, was at the lower end of expectations for 2007. Stadportal (2007) Bulk Logistics specialist HOYER heading for billion Euro turnover;

Growth in investment activity may led to weakening of the equity ratio but acquisition of new branches is necessary to be able to present diversified service portfolio in the competitive market of this transportation sector.

HOYER CHEMILOG was showing signs of improved earnings over recent financial period. This business unit was a long term chemical industry transportation partner and has a strongest position in Western Europe, enjoying being in services of powerful leaders in Germany and around the World. .

This business unit provides transpiration services most of the liquid chemical products. The list of those products can be very long but polyoles, polymers, isocyanates, fats, fatty acids and liquid resins constitute particularly lucrative transportation service provision opportunity. Since mid 2005 to the beginning of the crisis in 2008 market was described by bottlenecks caused by under capacity Diesel prices were also on the rise. To deal with rising costs business unit was successfully restructured and perused further market expansion strategy that led to stabilization of margins. Chemilog

business unit is looking out for new business opportunities and development of new markets, expansion into Russia is on the radar of this business unit managers.

HOYER FOODLOG growth was driven by increases in demand for the transport of glucose and beer. New business was found in Eastern Europe due to the massive reallocation of production facilities to Eastern Europe by major players in food industry. In 2007 this business achieved a new market access by acquisition of closer relations with the local food producers.

HOYER GASLOG transports industrial gases for engineering, medicine and food processing industries. This business unit is very well positioned among the global gas producers due to the high level of service and excellent equipment. Acquisition of two corporations in Germany and Italy In 2007 confirms the dynamic nature of this business unit.

Leasing of gas containers very expensive equipment is one of this business unit's core activates. GASLOG was very successful in its container fleet capacity utilization. GASLOG also had to expand its sophisticated equipment fleet due expansion of its business in the Middle East. HOYER GASLOG is outstanding leader in its market niche and cemented its position by growing its equipment amounts by purchases of several new containers for transporting helium at a cost half a million euros each.

HOYER PETROLOG provides transportation services for the petrochemical industry and serves all 11 petrochemical giants in Europe. During recent several years this business unit grew by 30. Business consolidation however is a name of the game for this business unit as expansion in new markets was not bringing expected returns. Core business of this business unit is concentrated in Germany; significant build up is also seen in Sweden. "Value for Money" initiative was launched in order to increase competitive standing in the sector. New contract for distribution of bitumen in Czech Republic was also signed.

Despite the fact that HOYER Group's core business is bulk logistics it also maintains presence in the transportation sector for IBCs via TECHLOG business unit that was established in 2004. Cleaning services for the tank containers and road tankers and tank are also provided by HOYER TECHLOG business unit. This business unit expanded in the Alpine regions, in the UK and in the Benelux countries.

Hoyer Global Transport BV (Rotterdam)

Hoyer Global Transport BV manages business of global deep sea shipments of liquid chemicals in standard tank containers within Hoyer Group. Its Head office is located in Rotterdam and has branches in Sao Polo, Shanghai, Guangzhou, Singapore, Dubai and Huston. Main products shipped are chemicals (80%) and food staffs (20%). For detailed list of previously accepted for load products please refer to the Appendix 2.

Organizational structure of HGT consists of Management, Procurement, Marketing and Sales, Fleet, Operations, Cost Control, Credit Control, Accounts, Claims and Insurance,

Food; Special Logistics (deals with flexi tank containers) HRM, Training, ICT, QHSSE departments. For your attention there is description of the organization chart and detailed list of HGT departments in Appendix 3.

HGT showed record earnings and it's not will come by surprise if one will see that this business unit operates more then 15 thousand tank containers that amount for the ¾ of Hoyer group's container fleet.

For a long period of time HGT showed record growth rates in Europe, and of course a major growth region were in Asia and China that was showing 25 percent growth till the recent economic slow down. In addition to focusing on tank containers, the business unit also acquired Powertex, a company operating in the lucrative flexibag transport market. Demand for tank containers import and export moves was also growing in Russia. HGT is the major business unit that looking for the expansion opportunities in the Russian market driven by the opportunities of serving international trade in chemicals that constitutes a large chunk of Russian trade balance.

3.2.3 Interbulk Group PLC (7053 to 8100 tank containers)

This company occupies 3rd place in our charts and has a total of 18 own offices and 432 employees in their offices in Netherlands, UK, France , Germany, Norway, Poland, Russia, Sweden, Brazil, China (Beijing and Shanghai), Malaysia, Singapore, USA (Houston and New Jersey)

On top they have a broad network of 60 agents all over the world, sometimes more than one in one country.

Company claims ownership of sizable containers fleet that amounts to over 7,500 ISO-Tank containers. Most of the containers were purchases within 5 years. Intebulk also posses such special tank containers as baffles and electrical tanks.

Intebulk also operate 12,500 dry bulk boxes. They call this system "bag in box". Then they are making new ground in supply of its patented non-tipping ISO-Container for cementous materials in areas where there is difficult access to inter-coastal areas and islands.

The ISO-Veyor is an intermodal tank container developed by InBulk Technologies, facilitating easy transition between road, rail and sea. ISO-Veyor container consists of a cylindrical vessel constructed within the frame dimensions of a 20ft or 30ft ISO unit. It can be handled exactly as a standard ISO container, utilizing currently available trailer chassis and rail car rolling stock and is compatible with container shipping as it shares the same ISO dimensions of standard shipping containers. The ISO-Veyor can be handled efficiently and easily by standard container infrastructure.

Company is also followed the suit in the sector and started Flexitanks operations in 2007. However business for this kind of services is concentrated mainly in Asia Pacific and Middle East and showed no activity in Europe at all yet. In their annual report they

announced that this business made an operating loss in their financial year. However, according to the latest 6 months results report they exited this activity due to weak conditions. Interbulk currently operates 6 logistics terminals in Europe.

In December 2008 Interbulk announced that they are to build a new intermodal terminal on a 20,000 m2 site in the Port of Duisburg. The new facility was supposed to become the group's largest terminal to date. Interbulk corporate web-site (2010)

3.2.4 United Transport Tank Containers (6000 tank containers)

UTT was formed in the late 1980s as part of United Transport International (part of BET plc) with head offices in Rotterdam and Leatherhead. UTT now is one of the world largest Tank container Operators focusing on its core business with a fleet of over 6000 Tank containers operated world wide by 130 dedicated people.

Currently UTT expanded its network by opening offices in Shanghai China and in Warsaw Poland.UTT invested to add 500 new Tank containers to its fleet. Strengthened its Deep-sea management-team and is currently the first Tank container Operator assessing all its offices throughout the world to comply with the CDI-MPC Tank Container Management (TCM) assessment pack.

Company operates in Russia via agent WTN Group (Vneshtrans) located in St. Petersburg. United Transport Containers Corporate web-site (2010)

3.2.5 VOTG Tank Container (5000 Tank Containers)

Is a number 5 our charts. VOTG was founded in 1997 as a joint venture between VTG and Royal Vopak. With a very successful track record of 15 years in the iso tank business, This kind of VOTG Tanktainer synergy across supply chain with major liquid bulk storage and distribution company as Royal Vopak created a good environment for VOTG business growth already for over 15 years. VOTG handles a wide range of liquid transport chains – from tank terminals to tank trucks, rail cars and inland river barges up to deep sea vessels and the worldwide distribution of chemical products.

VOTG tank containers are 100% owned by VOTG Aktiengesellschaft, Hamburg. Logically VOTG's Head Office is located in HAMBURG, Germany. Interestingly these company employees only 160 people on a worldwide basis that manage 5.000 tank containers of different T-Code specifications (T7, T11, T12, T13, T14 & T50).

This amount of containers and employees allows VOTG to offer a global service and combine European traffic flows with overseas business.

Unquestionably company tries to maintain strategy of door-to-door transport and shows a signs of success in the transportation of goods from factory to customer. VOTG is readily sells its expertise in fleet management and promises that clients tank containers will be taken care of. They also ensure provision of god cleaning and maintenance

services by partnership with cleaning stations, depots and repair agents.

VOTG uses computer models and promises to demonstrate cost savings for the transport moves of containers for their dedicated clients and earn a business for movement of products that require high degree of specialization due to products qualities and specific customer requirements.

Spot moves are also handled by VOTG that offers its services in all the major developed areas by means of subcontracting agents. VOTG also provides such standard value added services as temperatures control. VOTG has developed specific equipment and systems to handle products that need to be maintained at a certain temperature.

VOTG manages world markets via 3 areas which controlled by regional offices.

The balance between agents and own offices should be maintained VOTG's global activities are supported by a combination of own offices and an agent network, covering all main industrialized countries in which VOTG is not represented by its own subsidiary. VOTG has exclusive agents in Norway, Sweden, Denmark, Poland, the CIS countries, Spain, Portugal, Greece, Turkey, Israel, Mexico, Brazil, Argentina, South Africa, Saudi Arabia, UAE, Oman, India, China, Korea, Japan, Taiwan, Thailand, Malaysia, Philippines, Indonesia, and Australia.

Overseas shipments are the main focus for the VOTG business development strategy. All the Asian countries are included into the company's transportation portfolio via partners support from third party and dedicated agents.

In Russia Company has agent in St. Petersburg and routes tank containers to various destinations within Russia via Helsinki by truck or rail. Due to the complex nature of the market, great care is taken to protect equipment and customer's product. VOTG corporate web-site

3.2.6 Bulk Haul (UK)

Bulk Haul takes a 6th position in the ranking with 4200 tank containers. Balkhaul Limited transports bulk liquids, powders and gasses globally. Expertise of in the bulk shipments is the major focus of this company.

Interestingly enough is the fact that tank containers that are shipped on the global basis are regularly routed through the Bulk Haul workshops on Teesside in North East England for purposes of monitoring and maintenance. Bulk Haul Head Office is located in UK Middleborough and has 5 departments including Operations, Commercial, Transport, Workshop and Accounts & Administration.

Aiming to foster close links with customers and in order to build a better understanding of their needs Commercial Department is divided into groups each with its own senior manager responsible for a particular sector of the customer base. Balkhaul practice very close cooperation between the commercial and operations departments by means

of highly sophisticated computer system. This system supports operations on 24 hours basis.

Besides its Head Office in Middleborough Balkhaul has dedicated offices in Fussgoenheim, Germany, Gent, Belgium, Milan, Italy, Cranford, USA, Houston, USA, Rio de Janeiro, Brazil, Singapore, Tokyo, Japan, Tokyo, Japan. Balkhaul doesn't have a representative office in Russia. BULKHAUL INTERANTIONAL CONTAINER SERVICES (2010)

3.2.7 Suttons International (4000 tank container)

Company operates 4000 tank and 800 gas containers globally through their office network which includes New Jersey, Houston, Antwerp, Le Havre, Essen, Kuantan, Singapore, Shanghai and Tokyo. Suttons International is also offers chemicals storage and distribution services.

Recently Suttons replaced 77 of its 200 strong vehicle fleet with new vehicles and added 11 high capacity tanker trailers. Company also ordered production of 200 tankers with capacity of 26,000 liters at Welfit Oddy in South Africa, plus 20 high insulation tanks with capacity of 24,000 liters are on the order books of China based Nantong Tank in Jiangsu . Suttons international will peruse its development plans despite recession times. September 2010 is when all the new tanks will be delivered.

Suttons Group has UK Road Tanker Division that operates in sectors of chemicals, gases, foodstuffs and mineral oils. Road tankers fleet has general purpose road barrels, multi-compartment solvent barrels, rubber lined barrels, rigid petrol tankers, liquid and powder food tanks and urban articulated trailers.

More specific description of tank containers that Suttons offers for global transportation services includes containers with the capacity range of 17,000 to 35,000 liters. Those containers can come with single or twin compartments, baffled tanks, steam and electrical heating

Suttons International also has interesting service of providing of purpose built tanks with possible modifications specification that include: rubber or other special linings (e.g. PTFE),top and / or bottom discharge facilities, dry break couplings, high level earthling devices, glycol cooling and full customer livery Global Positioning System (GPS) is employed for the Sutton's fleet management services that allow monitoring position of containers and temperature of products shipped within them.

Suttons also has accreditation to ISO9001:2000 and CDI-MPC for its International business. Suttons Group (2010)

3.2.8 Den Hartogh (2250 tank containers)

Den Hartogh Logistics is a Dutch-based Logistics Service Provider specialized in liquids and gas tank containers transportation with very well developed service network in

Western and Easter Europe. Due to the fact that on 19th June 2009 Den Hartogh Liquid Logistics acquired Extar B.V., Rotterdam. Extar B.V. was specialized in Eastern European, bulk liquid transport, in tank containers and had an annual turnover of approximately EUR 30 million. Den Hartogh Liquid Logistics will use the Extar organizations remaining agency facilities in St. Petersburg and Moscow in Russia and the Ukraine. These agents will now handle the Den Hartogh Liquid Logistics movements in these geographic areas. Den Hartogh Liquid Logistics has been active, for a number of years, in Central and Eastern Europe. This will be further strengthened and developed, with the addition of the knowledge and expertise of a number of new key personnel, who will become a part of the Den Hartogh Liquid Logistics intermodal knowledge centre in Oss, The Netherlands. The current Den Hartogh Liquid Logistics tank container fleet of 2200 units, will be increased with approximately 800 units.RRPA.RU (2009) Den Hartogh Liquid Logistics Development in Eastern Europe;

3.2.9 De Rijke (2057 tank containers)

De Rijke has 30 branch offices spread all over Europe in 9 different countries: Netherlands, Belgium, France, UK, Germany, Spain, Italy, Hungary, and Sweden. De Rijke specializes in serving transportation needs of chemicals industry as well as foodstuffs sector.

De Rijke owns large number of sites in Europe in all the possible locations what helps to be very effective in terms of minimizing distances and optimizing fleet management with return loads. This results in cost optimization, reliable deliveries, and a fast and adequate service.

De Rijke owns equipment for transportation of wide range of goods: starting with packaged goods, dry bulk products, liquids, containers, ending with industrial liquid gases.

De Rijke has ISO bulk containers. Company can satisfy all the product specific transport requirements from temperature control to hazard control. De Rijke owns tank trailers with the carriage capacity ranging from 20,000 to 58,000 liters with possible spread over a maximum of eight compartments. In addition to a broad fleet of tank trailers, De Rijke also has a large number of its own ISO tank containers and 1,000-litre stainless steel Intermediate Bulk Containers.
The transport of liquid gases requires extra expertise from the carrier. De Rijke has this expertise for the transport of liquid butane, propane, and cryogenic gases such as oxygen, nitrogen and argon, among others.Derijke.com (2010)

3.2.10 Briad Logistics (UK) Ltd

Founded in 1955 in Scotland Briad logistics is one of the oldest companies or maybe the oldest company engaged in tank container transportation business with head office Glasgow and warehouses located in Liverpool and London.

Braid Logistics has offices in France, Germany, Spain, USA, Chile, Singapore, Indonesia, Taiwan, China, New Zealand, Australia, and South Africa with agency network of 62 partnering agents worldwide.

Over 1 billion liters of liquids are handled within the Bulk Liquid Logistics side of the business, an important and growing part of the group.

Briad Logistics also operates a fleet of flexitanks containers with single double and multilayer polyethylene layer, barrier tanks, PVC and bottom discharge. Braid Logistics (UK) Ltd. (2010)

Conclusion

All the above mentioned companies are players in a certain niche of chemical supply chain network that is defined by chemicals production, storage, sea shipment, distribution and transport to final consumers. And now as one can locate tank container transport service provider's niche along chemical chain one can think of such a concept as a "demand flow" which is generated and shared among all the players in the supply chain. The major finding is that tank container Transportation Company will enjoy the part of demand flow in the range from distributor to end user, sometimes there is also such possible range of demand as from producer to distributor, as from distributor to distributor and in rare case from producer to end user.

Further investigation leads us to the question of: what are the main service providers along chemical supply chain transportation network which lays across all the 3 major chemical production and consumption points: 1) Upstream (on/off-shore procurement, on/off-shore pipelines, tankers, storage terminals), 2) Oil refineries and cracking plant on/off site transport solutions, after cracking storage oil depots and storage places for petrochemicals, 3) downstream distribution and transport. How tank container companies and their equipment should be integrated in these networks and what is the scope of a feasible demand for import export moves of chemicals transported in tank containers.

There are 3 "layers" we have to superimpose in order to receive a good picture of the market: 1 layer is chains of chemicals, their products and how is it all related to the products that can be transported in tank containers, what are current trends in the industry producing those chemicals. 2. Good understanding of all the elements of petrochemical supply chains and directions of their evolution; 3. Interaction between all the players along the supply chain and how do they share a "playground".

Firstly, for the purposes of this research it is necessary to mention that strategies for the market development of liquid chemical transporters are based on the level of their vertical and horizontal involvement into the chemical supply chain of certain chemical producers and companies. Plus the scope of this involvement is measured by the amount, quality and functional area of implementation of assets and expertise that company poses. Therefore, companies can enter certain segment of petrochemical supply chain on the base of the particular expertise stemming from the assets they own and manage.

For example we can see that in some sense scopes of liquid chemicals transportation market evolvement of HGT and those of Stolt-Nelson are different due to the fact that Stolt-Nelson not only has more tank containers but also owns and operates the largest fleet of parcel tankers in the world that allows Stolt to have a larger share of chemical transportation market which will include not only fine and specialty chemicals but also wide range of bulk chemical commodities. Among the companies whose strategies and scope of business that should be included into the scope of further research are Den Hartog, Bulk Haul, De Rijke, Inter Bulk and many others including those who are already entered Russian market.

Secondly, such approach narrows our scope to rather asset light or medium asset focus that lets us to target more diverse markets around the world as it just requires a global network of offices and global container fleet management and shipments operations. However, such approach doesn't exclude necessity of vertically and horizontally integrated companies. Indeed it even seems that more asset light approach will put more stress on horizontal cooperation and horizontal type of integration into the downstream chemicals supply chains. While first type might be more asset heavy (like parcel ship fleet and storage facilities in addition to the tank containers and depots) and might have vertical reach to the certain sources of raw materials outputs.

From one side it seems that Stolt-Nelson's connection to the Norwegian oil procurement and resources allows them to get their expertise from concentration on serving oil oriented petrochemicals supply chain and from the other is seems that Hoyer's growing strategy back bone would lay in developing network that would serve global market as a whole without very deep vertical integration within any particular country chemical supply chain but rather in horizontal integration. Therefore, for this HGT needs to build a formidable client base profile in such a country as Russia by following needs of the technology driven chemical industry.

In conclusion one has to say that companies in the tank container transportation sector are desperately trying to expand markets for the transportation services they are providing. The major factor that describes a company's profits and puts it on higher or lower position in the ranking comparatively to its competitors is amount of containers it owns and operates. Of course one understands that acquisition of containers is an investment into the major asset for these companies, therefore growth of containers owned by the certain company means that company was successful in growing its business and needs more containers then other companies or to serve the needs of its clients. Main trends of growing businesses is expansion into the new international markets and as Western European market is growing more and more crowded many companies are taking a risk and invest into the expansion into the Eastern European growing markets for tank container transportation and particularly in Russia as well.

Chapter 4: Russian Market for Transport of Containerized Liquid Chemicals

Literature and Informational Sources

This part of the chapter is based on several news articles as well as annual and semiannual reports of the companies concerned; Bertschi AG Corporate Web Page (2010) and Bertschi Official Press Release (2007) describe the situation about this company business in Russia; Also Interbulk Group Press Release (2010) was used as informational source for the InterBulk expansion into the Russian market. Also nd article from ICIS.Com (2009) was used to provide some live update on the Bertchi expansion plans in the East. Plus excerpts of Will Beacham (2009) article that describes positive developments of western chemical distributors entering Russian market but also warns about possible threats and problems for foreign companies expansion;

4.1 Examples of Western Companies entering Russian Market to Containerized Liquid Chemicals

Presently Hoyer Global is the 4th largest operator in Russia after Bertschi, Den Hartogh (Extar) and Interbulk. While Den Hartog involvement Russia is well described in the chapter above we would like to say several words about Bertschi Liquid products and Intebulk activities in Russia.

Bertschi Liquid products or Bertschi AG is a Swiss-based is a pan-European logistics service provider and has registered its own offices at Moscow and St. Petersburg. Altogether the family-owned company operates some 12,000 container units, 1,150 trucks and employs 1,650 staff members across 42 operating units in 22 European countries. With a total turnover of CHF 600 millions in 2006 Bertschi AG is regarded as the European market leader in Intermodal transport of chemicals both, by rail and short sea shipping.

Company also has storage facilities for tank containers represented in depots for sensitive goods. BERTSCHI operates its own tank container depots. BERTSCHI has tank container depots in Germany (east and west), the Netherlands, Italy, Spain and Switzerland. The company also has access to third-party tank container depots. BERTSCHI also provides tank container cleaning services and operates modern tank cleaning stations certified according to ISO 9001:2000 and SQAS norms. Those two cleaning stations belong to the company's private container terminal at Birrfeld (CH) and at Schwarzheide (East-Germany). Bertschi AG Corporate Web Page (2010)

BERTSCHI also pays a lot of attention to the safety and training of employees and during the recent International Chemical Fair "KHIMIA 2007" at Moscow Expo Center, Bertschi AG has announced that all Russian driver personnel operating at its St. Petersburg Branch Office are fully trained in accordance with the highly recognized ISOPA standard and have successfully passed the respective examination resulting of being licensed as individual driver.

Bertschi`s transport operation in Russia became the first registered Logistic Service Provider specializing within a large scale chemical market for bulk liquid transportation which has extensively trained its full driver force on save operational practices during the loading and unloading processes of MDI and TDI products. Bertschi Official Press Release (2007) BERTSCHI DRIVER IN RUSSIA TRAINED ON ISOPA – STANDARD, Vol. 09, 2007

The group will invest in a third subsidiary in Russia and prepares to start regular shipments from Nizhniy Novgorod. This route will serve import export flows and transport polyurethane (PU) products to Western Europe, and supply products and services to local producers in the Nizhny Novgorod area, which is the second-largest chemical cluster in Russia.

Berthchi has already made investments of about EUR 12m ($17m) in the Russian market and plans to open two more subsidiaries in the next two years. Discussions are underway with customers, but Bertchi said one would be located in the Urals region and one in southern Russia. Bertschi's two other distribution centers in Russia are in St. Petersburg and Istra. Company's long-term goal includes expansion plans of its intermodal capabilities to Siberia and then to China. "We want to form a bridge into China for intermodal transport," Bertschi CEO said. ICIS.Com (2009) EPCA logistics Special: logistics firms are expanding in readiness for new trade flows, but the economic crisis leaves the sector facing many headwinds;

InterBulk, has established an independent office in St. Petersburg, Russia. This means that from that moment operations will be managed within the group which will allow for total visibility of shipment along the supply chain. At the moment of establishing of independent operations in Russia InterBulk Group was already serving supply chains of several European based chemical customers. InterBulk has secured a number of contracts shipments of dangerous cargoes including deliveries of antifreezes to all of the Moscow's airports. InterBulk also has contracts for shipments of temperature sensitive products.

The decision to open own office in Russia came to InterBulk as a next logical step after it successfully worked and developed Russian market opportunities. Interbulk was committed to the Russian marketplace in view of steady 7% economy growth in and increasing demand and volume for chemicals, plastics and other materials used in booming chemicals, plastics and construction industries of confidently growing Russia's economy. Interbank's move one more time confirms an evident fact that there is still a lot of room to growth within the Russian chemical transportation market.

Ivan Kornilov, InterBulk Russia's newly appointed General Director said "We are excited to bring all of InterBulk's considerable expertise, safety and technology to the Russian marketplace. Besides our on-going activities in Liquid bulk logistics, we will be bringing all of InterBulk's innovative dry bulk technologies to the Russian market, including 'bag in box' logistics services for polymers and food grade ingredients and also the ISO-Veyor, which is a non tipping tank container for intermodal transport of cement and minerals."InterBulk Group Plc's CEO Koert Van Wissen added, "…the opening of the

Russian Company and office creates another significant link in InterBulk's global network whilst improving our service to current customers supplying chemicals into Russia. The new company confirms our commitment to be present in the world's fastest growing markets and bring value to our shareholders." Interbulk Group Press Release (2010) InterBulk expands operations into Russia;

4.2 Market structure and barriers to entry

Russian liquid bulk market is relatively young and approximately 70% of liquid products are shipped in rail-tanks either to Finland or to Baltic States. European destinations are still dominating the trade both export and import-wise. Shippers wish European and deep sea services to go in one package but they are still separate within HOYER. Tank container infrastructure is underdeveloped in Russia. There are no cleaning stations, repair shops and depots outside Moscow. Shippers usually use territory of their own facilities to clean the tanks. For example Stolt maintains stock of its empties at customer's plant.

HGT Operational results for Russia in 2009 were as following: in total 124 export loads including 61 export loads handled and shipped from Kotka, Finland) and 50 export loads. Among major reasons for such low turnover is missing infrastructure to load, clean and store tank containers in Russia. Tank container business is a "premium margin business" comparing to railcars or drummed exports due to the fact that chemical producers in Russia can get very good freight rates from Russian Railway Company, which allows for payload optimization of up to 50/60 tons in one railcar.

Plus Russia is still struggling to recover from the perils of the global crisis with reductions of available volumes, also due to the weak dollar most customers are trying to sell their products to the European markets, what also makes it hard to maintain dedicated container fleet in Russia as more containers are going out of it then coming into it, while the most favorable situation is when there is a balance between export and import moves on the supported by high volumes of shipments made towards both directions.

Among other problems and challenges is a threat of inflation in Russia that might become a major economic problem. People and human resources are very important and there is a growing problem posed by the fact that old generation managers is going for retirement, and renovation of local stuff of native Russians with local expertise is need, however, loyalty among this category of employees is rare and salary size based.

Black and Gray market was a problem for Western companies refused deal with companies who practiced "black" (not declared) or "gray" (declared at much lower value) imports.

The European Association of Chemical Distributors (FECC) and distributors involved in the Russian market concerned with opaque customs regulations set up a special roundtable consisting of 20 distributors and 10 major producers that presented its findings to the government of Russian Federation.

Major areas of groups lobbying strategy was rising the issue of black customs practices, establishment of dialogue between EU and Russian authorities and getting a support of chemical producers and consumers from both sides. Therefore European chemical and plastic producers have also become more aware of the issue, and are increasingly careful about how they export and to whom. As result of all this actions Russian authorities set a minimal import prices level. So if one sets prices below this level he has to pay taxes.

However now the situation when real prices for many chemicals imported to Russia are actually below the minimum price allowed do be declared without paying taxes many distributors facing a risk of being a victim of their own actions and pay more taxes. Therefore many chemicals distributors are busy providing proves that those low prices are real prices indeed. Proof of real price comes at a dear price of presenting all the transport documents and distribution agreements to the Russian customs authorities. Will Beacham (2009);

Chapter 5: Hoyer Global Transport Business in Russia

Literature and Informational Sources Overview

This chapter is mostly a reconstruction of author's interviews with Hoyer Global Transport office employs as well as with leading managers who are in charge of Russian market within Hoyer Group;

5.1 Current business model for Russia and its impediments

Hoyer Group and HGT history in Russia starts from 01.01.2002 when Hoyer Group established a new office in Klaipeda as a part of Hoyer Baltic region management set up with Russia also included in its range of responsibility.

The next step of Hoyer Group strategy towards exploring of Russian market was establishment of relations with agent. In September 2007HGT established principle agency relations with the Russian freight forwarding company TEK Poseidon headquartered in St. Petersburg. Current agent in Russia has offices in St. Petersburg and Moscow, detailed addresses of HGT agent in Russian could be found in the Appendix 4.

HGT Agent in Russia takes care of the entire operations, customs and clients base which might lead artificial dependence on services like customs clearance for certain type of goods. There is a strong need to diversify agent services supply in Russia in order make them compete for the business on base of better trucking and customs clearance rates provision. The other strategy is to stick with one agent in case agent generates enough business. Hoyer Global Transport currently also uses and agent in the Baltic States - UAB Arijus. Plus, it's also worth mentioning that before formation of this set up all requests for Russia including oversea shipments were handled centrally by TS-GUS in Hamburg.

There are several regional divisions within HOYER Group: Europe (main office in), Middle East and India main office in Dubai, North America (main office in Houston); South America main office in Sao Paolo, Far East with main office in Singapore, China is managed as separate country with main office in Shanghai and other offices in Guangzhou, Ningbo and Qingdao. Hoyer Europe or Chemilog, Gaslog, Foodlog which are inner EU business units while HGT has a global representation. There is no common agreement among EU business units and HGT due to technical mismatch between equipment types used for road and railroad in EU and tank containers used for HGT business. Plus they use not related pools of container fleets.

Hoyer business unit Chemilog has an office in Klaipeda as well as in Botlek, Rotterdam but there is not much cooperation possible due to equipment mismatch (European equipment might be bigger and 40 feet container are not quite useful as there is a restriction on the maximum weight of containers loaded onto cellular ships).

HOYER ability to satisfy client's requests for one-stop-shop in Russia is also impeded by the lack of harmonization between equipment used by the different business units. In

such a set up usage of shared facilities wouldn't be very useful, plus using of common container pool is not feasible as well.

However, there is no general trend among the companies in the sector for cooperation among business units despite the fact that Inter Bulk's use of harmonized equipment for both on land and deep sea transport allows them to promote their services on the one-stop-shop basis while such competitors as Stolt concentrate only on deep sea business in Russia.

The other ailing problem is Hoyer Global regional cost management guidelines which also applicable to Russia and require inclusion of empties repositioning costs into the freight rate and price quotation for the client. In addition to the fact that there is no 7 days of free demurrage, the entire time empty container is on the move to arrive for the export loading address or import move repositioning back to the origin counted as costs to the company and included into the price for the client.

Thus, for example 6 days by feeder from Hamburg to SPB plus 20 days of trucking to the final client will be counted as cost and included in the quotation for the client price. Other major players on the market avoid this practice and therefore capable to provide more competitive prices.

Demurrage charge after 7 free days of detention might be allowed but usually up to 21 days are needed due to distances container has to travel to reach end consumer door and return back to the port are still included into the price. This makes price not very competitive.

Invoicing payment facilitation is also requires setting up of business entity in Russia with Russian account.

5.2 Experience of Cooperation with Agent: need for the HGT own office in Russia

Agent also nominated by criteria of competence in the HGT business related issues and measured by his ability to represent and HGT in the certain country and consequently generates business. Therefore, agent must have some specialization in the liquid products handling like customs for example as well it might be of use if agents is an insider in the chemical business or chemical transportation business of the certain country. Also there is only one precedent in the history of HGT for the forming joint venture between former agent and HGT main office. It's a case of a merger with an agent in Israel due to the fact that an agent was a major player on the local chemical transportation and distribution market.

The tricky situation with agent in Russia is that business generation by the agent in Russia is not stimulated by any additional fees. Plus agent receives re numerations only for the arrangement of operational tasks typical for forwarding agent and will consider its relations with clients in Russia its own business and most likely wouldn't share information about their own clients. Plus closer study of agent is necessary in order to

answer such questions as: 1. what is the core TEK Poseidon's expertise 2. Is agent's business based on a special ability to clear customs for the fine and specialty chemical products coming into Russia? If yes then it explains its specialization in the tank containers forwarding and then it has information about Hoyer's competitors business in Russia! In case it is not solely specialized on the customs clearance for the chemicals it is most likely then just rather big forwarding agency with general possibilities of customs clearance which takes any business it can get to handle.

As usually a second guess is more accurate and after checking Tek Poseidon's web-site it's somehow became clear that it has some power in bulk cargoes customs clearance but it's not its core expertise and it tries to do all the business it can get besides bulk cargo handling.

At any rate agent expertise goes further basic cargo forwarding capabilities. TEK POSEIDON is also an agent for the smaller shipping lines that cover Europe, Middle East, Iranian Gulf and Indian subcontinent. So given all the information above they have to be special in something and this something is that they probably rather stable agent for Russia to sit safely with but are they good for developing the market together? The answer is that they were a "sit safely" agent of Stolt in Russia before they became such agent for Hoyer in Russia right after first went on further and opened its own office in Russia.

Also Cooperation with an agent might lead to generation of business for Hoyer Group not only booking business for HGT. Possible necessity to send a HGT representative and learn on spot. This might be tricky or no go at all because agent generates business for shipping and would not like to share info about its clients. However, some sort of partnership might be considered in case of large enough volumes in business generation by agent and sub sequential takeover of agent by HOYER. On the initial stage of closer cooperation it might take form of HOYER-POSEIDON joint venture. However, there is only precedent in HGT with former agent in Israel who became sole strategic partner of HGT.

Is Russia business always generated by agent? Is agent a sole proprietor of a client base info in Russia; Partial answers to those questions will be procured from market research based on the historical information about substances shipped in and out of Russia and presented in Chapter 6 of this thesis project.

From the initial investigation it is clear that as clearing customs for the liquid bulk and premium chemicals is not a core competence of an agent what makes him not very interested in increasing levels of business generation for Hoyer Group.

Agent also can't match their core shipping contracts with their principle shipping lines to their customs clearance business as HGT's rates are by definition lower than those provided by the current agent's shipping principles plus HGT might have special requirements for shipping with certain shipping lines on certain trades and those shipping lines most of the times don't match with what agent can offer.

Plus agent is not bound by quota or minimum amount of moves they should guarantee in order to sustain their agent status with HGT. However, most of the business is generated by the agent and more information could be obtained from close cooperation with an agent in this regards as well as knowledge of client base and final consumer's agents or trading companies that serve them.

For the marketing and sales strategy there is a very important fact that 95% of Russian producers work via their trusted transportation or sales agents. Among broad directions of market development strategy in Russia is work with diversified network of agents for trucking, container cleaning and storing and customs clearance (this function probably should be among core competences of the Russia office or customs clearance and trucking procurement cooperation with the current agent should be continued). This strategy will enable HGT office in Russia to quote door to door price with control over cost on every leg of each individual shipment.

Together with investment decision into Russia the question about what comes first: office self rent ability or experimental office investment, should be answered.

In order to open HGT office in Moscow it is necessary to have a guarantee that enough business will be generated in order to break even with the office costs and make profit for the Group. Search of strategic partners among the global companies as well as among the local industry leading players is needed. In EU 70% of all the business is generated from tender management the same could be done in Russia as well with slightly different techniques and procedures than in EU.

Therefore, participation in the regional economic forums will be necessary: SPEIF, BEF, not only industry dedicated conferences will be necessary in order to secure orders from Russian chemical industry and other producers and industry players. This notion is very useful strategy to success in the tender management for the supply of big and strategic projects connected with further processing and refinement of fossil fuel feedstock which is abound in Russia and creates great opportunities of export and import moves generation.

For the offices of the HGT is common that they usually situated in the cities and ports in a relatively close vicinity to developed chemical industry clusters and industries that it serves. Therefore location of offices in Rotterdam, Huston, Sao Paolo, Dubai, Singapore etc says for itself.

However, in Russia there is no such a port-city that connects qualities of being a big port close to the demand for chemical products from the surrounding industry. Port industry combination is not attainable Russia in the short terms, but presence in is necessary. Moscow is a good base to get representation for global clients as DOW Chemical, BASF, and Shell and other Western chemical producers and distributors who also have their offices in Moscow. However there will be a necessity of travel or use means of telecommunication in order to keep in touch with agents in St. Petersburg and develop a client base among the core enterprises of Russian chemical industry located West of Ural Mountains.

5.3 Major roadblocks for further HGT business development in Russia

As St. Petersburg becomes more and more important for HOYER due to many operational hindrances that arise from using of Klaipeda as an operational gateway to Russia brings and becomes too expansive in a face of growing price competition.

Currently another Hoyer business unit Gaslog/Wimmer is in the process of discussion of potential market development in Russia with its biggest customer Linde. Therefore a groundwork study for optimal local business set-up is also required.

Russia business development requires close cooperation among business units within Hoyer Group in order to be able to service clients on the base of “one-stop-shop” concept. This kind of cooperation will resolve such problems as necessity to use agents equipment for import/export moves by using pool of equipment within the group, and become more competitive by means of utilization of own trucking capacities.

HGT and HOYER Group scopes of business should be interconnected into one strategy of bundling inbound logistics and on-site dedicated solutions for the Chemical business conglomerations with import and export moves over Short and Dee Sea. There is a good chance that Hoyer Group expertise on handling liquid chemicals in EU can generate a business for HGT import/export moves and vice versa.

Major draw is predominance of pier to pier moves due to the fact that business generated and supervised by shipper’s (customer’s) in-house forwarding agents and they keep knowledge about end-user to themselves. This kind of situation is in strong contrast with Hoyer Group policies; Comparative shortness of a free time provided by Hoyer becomes an issue in Russia due to the longer distances container has to travel in order to be loaded or unloaded and back to the Hoyer depot which is usually outside the country. On top of this Hoyer’s competitors doesn’t charge pre-demurrage and demurrage to their Russian customers, while Hoyer does.

Among basic requirements that need to be in place for further successful business development in Russia are infrastructure, local sales contact management and market potential study.

When we talk about infrastructure we talk about depots, cleaning stations and other facilities necessary to manage Hoyer Global main asset properly, its tank containers. However, as there are no such facilities that would belong to Hoyer or other 3rd parties, customers usually clean containers on-site where they load or unload their own products and deduct cleaning services from the Hoyer Global Transport rates.
Plus we have to remember about rail dominated chemicals transportation infrastructure in Russia combined with possibility of mounting tank containers onto the rail cars creates room for rental or lease of equipment to the chemical and other industry plants logistical departments.

According to the pictures taken near SPB port by Hoyer Global Transport area manager there is almost non existing infrastructure for the cleaning, storage and handling of tanks containers in Russia. This may necessitate building depots in Russia. Plus heavy

reliance on railroad and general poor condition of motorways creates a certain level of concern.

There is a perception that railway mode of transportation that is very well developed in Russia is a big threat for the truck operated on-site services as well for the deep sea import/export moves . For example, there is a potential threat for moves to Far East via Kotka from Russia as they can be handled by train to China.

Plus most of the supplies within Russia made by railroads due to distances and low freight rates, but outdated equipment might be an entering point. 3PL agent's flexibility should be also implemented in order to be able to stay in business because Hoyer's equipment is essential asset around which business is built and change of modalities should not be a problem as soon as added value services around those assets are sold in one form or another.

Moreover there is not a big threat to the business going via Kotka to Far East due to: a) strict customs procedures on rail road border crossings with Russian neighbors especially in China; b) a lot of delays due to outdated shunting methodologies and government owned type planning practices; c) high congestion levels;

Plus, the lack of advanced equipment might be potential for new business generation. Additional Services List connected with transportation of tank containers is also included in the Appendix 5

Local sales contacts acquisition is the first step for the further market development. At present this kind of information is at hands of potential clients/customers in-house forwarding agents. This situation can be changed only if Hoyer will have its own set-up in Russia, For example representatives of DOW in Moscow say that they will discuss long term business perspectives only when Hoyer will have its own office in Russia.

HGT Own office will create a good image of constant presence on the market and will open doors to further consolidation of a client base in Russia. For this set-up to bring good results, market insiders with personal contacts and developed relationships are needed.

However, before setting up an office and looking for employment of people with local market knowledge, there is a strong need for detailed overview of the market potential and singling out the most of market segments that have the most potential to grow into. An attempt of reconstruction of Russian market potential will be done in Chapters 6 and 7;

Chapter 6: Hoyer Global Historical Shipments Data Base Analysis

Literature and Informational Sources overview

This Chapter comprises two layers of informational resources as well as inspiration for new methodology received from the overview of academic and scientific literature described earlier in the notes on methodology; First layer of information is a valuable information obtained from HGT shipments data base as wells as shipping documents archives thoroughly collected and studied by the author; The second layer is information from open sources of information such as internet where author collected information on the product final and intermediate application of goods shopped; The third integral part of this article is of course a methodology of instigative marketing which is used to make a links between products shipped and their end users and markets for final goods they are used to produce;

HGT historical shipments data base is the main source of information that used to describe operational results for of Russia for the period from 2007 to 2010. Plus this information can be used for description of dynamics for Import and Export moves and reconstruction of main end user industries and markets in the target country.

6.1 Overview of Import moves to Russia made by HGT during 2007-2010

Table 3: Total amount of Import shipments into Russia made by HGT during 2007 -2010

Latin America (Brazil)	**U.S.**	**EU Empty**	**EU loaded**	**Asia (Korea, China, India)**	**Middle East**	**Total**
2	57	91	1	91	1	243

Source: HGT shipments data base 2007-2010;

Table above numerically describes all the Import shipments made by HGT including repositioning of empty containers from EU.

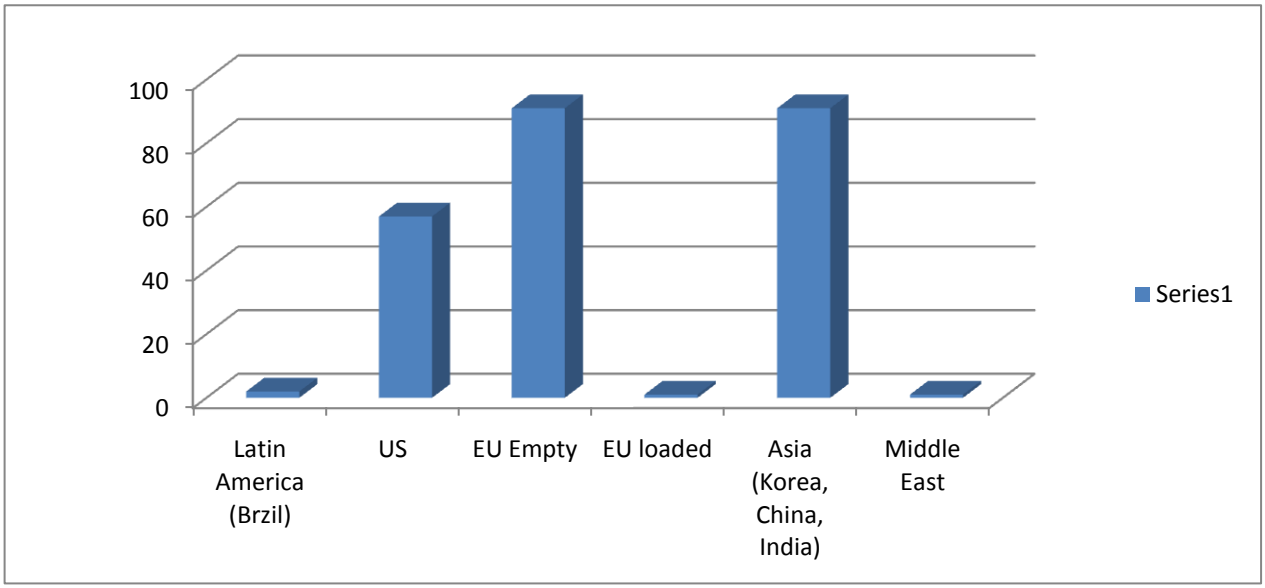


Figure 5: Import Moves Count by Region of Origin

Source: HGT shipments data base 2007-2010;

Form the figure above that compiles count of shipments of HGT we can infer that majority of loaded import moves – 91 out of 243 made to Russia by HGT are coming from Asia, second place is occupied by imports from United States of 57 containers, 2 containers were brought from Brazil, while Middle East and EU are sharing the last place amounting only to 1 loaded container move each. There is a big cluster of outliers formed by shipments of empty containers from EU. For the purposes of receiving of more precise weight of each World region in the imports to Russia of loaded container facilitated by HGT lets aggregate data and exclude empty moves from EU from the equation.

Table 4: Shares of Loaded Containers Imported by HGT to Russia by Region of Origin

US and Latin America (%)	**EU loaded (%)**	**Asia (%)**	**Middle East (%)**	**Total (actual number)**
38.82	0.66	59.87	0.66	152

Source: HGT shipments data base 2007-2010;

Now we can see even more explicitly then in the first table that almost 60% of import moves came from Asia, while import moves from US and Latin America combined account for about 39% of total. EU and Middle East share last place accounting only for a little bit more then half percent of total import shipments volume each.

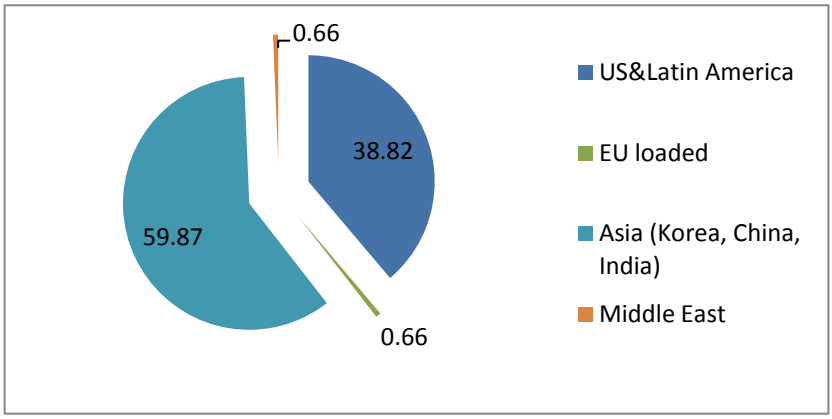


Figure 6: Share of Imported Containers by Region or Origin,

Source: HGT shipments data base;

Separate analysis of shipments share made to Asian countries shows that imports from India take a first place and account for48 moves or 53 % of shipments from Asian countries.

Shipments from India are f followed by shipments from China and account for 27 moves that constitute 30% of all containers imported from Asia. Finally 16 shipments from Korea account for 18% of total moves from Asia putting this country shipments share on the last third place.

Table 5: Shares of Containers Imported from Asia by Country

Korea	**China**	**India**	**Total Asia**
16	27	48	91
0.18	0.30	0.53	1
18	30	53	100%

Source: HGT shipments data base 2007-2010;

In conclusion to this section one has to confirm a strong trend towards imports from Asian countries. That situation describes strong trade with Asia in which Russia still tries to keep a balance in its favor. Trade in imported chemicals with EU has a lots of room to grow as it looks like much unsaturated markets as of yet.

6.2 Overview of HGT Export Moves from Russia during 2007-2010

Table 6: HGT Export Moves to Russia Distribution and Count

US	**EU empty**	**Asia**	**Middle East**	**Total**
30	33	109	8	180

Source: HGT shipments data base 2007-2010

Export moves distribution and count shows that 30 containers were sent to US, 33 empty containers were relocated to EU, 109 containers shipped to Asian countries, 8 to Middle East. All in all there were no more no less the 180 tank containers moved from Russia to other destinations.

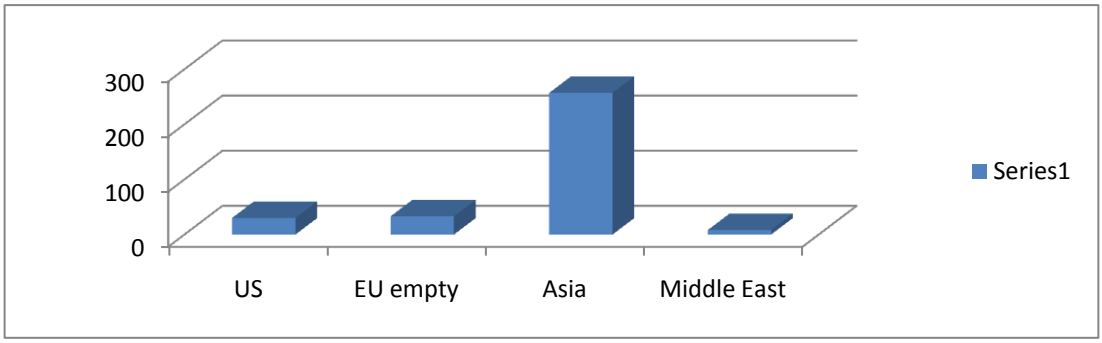


Figure 7: HGT Export Moves from Russia Distribution by Regions of Destination

Source: HGT shipments data base 2007-2010

From export moves shares break down by region we can see that in export moves Asia has almost 61% of all moves even if we will consider empty repositioning moves to EU as well.

Table 7: HGT Export Moves from Russia: Shares by World Regions (with and without empty moves)

Export regions % shares including EU empty					**Export regions % sharers excluding EU empty**			
US	**EU empty**	**Asia**	**Middle East**	**Total**	**US**	**Asia**	**Middle East**	**Total**
0.17	0.18	0.61	0.04	1.00	30	109	8	147
16.67%	18.33%	60.56%	4.44%	100%	20.41%	74.15%	5.44%	100.00%

Source: HGT data base 2007-2010;

However, if we will exclude empty moves that are irrelevant to the trade balance we will see that 75% of containers moved are going to Asia, 20% go to US and 5.5% are going to Middle East.

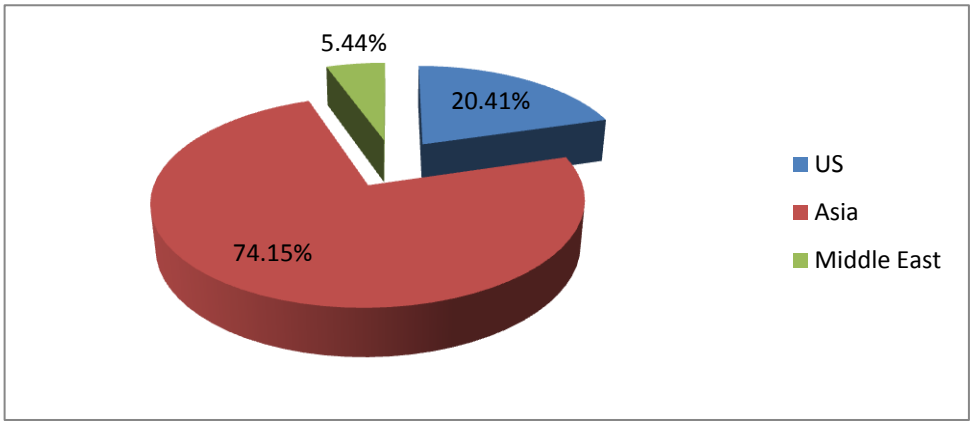


Figure 8: HGT export moves from Russia by Word Region Excluding Empty Container Moves

Source: HGT shipments data base 2007-2010.

It is also worth mentioning that there is certain amount of containers that were exported from Russia to Finland for further delivery to different ports in Far East. However due to the nature of transshipment it is hard to decide of those should be counted as loaded export moves to EU or as Export moves to Asia. However, as those moves were coordinated by Hoyer Global Transport from Rotterdam they can be rightfully be accounted as export moves to Asia. There are 148 additional moves therefore. Total count of export moves will come to 328 with EU empty and 295 without them.

Table 8: HGT Export Moves from Russia by Region with and without Transshipment in Kotka

US	EU empty	Asia	Middle East	Total	US	Asia	Middle East	Total
30	33	257	8	328	30	257	8	295

Source: HGT shipments data base

Therefore, percentage share of loaded containers that were sent to Asia with origin in Russia will now be 87.12% of total export shipments made by Hoyer Transport Global during 3 years.

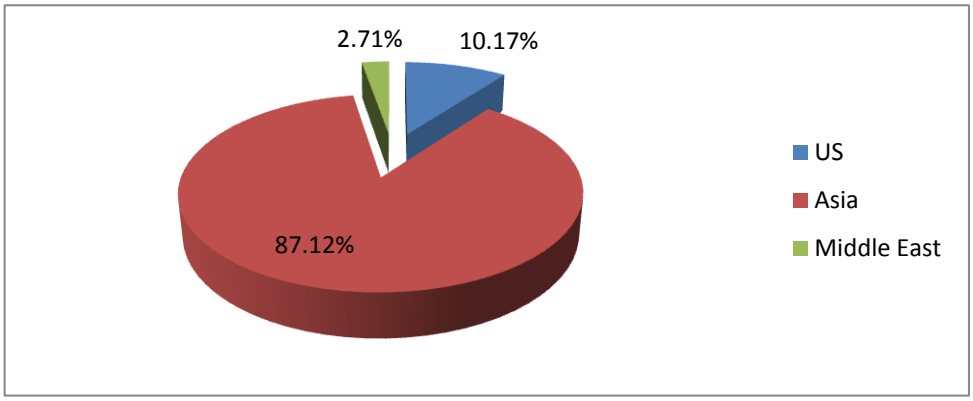


Figure 9: HGT Export Moves from Russia Shares by Region (including Kotka transshipments)
Source: HGT shipments data base 2007-2010

While shares of containers volumes shipped to US and Middle East will shrink to 10.7% and 2.71% respectively.

Overview of HGT export moves show strong prevalence of Asia oriented export moves from Russia. This says a lot about dynamics of Russian trade in chemicals, where Russia exports most of its goods to Asia in order to counterbalance its imports from Asia.

Even though trade with EU countries described only with repositioning moves it of empty containers one can see that there is a lot of room for business development and especially for Hoyer Global Transport to tap into EU – Russia trade in Chemicals that was a virgin area for Hoyer Group so far.

6.3 Testing of demand potential estimation methodology and applying investigative marketing teqnuique in HGT historical data base analysis

The first step in study of Russian market potential is the if use of historical shipments data base in order to create origin destination table and use “reverse marketing” technique in order to trace demand and supply patterns for import and export of chemicals on the base of historical information for shipments to and from Russia made by HGT over the period of 2007 - 2010.

We also have to crystallize major products and what kinds of end user industries have the most potential for import and export generation and what industries demands for what kind of products will be a guarantor of stable balance of import and export moves.

Example of linking product to its end user's industry by means of reverse and investigative marketing and origin/destination based supply demand/ linking devise is represented below:

Table 9: Origin Destination Based Supply Demand Linking Table Excerpt

Amount Order date	**Product Name &Applications**	**Producer**	**Loading address**	**Shipper**	**Consignee**	**Discharge address and industries in the vicinity**	**Final User Consumer or Industry**
1X20	**Product Cortron® R-2378**- corrosion inhibitor, used for protection of metal pipes used to transport crude oil. Contains: **DIETHYLAMIN: 1)** plastic,2) plywood and paperboard manufacture, 3) wood stains varnishes , 4) Varnish Solvents **XYLENE:1)** Electroplating; 2) Laboratory Chemicals; 3) Machinery Mfg and Repair; 4) Paint Manufacture; 5) Paint Stripping; 6) Paper Coating; 7) Pesticide Mfg (Herbicides), 8) Pharmaceuticals ; 9) Printing; 10) Rubber;11) Semiconductors; 12) Wood Stains and Varnishes; 13)		Odessa , Texas	Hoyer Global (USA) Inc.	K&C Logistics Co Ltd	Kholmsk in Russian Sakhalin main industries Lumbering, herring fishing, pulp and paper milling, forestry, woodworking, light industry Production of cans and wooden and cardboard containers., food, and offshore gas and oil production Companies, process most of the raw materials produced in the region.	Plywood and paper boards, manufacturing industry of Sakhalin that can use paper coating; wood stains and varnishes maid by chemical plants adjacent to the oil and gas initial refinery by imputing of diethylamin xylene as a feedstock. However, the name of the product says that it will be used for the anti-corrosion agent in crude oil pipes.

	Electroplating; 14) Cold-cleaning Solvents; 15) Dilution; 16) Machinery Manufacture and Repair; 17) Hydrocarbon Solvents; 18) Solvents for Paint Stripping; 19) Solvents for Herbicide Manufacture; 20) Pharmaceuticals ; 21)Rubber; 22) Varnish Solvents						

Source: HGT shipments data base 2007-2010;

For example of implementation of the device represented above, let's make and analysis of information obtained from the Bill of Lading that describes the business for 2X20 with DIETHYLAMINE, XYLENE, shipped from door in Odessa, Texas to pier in Kholmsk in Russian Federation. (See the table above) Initial web search shows that substance might be used in production of plastic bottles, but there is a potential for a different scenario as Sakhalin also has gas and oil production.

Absence of information about final consumer of goods transported in the database due to pier to pier nature of the move hangs both assumptions in the air and next logical step is to investigate other uses and applications of this product. Further investigation shows that DIETALAMINE is also used in plywood and paperboard manufacture for Urea-Formaldehyde Resin Buffers and wood stains varnishes and other varnish solvents production while XYLENE uses are even more diversified and presented in the table below:

Table 10: Xylene Potential End Use Products and Industries List

Electroplating	Electroplating - Cold-cleaning Solvents
Laboratory Chemicals	Solvents - Dilution
Machinery Mfg and Repair	Solvents - Machinery Manufacture and Repair
Paint Manufacture	Hydrocarbon Solvents
Paint Stripping	Solvents - Paint Stripping
Paper Coating	Solvents

Pesticide Mfg (Herbicides)	Solvents - Herbicide Manufacture
Pharmaceuticals Mfg	Solvents - Pharmaceuticals
Printing	Solvents for Pharmaceuticals
Rubber Manufacture	Solvents - Rubber Manufacture
Semiconductors	Developers - Negative
Wood Stains and Varnishes	Varnish Solvents

Source: Scorecard (2005) Chemical Profiles: Xylene (Mixed Isomers) Industrial End Uses;

Information in the table above totally destroys both previous assumptions, namely saying that it would be less of the guess if we knew final consumer of the product which could give us a pattern. In this situation we can use two methods: first is to ask an agent in Russia for more information because he arranged trucking to final door or knows exactly who the final consumer is because he made customs clearance for the goods. In this case among nominates for the perfect knowledge is Yuriy Soroka from Panalpina Sakhalin Projects who allegedly did customs clearance or somebody from Tek Poseidon an agent of Hoyer Global Transport in Russia whose name is preceded by “to order” sign and who is identified in the B/L as the one to whom one should apply for delivery of goods.

However, we can’t base our procurement of the knowledge about final consumer, which is the key to the supply chain ownership, solely on solution of such logical and logistical conundrum by means of procurement of in-house information that might not be open even to the current agent in Russia. In this particular case we can try to find the final consumer by matching product applications with industries represented in Sakhalin, while giving a priority for the industry that will use this product and in case of possibility to apply product in more than one industry to t e most developed one.

This way of selection will lead us to the conclusion that the most probable end user for this example is in the plywood and paper boards manufacturing industry of Sakhalin because common use of both products under investigation is for varnishes that might be used in plywood and paperboard manufacture and for wood stains removal plus plywood and timber manufacturing is one of the most developed industries in Sakhalin besides oil and gas projects.

For the purposes of market potential estimation we have to study potential demand of the plywood and timber industry in Sakhalin for varnishes and the DIETHYLAMIN and XYLENE. First of all one has to understand that varnish is a product of chemical industry which can be applied in plywood and timber production industry. This pinpoints an area of further market research. However, the potential for further growth of import of diethylamide xylene into Russia for purposes of plywood, paper and pulp production industries is doubtful because research showed that there government of Far Eastern region of Russia Federation is not favoring dependence of imports for the purposes of local industries development. Therefore we only can guess that this shipment is rather a

spot business for the purposes of Exxon Corporation that participates in gas and oil procurement projects off shore of Sakhalin Islands. This assumption is confirmed by the information from the B/L of this shipment where it says that trade name of a product is **Cortron® R-2378**. This product contains Diethylamin and Xylene but it used for reducing of corrosion in the oil fields. Therefore, more shipments with this and other related chemicals followed.

Thus, this kind of "reverse marketing" or "investigative marketing" method will be useful for comprehensive study of Russian chemical market potential only after all the imports and exports from Russia will be carefully imputed into the origin destination based supply demand matrix for products shipped in or out of each region in Russia and around the Globe and every potential will be addressed. Therefore meticulous investigation should be done for each entry of the Russia Export/Import register and then verified by the check up with the agent in Russia where applicable. Knowledge of the final user or industry doesn't means automatically having it added into the client base but provides an opportunity for market potential estimation and new business generation.

6.4 Linking Products and their end users in the industrial markets for Import Moves made to Russia by HGT

Table 10: Russia Import Chemicals End Use Projects, Industries and Products

Amount & Date	**Chemical Product Name &Applications**	**Producer**	**Loading address**	**Trading CO/ FWD Agent**	**Shipper**	**Consignee**	**Discharge address**	**Final User Consumer or Industry**
1X20, 28/01/09	**TEG** – applied as natural gas dehydrator		Pusan (Handled by Singapore office)	K&C logistics Ltd			**Pier Kholmsk**	Sakhalin off shore gas and oil projects;
7X20, 23-Sep-2009 till now	**Cortron® R-2378**-Managing Corrosion in the Oilfield	Champion Technologies Inc	TX , Houston	Panalpina Inc Houston	Hoyer Global (USA) Inc.	CHAMPION TECHNOLOGIES RUSSIA & CAPSIAN BV, SAK	**Pier Kholmsk**	Sakhalin off shore gas and oil projects.

						HALIN BRANCH		
1X20, 1/6/2010	**Assure® HI-41W-** provides customizable hydrate management for challenging deepwater operations.	Champion Technologies Inc	Houston	Panalpina Inc Houston			**Pier Kholmsk**	Sakhalin off shore gas and oil projects.
13X20; 29/01/07-26/04/07;	**Triethylene Glycol (TEG**) applied as natural gas dehydrator		Pier Pusan	K & C Logistics Co. Ltd			**Pier Korsakov**	Sahalin-2 project related plant;
36X20, 31/01/07-26/03/07	**Diisopropanolamine LFG 85**: Natural gas purification – DIPA removes carbon dioxide and hydrogen sulfide from both natural and synthesized gases; It also can be used in production of personal care products to directly adjust the pH of a product or can be chemically modified to form emulsifiers, foam stabilizers, or viscosity modifiers. Isopropanolamides are produced by the reaction of DIPA with fatty acids (lauric, oleic, or stearic) or their methyl esters. Isopropanolamides function as thickeners in shampoos and other	DOW Chemical Co.	Huston		Dow		**Pier Korsakov**	Sahalin-2 project related plant; Just after WWII Korsakov industry was represented by two refrigerators for fish processing, one paper factory, one factory to extract salt from sea water with production capacity of 20 thousand tons per year, one sulphur-alcohol plant, 7 sake production facilities and 2 timber

	products, and foam boosters in products like shaving cream. Fatty acid soaps made from DIPA produce stable cosmetic emulsion formulations. The DIPA-derived salts of dodecyl benzene sulfonic acid and lauryl sulfate are used in shampoos, creams, and lotions. DIPA is also used in industrial metalworking –- isopropanolamine soaps from derived DIPA are used to produce metal-cutting fluids, strippers, and wax-emulsion formulations. They offer some corrosion protection, improve lubricity, act as a foam suppressant, and reduce friction in buffing, cutting, and cleaning fluids. DIPA is also used in coatings, pesticide formulations, paint strippers, paper, antistatic agents, photographic intermediates, plastics, surfactants, textile processing, and polyurethane production.							plants; Now pier of Korsakov is a gateway for the imports into the Sakhalin island
5X20, 18/02/ 08-	**Mono Ethylene Glycol (MEG): 1)** manufacture of		Pusan	K&C Logistics Co. Ltd.			**Pier Korsa kov**	Oil and gas production in Sakhalin-1, 2

13/03/08	polyester (PET) resins, films and fibers. 2) Production of antifreezes, coolants, aircraft anti-ice deicers and solvents; 3) dehydrates natural gas.							projects, gas anti freeze and dehydrator.
8X20, 31/10/07-5/7/2007	**Para white VSP-AF liquid -** urea free optical brightener for the paper industry;		KHAVA SHEVA	Patvolk Division (Forbes Gokak Ltd)	OY BA N M AR K AB		**Pier Kaliningrad**	Pulp and paper industry.
2X20, 22/02/08-3/5/2007	**Optical Brightener Agent Tafluonol SCBP Liquid** - Surface coating whitening for medium to high whiteness paper making, e.g. art paper pigment paper lightweight coated paper art card, etc.+ Size press whitening for medium to high whiteness paper making, e.g. high whiteness carbon paper;		KHAVA SHEVA	SAMSARA SHIPPING PVT LTD	OY BA N M AR K AB		**Pier Kaliningrad**	Kaliningrad major paper producers demand potential estimation for optical brightener agents and Tafluonol in particular is need.
10X20, 18/02/08 - 9/10/2009	**Optical Brightener Agent Tafluonol SCBP Liquid -** 1) Surface coating whitening for medium to high whiteness paper making, e.g. art paper, pigment paper lightweight coated paper , art card, etc. 2) Size press whitening for medium to high		Pier Nhava Sheva, India	SAMSARA SHIPPING PVT LTD	Ba nm ark OY	OJSC "St. Petersburg Cardboard and Printing Plant	**PEIR SPB**	Paper mills, fine paper production: OJSC "St. Petersburg Cardboard and Printing Plant

	whiteness paper making, e.g. high whiteness carbon paper;							
1X20, 12/8/2009	**PROSWEET S1736-** Hydrocarbon sulfide scavenger i.e. removes hydrocarbon sulfide molecules from hydrocarbon molecules; 1) maximizing production in Petrochemical catalytic reactors by reducing and/or eliminating catalyst poisoning; 2)Minimize loss of throughput and cost of equipment cleaning by reducing amine chloride salt deposition in fractionation trains; reducing fouling and corrosion. http://www.gewater.com/misc/newsletters/articles/12-2009/nonamine.jsp		Sorocaba, Brazil	Ge Betz Do Basil Ltd	GE Water & Process Technologies BVBA	GE RUS LLC	**Ryazan**	The Ryazan Oil Refinery Company (RORC) is TNK-BP's biggest refining subsidiary.
1X20, 12/8/2009	**PROSWEET S1736-** Hydrocarbon sulfide scavenger i.e. removes hydrocarbon sulfide molecules from hydrocarbon molecules;		Sorocaba , Brazil	Ge Betz Do Basil Ltd	GE Water & Process Technologies BVBA	GE RUS LLC	**Yaroslavl**	JSC Slavneft- oil refining branch of Gazprom Neft, also produces aromatic hydrocarbons and, lubricants.

26X20, 16/10/09-30/10/09	**Cocoamidopropyl Betaine (CAPB)** - 1) surfactant in bath products such as shampoos and hand soaps; 2) cosmetics as an emulsifying agent and thickener; 3) reduce irritation from purely ionic surfactants would cause; 4) antistatic agent in hair conditioners;		PIER NHAVA SHEVA	Lanimar Shipping LTD		TEK POSIDON	**PIER SPB**	Shampoos, hand soaps and hair conditioners, Cosmetics: Arnest OAO, Faberlic OAO, Kalina Concern OAO, Nefis Cosmetics OAO, Nevskaya Kosmetika Zao, Novaya Zarya-nouvelle Etoile ZAO, Svoboda OAO, Vesna OAO KF, Henkel, P&G, Uniliver, L'Oreal, Oriflame, Avon, Mary Kay.
2X20, 2/2/2007-2/2/2007	**ETHYL ACRYLATE STABILIZED -** PERSONAL CARE AND HYGIENE PRODUCTS.		TIANJING DOCK	TIANJIN QINXING KEMAO CO. LTD (trading company)			**PIER SPB**	Arnest OAO, Faberlic OAO, Kalina Concern OAO, Nefis Cosmetics OAO, Nevskaya Kosmetika Zao, Novaya Zarya-nouvelle Etoile ZAO, Svoboda OAO, Vesna OAO KF, Henkel, P&G, Uniliver,

								L'Oreal, Oriflame, Avon, Mary Kay.
1X20, 6/11/2007	**Fatty alcohol** 1) smaller molecules are used in cosmetics , food, and as industrial solvents; 2) Larger molecules are biofuels 3) have anticancer, antiviral, antifungal, anti-HIV properties, for potential use in medicine and health supplements; 4) component of waxes. 5) Fatty alcohols behave as nonionic surfactants.		PIER NHAVA SHEVA	Patvolk Division (Forbes Gokak Ltd)	United Transport		**PIER SPB**	Household detergents and toilet soaps producers. Also food, cosmetics, waxes and industrial solvents.
1X20 Flexi tank, 10/10/2008	**Linear alkyl benzene** (LAB) is an intermediate in detergent production.		PIER ALEXANDRIA	Helm AG,			**PIER SPB**	Detergent Production;
15X20 ,12/8/2008-23/02/09	**HCFC-141b Main applications: 1)** Blowing agent for polyurethane and phenolic foams and solvents; 2)Foaming and cleaning agent in solvents;	ZHEJIANG SENMEI CHEM	WUYI City, China		TEKPOSEID ON LTD		**PIER SPB**	Insulation foams for appliance and construction industry; Cleaners and solvents industry
1X20, 9/12/2009	**Tris (2-chloroethyl) phosphate 95%:** production of rigid foam used in building insulation		Pier SPB	Estichem OU (logistics and distributi			**PIER SPB**	Insulation for appliance and construction industry;

				on)				
2X20, 13/05/09 - 8/6/2009	**Tert Dodecyl Mercaptan**: 1) synthetic rubber, synthetic resin, as synthetic fiber polymerization regulator, particularly in SBR, ABS resin manufacturing; 2) non-ionic surfactant. 3) Germicides, 4) pesticides, 5) antirust agent, 6) lubricant additives, 6) drugs; 8) used in Ceramic Industry as the "Jinshui" for its good acidification.	ARKEMA CHEMICALS	HOUSTON,TX	BARTHCO INTERNATIONAL	Arkema,Inc, international logistics department	AVENTELRUS LTD.	**PIER SPB**	Rubber and resin; antirust agents; Ceramics, synthetic antioxidants, fungicides, pharmaceuticals, pesticides polymerization radicals in polystyrene, SBR rubber, ABS and other polymers and other fine chemicals important intermediates
10X20, 6/7/2009 - 4/12/2009	**Triethylamine:** (TMA) is a natural degradation product of plant and animal residues, and is the major odor produced from rotting marine animals. 1) catalytic solvent in organic chemical synthesis; 2) accelerator activator for rubber in wetting, penetrating, and waterproofing; 3) an agent of quaternary ammonium types; 4) curing and hardening of polymers; 5)	Henan Huilong chemicals Co., ltd., Henan dongda chemicals plant.	TIANJING DOCK, ZHEJIANG JIANDEJIANY, Pier Shanghai	HENAN HARVEST INTERNATIONAL CO LTD/Ehs Tank Container Logistics (Shanghai)	TEKPOSEIDON		**PIER SPB**	Refinery: chemical synthesis; Rubber production; Plastics: hardening of polymers; Personal Care products, Warning agent in natural gases;

	corrosion inhibitor or propellant; 6) insect attractant; 7) warning agent in natural gas; 8) disinfectants; 9 flotation agent in plastics production;							
4X20, 12/2/2007 - 12/2/2007	**Triethylene Glycol** 1) Almost 60% of (TEG) is used by the oil and gas industry to "dehydrate" natural gas; 2) relatively mild disinfectant toward a variety of bacteria, influenza A viruses, and spores of *Penicillium notatum* fungi and ideal for air disinfection purposes in occupied spaces i.e. for air fumigation; 3) Potent weapon against future influenza epidemics and pandemics; 4) important non-volatile industrial solvent; 5) production of plasticizers for cellophane, glue, cork, powdered ceramics and some plastics; 6) component in the formulation of some pigments, printing dyes, inks and pastes.	Dow Chemical Co.	DOW TAFT, LA		Dow Chemical Co		**PIER SPB**	Solvents - 11%, plasticizers 11%, PU 7%, Humectants 4%, UPR – 3%, coating resins and textile lubricants 6%. Major oil refineries, plastic producers, pharmaceuticals, printing and ink producers. World demand growth 1%per annum. Main US producers: DOW, Shell, Eastman, Huntsman, Equistar, Formosa. US demand 60ktpa, exports 10 ktpa.
3X20, 22/04/10-1/7/20	**Ultrene dicyclopentadiene** 1) Unsaturated Polyester Resins 3)	Arkema, 4444 Indu	Cymetch, Calvert City,	Sojitz Corp of America (trading	SOJITZ C	PHARMA LAB LLC	PIER SPB, For deliver	Pharmaceuticals, rubbers, resins,

10	EPDM Rubber; 4) Fragrances; 5) Insecticides; 6) Specialty Lubricants & Oils; 7) Electrical Insulating Coatings; 8) Specialty Polymers; 9) Norborne Based Chemicals; 10) Specialty Fertilizers; 11) Specialty Organic Compounds.	strial Parkway Calvert City, Kentucky 42029	KY	company, Houston)	ORPOFAMERICA		y refer to TEK Poseidon LTD	lubricants, fragrances, specialty chemical compounds and polymers;
91X20, 11/9/2009-2/12/2009	**Empty clean containers**	Chemilog	Hamburg, Antwerp	HOT	**Reposition**		**PIER SPB**	**Reposition**

Source: HGT data base 2007-2010

Reconstruction of links for the import moves made to Russia by HGT included thorough review of HGT shipments data base and led to success due to indication of information about final users in such cases as Paper Mill in St. Petersburg and Yaroslavl and Ryazan Oil refineries. In the case of Sakhalin project identification some investigation of products shipped and further superimposition onto the area where it was shipped also led to affirmative results.

However, for the majority of import moves made to the pier of St. Petersburg many diversified uses of the products shipped were included into the scope of investigation. In several cases final user and intermediate user industries identification was not on the surface. However, persistent and methodological reconstruction of further industrial usage links has created fundament for the next Chapter where demand drivers for import of those products will be discovered and estimated.

6.5 Linking products to their potential industrial markets and end users for Export Moves from Russia

Table 12: Russia Export Moves Chemicals End Uses, Projects, Industries and Final Products

Amount	Chemical Product	Prod	Loadin	Forwa	Shi	Con	Disc	Final User

& Date	Name &Applications	ucer	g addres s	rding Agent	ppe r	sign ee	harg e, area , city addr ess	Consumer or Industry
13X20, 1/4/2009-15/06/10	**ACROLEIN**: 1) preparation of polyester resin, polyurethane, propylene glycol, acrylic acid, acrylonitile, and glycerol; 2) fixative in preparation of biological specimens for electron microscopy; 3) contact herbicide to control submersed and floating weeds, as well as algae, in irrigation canals; 4) chemical intermediate in the production of acrylic acid and its esters; 5) aquatic herbicide and algaecide in irrigation canals, as a micro biocide in oil wells, liquid hydrocarbon fuels, cooling-water towers and water treatment ponds, and as a slimicide in the manufacture of paper;	JSC VOLZ HSK Y ORG SYNT HES E	VOLZHSKY	MULTI-CHEM IMPO RT & EXPO RT LLC	JS C VO LZ HS KY OR GS YN TH ES E	MUL TI-CHE M IMP ORT & EXP ORT LLC	USG C, BAR BOU RS CUT TER MIN AL	Intermediates for production of animal nutrition (Novus, Evonik, Bluestar, Sumitomo); Herbicides for water treatment; microbiocide in oil wells; in hydrocarbon fuels production; Intermediate for production of polyester resin used to produce building materials: fiberglass reinforced plastic, tonners for laser printers, bulk molding compounds, sheet molding compounds and paper production. In 2000, more than 17 million lb were imported but also 1.5 billion lb were exported in 2000 from USA.
104X20, 4/6/2008-27/02/09	**EPICHLOROHYDRIN:** 1) Epoxy resins; 2) Textiles; 3) Papers, inks and		Pier SPB	TEK POSEI DON LTD	HO YE R Glo	SAM SAR A SHI	India , Che nnai	68% used in epoxy resins production and 19% in synthetic glycerin

	dyes; 4) Ion exchange resins used to clean polluted air and water; 5) surface active agents used in cosmetics and shampoos;6) rubbers exhibiting resistance to extreme temperatures, 7) fuel, oil and ozone for automotive and aircraft parts, seals and gaskets, and a myriad of other uses; 8) agricultural products such as insecticides, bactericides and fungicides; 9) synthetic materials, including epoxy resins; 10) cure propylene-base Rubbers; 11) a solvent for cellulose esters and ethers and in resins with high wet-strength for the paper industry; 12) production of Zeospan, a specialty polyether rubber used for automobile parts; 13) stabilizer; 14) epoxy resins and synthetic glycerol; 15) epichlorohydrin elastomers, polyamide-epichlorohydrin resins, water treatment				bal Tra nsp ort B.V .	PPI NG PVT. LTD		production; 3% in Elastomers production and 10% in other uses.

	chemicals, and a variety of glycidyl derivatives.							
6X20, 26/03/08-14/03/08	**Nonylphenol Alkyl Phenol and Non Ionic Surfactants:** 1) used as industrial surfactant; 2) processing of wool and metals; 3) emulsifier for emulsion polymerization; 3) laboratory detergents; 4) pesticides; 5) component of some household detergents outside of Europe; 6) Nonoxynol-9, one of the APEs, is used as a surfactant in cleaning and cosmetic products, and as a spermicide in contraceptives**;**		Pier Novorossiysk	Tanco International (97) Ltd			Pier Haifa	Laboratory and household detergents; Wool and metal processing; Cleaning and cosmetics.
2X20, 18/02/10	**NORMAN-346:** 1) Oil extender for chemical rubbers and softener for rubber compounds in tire production;		Pier SPB	TEK POSEIDON LTD			PIER PUSAN	Rubber &Tire production in Korea
3X20, 23/11/07-26/02/08	**PEG400:** emulsifying agents, detergents, plasticizers, humectants, and water-soluble textile lubricants;		Pier SPB	TEK POSEIDON LTD	HOYER Global Transport B.V	K&C Co Ltd	PIER PUSAN	Solvent and lubricant in personal care soaps and cleaners, cosmetics and pharmaceuticals products as well as detergent emulsifier; Paper and agricultural

								products coating; Wood working;
2X20, 30/01/07	**Tris (chloroisopropyl) phosphate TCPP:** 1) flame retardants; 2) Rigid polyurethane insulation foams; 3) Unsaturated Polyester resins(including vinyl ester resins) compete with epoxy resins for end markets.; 4) PVC plastics (Poly Vinyl Chloride); 5) Adhesives, Coating & Elastomers; 6) Cellulose Acetate, Nitrocellulose; 7) Epoxy Resins.	KHIM PROM PLANT	NOVO CHEB OKSAR SK	HOYE R GmbH (Attn of TS-GUS)			PIE R CHI CAG O	Production for rigid foams; adhesives (glues), coatings and elastomers (rubbers). Plastics industry via nitrocellulose and cellulose acetate and PVC. Primary end markets for unsaturated polyester resins are construction, automotive and marine, also used to produce rotor blades, engine housings and gel coats for the wind power generators.
16X20, 14/08/09-9/12/2009	**Tris (2-chloroethyl) phosphate 95% (TCEP)** production of rigid foam in building insulation; Chlorinated organophosphates are used as flame retardants in insulation foams, paints, coatings, plastics, and textiles;	JSC KHIM PROM	PIER SPB	RW SMIT H FREIG HT FORW ARD	JS C KHI MP RO M	CEL LCH EM INTE RNA TIO NAL LLC	CHI CAG O, IL	Rigid foam in building insulation, flame retardants, insulation foams, paints, coatings, plastics, and textiles; unsaturated polyester resins. Production and use of TCEP has been in decline since the 1980s. Annual worldwide demand was less than 4000 tones in1997.
1X20, 18/11/08	**Technical Ethylcellosolve:** used in production of paints and fuels; **Ethylene glycol monomethyl ether** (EGME) 1) a solvent for cellulose	Nizhn ekam skneft ekhim	NIZNE KAMSK	Helm AG	Hel m AG	San o Intert rans Ltd**.**	PIE R HAIF A	EGME is used in modern military jet fuel systems icing inhibitors (FSII) production. FSII is (99.9%) ethylene glycol monomethyl ether. Solvents

	acetate and resins; 2) a solvent in the semiconductor industry. 3) leather dyeing ; 4) Photographic films. 5) Anti-freeze in jet fuels. 6) Quick drying varnishes, enamels, nail polishes, and wood stains.							(cellulose acetate, resins, semiconductors).
1X20, 11/8/2009	**Tri Butyl Phosphate (TBP):** 1) solvent and plasticizer for cellulose esters (nitrocellulose and cellulose acetate)***;*** ***2)*** a component of aircraft hydraulic fluid; 3) solvent for extraction and purification of rare earth metals from their ores; 4) solvent in inks, synthetic resins, gums, adhesives, herbicide and fungicide concentrates; 4) anti-foaming agent in detergent solutions, emulsions, paints, and adhesives;5) defoamer in ethylene glycol-borax antifreeze solutions; 5) increases the oil film strength; 6), improves wetting properties mercerizing liquids;	VOAO CHIMPROM	VOLGAGRAD	INTERMARC BV	Intermarc BV	Euro Maroc Phosphore S.A	Casablanca, Morocco	*Tributyl phosphate*, TBP *production* is estimated at 3000–5000 tonnes worldwide. *TBP* finds its use as a *solvent* in inks, synthetic resins, gums, adhesives. Other industrial applications can be found in Chemical catalysis processing and synthesis; Polymers production; Plastics, rubber and latex production; Hydraulic oils production; Dyestuffs, pigments and optical brighteners.

	7) heat exchange medium in chemical reactions; 8) base for herbicides and water thinned paints.							
148X20, 10/3/2008-20/05/10	**Acetonitrile extra pure**: 1) Laboratory chemicals 2) pharmaceuticals 2)solvent in butadiene purification; 2)Acrylic Fiber; 3) Polystyrene; 5)SBR Latex; 6) pesticide manufacturing; 7) starting material for the acetophenone, alpha-naphthalenacetic acid, thiamine, and acetamidine; 8) remove tars, phenols, 9) drugs and food quality testing, 10) perfumes; 11) Nitrile rubber, and ABS resins. Manufacture of fabrics, plastics, and synthetic rubber. It is used as a chemical intermediate in pesticide, perfume and pharmaceutical manufacturing, in extraction and refining of copper.		Finland, Kotka	VOPAK OY Mussalo Terminal and Oil tanking Sonmarin			Dalian, Shanghai, Tianjin, Yokohama	**Acetonitrile** is byproduct of Polyacrylonitrile production 70% of **Acetonitrile** is used as solvent production of pharmaceuticals. Acetonitrile World supply is shortened due to slump in demand for Polyacrylonitrile derived plastics used in production carpets and car bumpers to refrigerators and LEGO plastic. This created upward pressure on prices for Acetonitrile. More rational usage, recycling and search for alternatives. Acetonitrile Recycling

Source: HGT data base 2007-2010;

In the case of export moves product final user and intermediate industry links faced the identical challenges of no simple identification of final user in the transportation documents. Last links in most of the cases are forwarding companies that take care of product customs clearance and delivery to the final user. However, in some cases indication of producers in the shipping records or documents helped to discover the area of product implementation more specifically. Usually in the matter of such investigation products the distinctive market or brand name help to specify its end uses, while general description of chemicals shipped complicates investigation by introduction of multiple variables for end users and therefore end markets that drive a demand for the transportation these chemicals.

Chapter 7: Estimation of Demand Potential for HGT Import and Export Moves in Russia

Literature and informational sources overview

As this chapter is the largest and most extensive of all the chapters of this thesis study it involves usage of a considerable amount of literature and informational sources. Basically, sources for information consist of several groups and mostly published by the internet based publishers. However this fact doesn't preclude a gathering of analytical information in the form of market reports or news like articles dedicated to investigation of certain issues. All the subsections of this chapter include information about different products obtained from the web-sites of leading chemical producers like: Dow (1995-2010) Ethylene Glycols: Monoethylene Glycol , Dow (2010) Epichlorohydrin, ICIS (2004) Chemical Profile: Triethylene Glycol (TEG), Orgkhim Biochemical Holding (2009) Norman 346 ® Extender Oil information about chemical application also can be received from Wikipedia (2010) Acetonitrile but also from international organizations and governmental agencies like World Health Organization (1998) FLAME RETARDANTS: TRIS (CHLOROPROPYL) PHOSPHATE AND TRIS (2-CHLOROETHYL) PHOSPHATE, Geneva and U.S. Environmental Protection Agency (2010) Ozone Layer Protection - Regulatory Programs: HCFC-141b Questions and Answers.

Further investigation is usually supported by analytical articles about particular final users of certain chemicals or end product markets in Russia like: Market Publishers (2010) Market Report Data Base: Fatty Acids Market Research, August 2010 or SRI Consulting (2009) Unsaturated Polyester Resins Report for description of demand for the chemical use.

Then when a market of finished goods is determined, localized study of target markets is conducted by application of information from such reports as PriceWaterHouseCoopers (2004/2005) Russia, part of 2004/2005 Global Retail & Consumer Study from Beijing to Budapest; The London School of Hygiene & Tropical Medicine (2000) The Global Market For Soaps: A Market Research Report for the Public-Private Partnership on Handwashing with Soap for the final products market development study, Trade Portal of India (2001) Recent trends in the Russian Beauty and Health Products Market, ReportLinker (2009) Global Soaps and Detergents Industry and of course Kline&Company (2009) Russia: The Jewel of European Personal Care Market, presentation at HBA Global Expo, September 17, 2009 and ICIS (2010) Personal Care Markets Expect a Swift Recovery from Recession: Recession Recipe and Aginsky Consulting Group (2007) Cosmetics Market Research Summary: Market opportunities in Russia . Or the same examples may be applied to study for rubber production market supported by information from Freedonia (2010) World Rubber & Tire to 2013 - Market Research, Market Share, Market Size, Sales, Demand Forecast, Market Leaders, Company Profiles, Industry Trends and Eurasian Chemical Market (2009) CIS Isoprene Rubber Production and Market Conditions;

The third layer of information is information about recent developments in the market and its main players obtained from the news articles like Tire Review (2010) Russian Tire maker Making Production Push, September 07, 2010 and Robroad.com (2010) Opportunities amidst Russia epoxy production downturn or Lars Fischer (2010), Fighting till the last drop… of Acetonitrile, 3rd EuCheMS Chemistry Congress, August 28 and Imogen Matthews (2009) BRICs are building blocks for many companies: personal care marketers trying to build their business should make Brazil Russia, India and China a foundation for all of their expansion plans, Copyright 2009 Gale, Cengage Learning. All rights reserved;

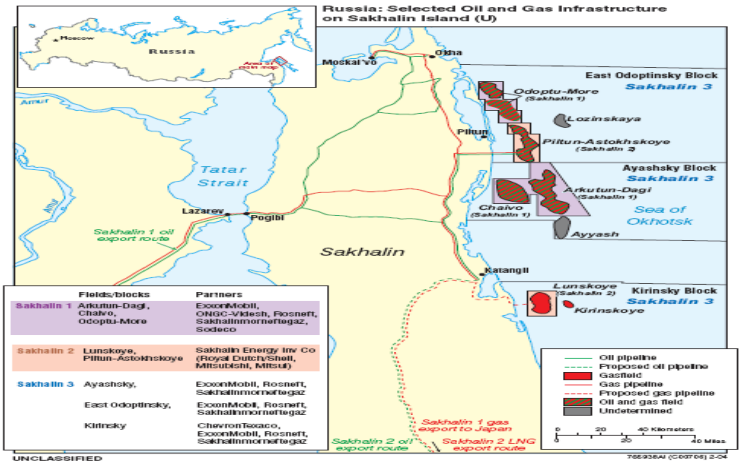
Also in some cases when investigation into the production processes that involve usage of certain fine chemicals such technical reports as Hydrocarbons-technology.com (2010) Sakhalin II Crude Oil and Liquefied Natural Gas, Sakhalin Island, Russia and Dr. Ian Rutledge (2004) the Sakhalin II PSA –a Production 'Non-Sharing' Agreement Analysis of Revenue Distribution, November 2004 or Sakhalin Energy Investment Company (2006) Environmental Impact Estimation report Sakhalin-II Project, Chapter 2: Project Description, Volume 3 as well of such equipment producers as Aker Solutions for the investigation of consumption rates within the production cycles of equipment they supplied to the project .

7.1 Estimation of Potential Demand for Hoyer Import Moves to Russia

7.1.1 Russia Progressive Upstream Gas and Oil Production Sector Import Potential (60X20);

During the period from January 2007 till March 2008 there were 60 containers moved to the port of Korsakov and Kholmsk. Among them: 13X20 with Triethylene Glycol, from Pusan on behalf of K&C logistics Co. Ltd; 36X20 with Diisopropanolamine LFG 85 from Huston on behalf of DOW Chemical Co. and 5X20 with MEG from Pusan again on behalf of K&C Logistics Co. Ltd. Plus In the period from 3-Sep- 2009 till now Kholmsk, another industrial port on Sakhalin Island with the vicinity to the Sakhalin oil and gas projects, saw imports of 7X20 with Cortron® R-2378 and 1X20 with Assure® HI-41W on behalf of Champion Technologies Inc from Houston, that were forwarded to the final destination by Panalpina Sakhalin office. Kholmsk also had a pleasure to receive 1X20 with TEG from Pusan on behalf of K&C logistics Ltd. Gas dehydration accounts for more than 50 percent of TEG consumption, and it is the only growth area—growing at approximately 2 percent per year for the past five years. ICIS (2004) Chemical Profile: Triethylene Glycol (TEG);

Ports of Kholmsk and Korsakov are known to be the closest town to the first in Russia LNG plant, constructed within the framework of the Sakhalin-2 project. Wikipedia (2010) Korsakov (town)



Map 2: The map of Sakhalin Oil and Gas Projects
Source: U.S. Energy Information Administration (May 2008) Sakhalin Island

Now as we take a look at the industrial uses of products shipped to the port of Korsakov and Kholmsk we can see that those are all fine specialty chemicals used in the facilitation of upstream oil and gas production processes:

a) Triethylene Glycol (TEG) is used by the oil and gas industry to "dehydrate" natural gas. It may also be used to dehydrate certain other gases. There is a certain need to dry natural gas to a necessary point, as humidity in natural gas can cause pipelines to freeze, and create other problems for end users of the natural gas. Triethylene glycol is placed into contact with natural gas, and strips the water out of the gas. Triethylene glycol is heated to a high temperature and put through a condensing system, which removes the water as waste and reclaims the TEG for continuous reuse within the system. The waste TEG produced by this process has been found to contain enough benzene to be classified as hazardous waste (benzene concentration greater than 0.5 mg/L). http://en.wikipedia.org/wiki/Triethylene_glycol

b) Diisopropanolamine LFG 85 (DIPA): Has distinctive natural gas purification qualities and removes carbon dioxide and hydrogen sulfide from both natural and synthesized gases.

c) Mono Ethylene Glycol (MEG) is a raw material in fiber production. A primary use of MEG is in the manufacture of polyester (PET) resins, films and fibers. In addition, MEG is important in the production of antifreezes, coolants, aircraft anti-icier and deicers and solvents. Natural gas is dehydrated by ethylene glycol as well. Dow (1995-2010)

Ethylene Glycols: Monoethylene Glycol

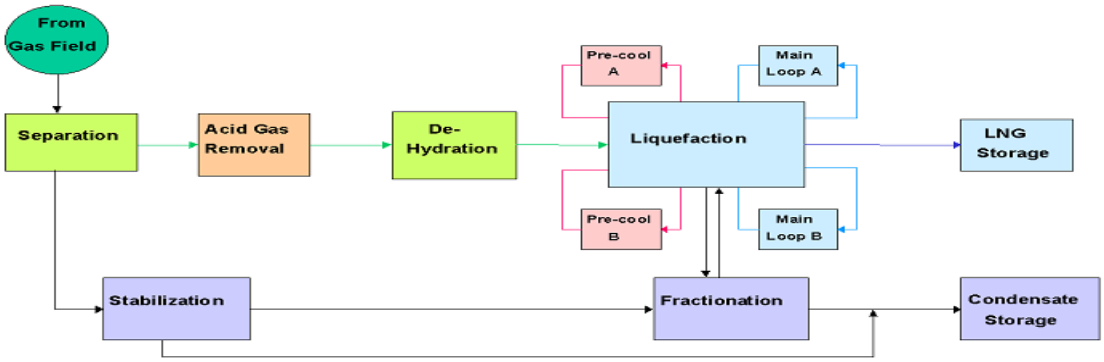


Figure 10: Gas Dehydration System
Source: Cas Groothuis, Dave Fletcher, Rob Klein Nagelvoort (2010)

MEG used as main hydrate-formation inhibitor. A residual quantity of MEG injected together with produced water. It biodegrades with time due to the action of micro-organisms (whereas residual quantities of other glycols, which could be used in the process, are less likely to fully decompose);

Therefore, for the reasons of glycol regeneration MEG injected in both of the multiphase pipelines on Lunskoye platform to prevent hydrate formation in the lines. The glycol water solution is separated from hydrocarbon stream onshore and regenerated in a conventional regeneration package. The lean MEG (about 90% conc.) is pumped back to platform for injection. Produced water delivered with the MEG evaporates in the regeneration process and disposed off via the injection well. Annual waste water volume for injection will be approximately 138 000 m3. This volume is estimated to contain up to 50 mg l-1 of petroleum products. Monoethylene glycol (MEG) is injected at the offshore platform into the pipeline to prevent hydrate formation. MEG is recovered at the OPF and piped back to the platform.

ProSep Company shipped a gas dehydration skid to the Fluor / Exxon Sakhalin Island project. The system was designed to provide 0.2 MMSCFD of dehydrated natural gas to a dew point of less than -16°C at 427 psig. Gas Dehydration and Dew Point Control is an important part of natural gas procurement at Lunskoye gas. MEG is injected for hydrate suppression then gas cooled by heat exchangers. The dew point controlled gas is routed to the inlet of Booster Station #1 to be mixed and compressed with the pipeline gas from the PA fields. ProTalk (2010)

Sakhalin Energy Investment Company in its Environmental Impact Estimation report mentions on-site Tankage Structures that will store: Rich Monoethylene Glycol (MEG); Lean Monoethylene Glycol (MEG); and oil field chemicals including demulsifiers, corrosion inhibitors, and neutralizers. This means that constant supply of these products was carefully planned and will be maintained on rolling stock basis. Sakhalin Energy Investment Company (2006)

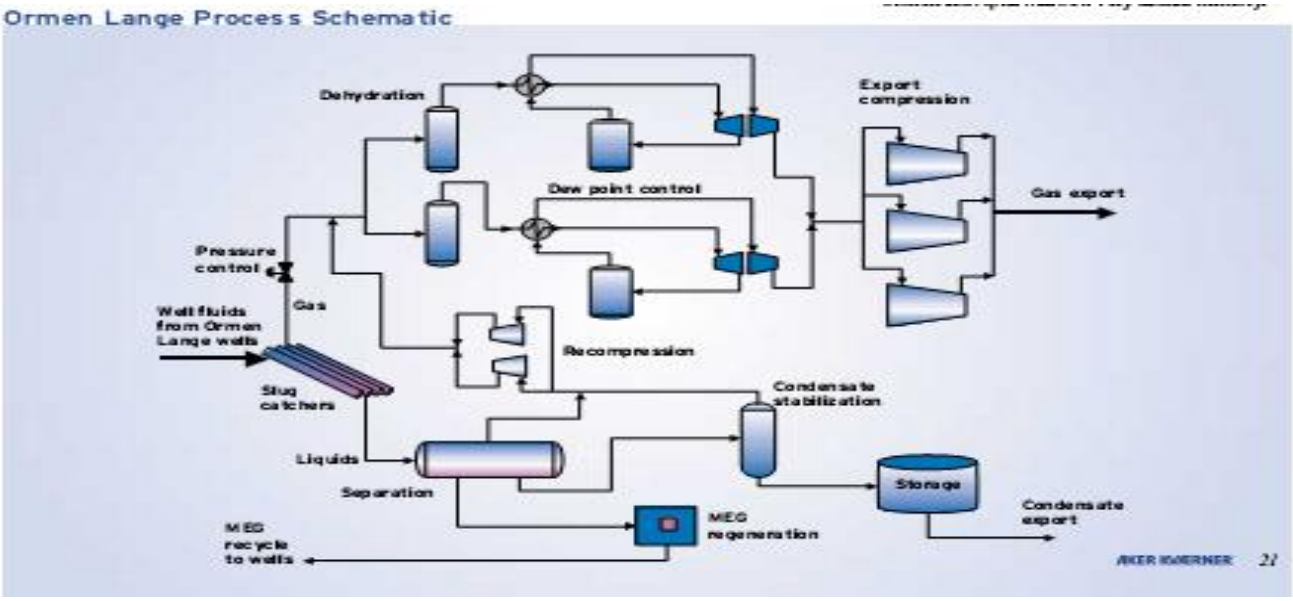


Figure 11: Gas Procurement, Dehydration and Storage Scheme
Source: Aker Solutions

d) **Cortron®** series products are specialty fine chemicals formulated for managing corrosion in the oilfield are definitely carefully supplied and stored at the plant storage facilities.

Croton line products are specially developed to fight corrosion in the pipes, production vessels and transportation systems caused by hydrogen sulfides (H_2S) and carbon dioxide (CO_2).

Major problem occurrence of which prevented by this line of products is sluggish flow patterns of fluids in pipelines that has tremendous negative impact of corrosion on the tubing strings.

Temperature and flow rates differences in the different parts of the pipelines can cause top-of-line corrosion due to the saturation of water at the top of the pipe with acid gases. Champion's Cortron® product line consists of a number of corrosion inhibitor formulations - some have been developed to address specific corrosion problems and others have been formulated to have wide applicability. Applications include controlling corrosion in all types of oilfield operations, including oil and gas production, processing, and transportation systems.

Champion company provides expertise on corrosion management and guarantees extending asset life, reducing failure rates, maintaining operability of systems, and by allowing customers the ability to manage risk associated with corrosion. Champion Technologies (2010) a

E) **Assure®** is a product within the program for integrated hydrate control and provides customizable hydrate management for challenging deepwater operations. This product

is usually applied together with fit –for-purpose hydrate management methodology and CTI modeling. This kind of modeling allows for precise chemical selection, accurate cell pressures and temperatures, including conditions of rapid cool-down, are determined using leading-edge equipment The Assure® hydrate management program is continually monitored and revised by CTI experts to maximize cost-effectiveness and performance and it would be really nice to ask them how much of this liquid is needed on Sakhalin II project. Champion Technologies (2010) b

After analysis of those 5 products uses and superimposing their possible implementations onto the import region industry grid one will make an obvious choice of Sakhalin-2 project related facilities. The next step will be to estimate potential annual demand of those facilities for the fine chemical products shipped expressed in standard size tank containers. For this we have to investigate production cycles of the target facilities and get data on annual consumption of the products described above. Information should be expressed in fluid tones. However it is very hard to estimate how much of these chemicals are needed per year on Sakhalin -2 project without chemical engineering expertise.

The shipment of 4X20 with TEG from Houston to the port of SBP is also discovers the necessity of TEG in the Western part of Russia where most of the oil and gas procurement and refining capacities in are located. TEG is used by the oil and gas industry to "dehydrate" natural gas. It may also be used to dehydrate certain other gases. It is necessary to dry natural gas to a certain point, as humidity in natural gas can cause pipelines to freeze, and create other problems for end users of the natural gas. Triethylene glycol is placed into contact with natural gas, and strips the water out of the gas. Triethylene glycol is heated to a high temperature and put through a condensing system, which removes the water as waste and reclaims the TEG for continuous reuse within the system.

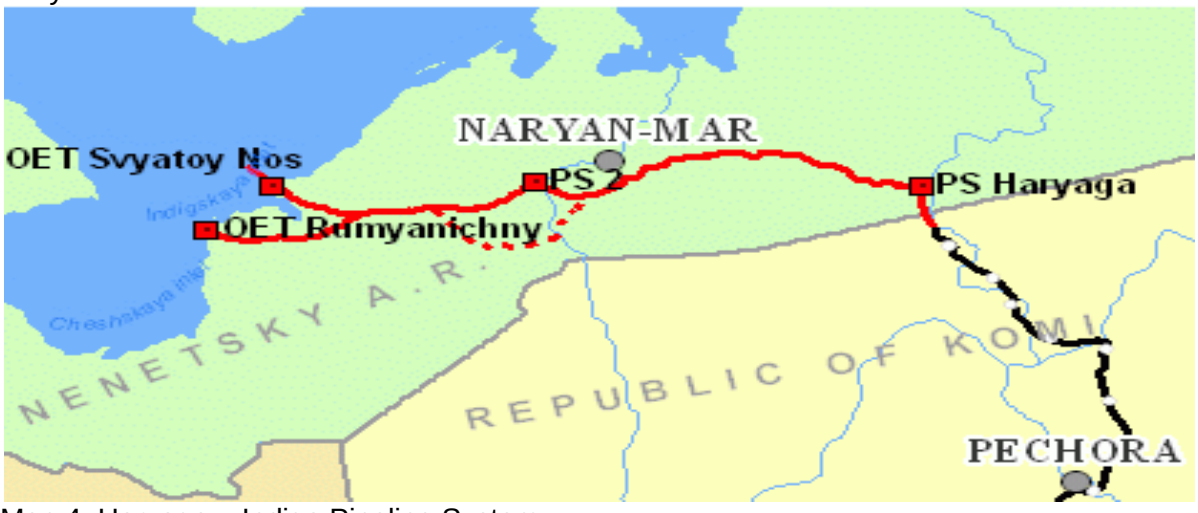
Further investigation shows, that there are gas and oil procurement projects that utilize networks of pipelines for the transport of crude oil and gas in Western part of Russia. The freshest example of such a project is Haryana pipeline with major oil procurement hub near the town of Usinsk.

Map 3: Kharyaga –Pechora Hydrocarbon Region
By fortune of hard search and a dollop of a good luck a warehousing report for the period of 09.05.2010 - 09.09.2010 including technical liquids for the Usinsk project was obtained. For more detail please find its upgraded version of this document in the appendix 6.

Total quantity of liquids stored at the warehouse per quarter of a year equals almost to 9 standard containers with average capacity of 20000 tons or 174247 litters. Even though it is hard to estimate total yearly demand for each type of chemical product from snapshot information represented in the table one still can also come up with a an approximation of yearly amount needed to sustain operations of such a project which will be equal to 8.7 times 4 or 35 standard containers. Estimation would be more precise if made for one type of the product. For this purposes one should suggest to select Mono ethylene Glycol which is also used on the Sakhalin project. Recalculation of yearly consumption of MEG according to the formula of (4X quarterly product usage)/20000 will give us result of 0.504 standard containers of MEG needed for a yearly maintenance of Haryana projects 460 km of pipelines. If we will calculate the rate of consumption by the Kharyaga info we will get 26 litters per 1 km of pipeline per year.

Therefore let's Sakhalin II project pipeline which has 2 onshore pipelines of 809 km with and 92 of off shore and totals to 1710 km is almost 4 times (3.7 times) longer then Kharyaga pipeline. 5X20 were sent to Sakhalin project but if we will apply this rate to Sakhalin project given its pipeline length being 1710 km, 5X20 would suffice for more then 2 years of operations and there is in not much of potential for transport of this particular chemical. This situation is partially might be explained by the fact that MEG is recycled within the pipeline transportation system networks.

However cumulative demand potential for liquid specialty chemicals is estimated around 35X20 per year for Kharyaga project according to the most modest assumptions that does not include stock flow and injection rates study for each individual product through the year.



Map 4: Haryaga – Indiga Pipeline System.
Source: Environmental Center (2010)

For the estimation of demand for individual chemicals we will use information for daily dynamics of fluid chemicals infection on the Kharyaga project presented in the table below:

Table 13: Haryaga Project Seclected Chemicals Daily Intake

Product Name	Daily Injection rate, ltr/day	yearly injection in litters	20' tank containers a year	Minimum stock, drums	Maximum stock, drums	In stock, drums	Estimated lifetime, day	PO #	Quantity on order, drums
Defoamer Prochinor AM2774	39	14040	0.702	20	40	38	189		
Biocide CECA Bactrian 446	14	5040	0.252	19	38	19	281		
Antiscale INIPOL AD15E	23	8280	0.414	15	40	22	198		
Corrosion inhibitor CECA Norust 760	105	37800	1.89	90	190	30	58	2932	80
Demulsifier Prochinor DN 14	153	55080	2.754	160	260	68	84	3833	110
Heat transfer fluid Therminol 59		0	0	50	130	93			
Heat transfer fluid Therminol ADX-10		0	0			30			
Total			6.012						

Source: Anonymous.

Interestingly that amount of corrosion inhibitor type Norust 760 is about 2X20 per year and it confirms that trend that corrosion inhibitors are also not a high volume items for the gas and oil procurement and production projects as on Sakhalin project corrosion inhibitors shipments totaled for 8X20 containers, given that the total size of the pipeline network in Sakhalin is about 4 times longer than that of Kharyaga projects its proves that 100% of demand for Sakhalin project chemicals was matched by HGT shipments!

Having this in mind we can estimate the rate of consummation for the most volumous product that was delivered to the Sakhalin project Diisopropanolamine LFG 85 (DIPA) a natural gas purification substance that removes carbon dioxide and hydrogen sulfide from both natural and synthesized gases. Therefore we also can call it a carbon dioxide and sulfide scavenger for natural gas.

Given input of information about 36X20 containers with this substance that were imported by GHT to the Sakhalin and keeping an assumption that 100 % of projects needs were provided we can calculate the rate of consumption for this product on the basis of yearly gas production output estimated in 2007. However, we should not forget that Sakhalin 2 project started its operations on 2009.

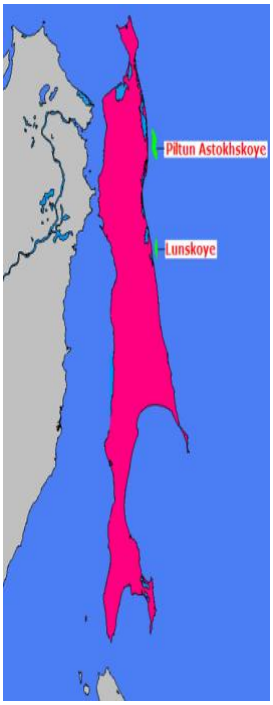
Table 14: Sakhalin II Project Oil and Gas Reserves

	Oil (Mb)	Condensate (Mb)	Total Liquids (Mb)	Gas (Bcf)
Piltun-Astokhskoye	660	100	760	6,463
Lunskoye	58.6	320	379	13,561
Total	718.3	420	1,139	20,024

Source: Dr Ian Rutledge (2004)

Piltun-Astokhskoye-B platform - Estimated production capacities are approx. 70,000bpd (11,130m³ per day) oil and, which is 2.83 million cubic meters a day of gas (100mscf per day);
Lunshoye platform production capacity is estimated at 52 million cubic meters a day (1,800 mscf per day) gas, 8,000m³ per day (34,000bpd) liquids and condensate and 2,500m³ per day; (16,000bpd) of oil. Hydrocarbons-technology.com (2010)

Therefore, if we assume 24/7 operations during a year we will arrive at 1019.39 millions cubic meters per year at Piltun –Astokhskoye B platform plus 19188 million cubic meters at Lunskoye platform to constitute 20207.39 million cubic meters of gas production a year.



Map 5: Piltun – Astokhskoye and Lunshoye platforms locations
Source: Wikipedia (2010) File:Sakhalin-2.PNG

Thus, the rate of consumption of Diisopropanolamine LFG 85 (DIPA) needed to produce one million cubic meters of gas should be calculated. So if 720000 litters of DIPA were used to produce 20207.39 million cubic meters of gas we can calculate how many litters of DIPA is needed to produce 1 million cubic meters of gas and its equals to 35 litters (720000 divided by 20207.30). Therefore daily consumption of Diisopropanolamine LFG 85 at Sakhalin II project is 2.83+52 = 54.83X35 = 1919.05 litters.

Furthermore, as combined gas capacity of Piltun-Astokhskoye and Lunshoye is estimated to be 20024 billion cubical feet or 567 billion cubical meters, and then it will take around 28 years to deplete it at this level of exploitation. And during this 28 years total amount of 1010X20 tank containers of DIPA 85 will be shipped to Sakhalin II project storage facilities.

Therefore, we can make a conclusion that even though anti-corrosive chemicals are needed the most at the sites of oil and gas production there is no such a sight that would generate amount of shipments that will generate meaningful amount of profit to sustain office in Russia. However, we can see a proof that such demand exists and should be covered by the economy of scope i.e. if needs of several such projects are covered it may bring more or less sizable profits. For exact estimation of amounts of shipments that can be potentially made one has to collect information about all the oil and gas production sight in Russia.

7.1.2 Russian Refinery Industry Potential for Fine Chemicals Import

7.1.2.1 Russian Petrochemical Industry Recent Trends

The petrochemicals industry in Russia, like most other areas of the country's economy, has faced severe shocks in the aftermath of the Soviet collapse and several measures had been undertaken to prepare this sector for the future challenges.

Russian petrochemical sector insured constant and abundant supply of gas feedstocks by preserving more of gas associated with oil procurement and reducing flaring practices to the minimum. These moves led to increase of profitability in the Russian petrochemicals business.
In the period from 1970 to 1995 there was not much impetus for building new plants, or for upgrading existing old and inefficient plants. Expansion and upgrading of petrochemical plants started just recently within the integrated Russian oil companies and the Gazprom group.

Gazprom is the biggest company in Russia and the world's largest exporter of natural gas controlled by the state. Russian government holds 50%+1 share in this vertically integrated petrochemical giant. Gazprom intends to become a major producer of petrochemicals as well as retain its role as a monopoly on the global gas market. Now it is concentrating on rejuvenation of existing plants and securing gas feedstocks of such gases as LPG. Russia produces 11m t/y of LPG and plans to increase its production to about 15m t/y by 2012. LPG is produced from associated gas and Russia's oil refineries. The country's proven reserves for LPG production are estimated at 1.3bn tons.

In 1999 Gazprom began to develop a new petrochemical holding company in partnership with the city of Tobolsk in West Siberia where Russia's biggest petrochemical complex is located. The new company controls about 500,000 tons/year of LPG production and will double this amount in order to secure gas feedstocks on long-term basis and supplied to the Tobolsk complex.

In 1999 Tomskgaz another 50 % Gazprom and 50% Eastern Oil Co. owned company began producing gas dedicated to the petrochemical industry from the Myldzhino field, in the Tomsk area at the rate of 5 MCM/day, with the field's gas reserve estimated at 100 BCM. Now it produces about 30 MCM/day and supplies the Tomsk petrochemical complex, with a pipeline linking it to the field already built. APS Review: Downstream Trends (2010);

There is a trend to enter petrochemicals business in order to invest their earnings and diversify mainstream business portfolio. Fore example Lukoil having built up a large cash pile and now pursuing diversification, has become an important producer of petrochemicals within Russia and abroad.

A plan for the refining sector's development for 2005-2008 has focused on continuing increases in the output of light oil products, catalysts and raw materials for the

petrochemicals industry. As production of fuel oil is reduced, local refineries are only meeting about half of the country's demand for high octane gasoline and Russia imports the rest.

Russia has 41 oil refineries with a total crude oil processing capacity of 5.4m b/d, but many of the refineries are still inefficient and in need of modernization. Refining throughput in Russia has increased to around 4.8m b/d. A major rise in capacity and throughput occurred in the first half of 2008. Russian refineries in 2009 produced around 1.2m b/d of heavy fuel oil, 1.3m b/d of middle distillates, and 815,000 b/d of gasoline. APS Review Downstream Trends (2010), Russian Petrochemicals Sector, Monday, August 30 2010

7.1.2.2 Product Implementation

Another product that appears on our radars and lies within oil procurement and refinery range is PROWSWEET S1736. This product continues our story of investigative exploration of hydrocarbons implementation along their value chains because this product is mainly applied as a scavenger of hydrocarbon sulfide and removal of hydrocarbon sulfide molecules from hydrocarbons. Kilma-OG Forurengsnings Direktoratet (2010) Prosweet 1736;

Prosweet S1736 is mostly used in the drilling, production, transport, storage, and processing of crude oil, including waste water associated with crude oil production, and in the storage of residual fuel oil. This product is needed for careful disposal of hydrogen sulfide which is a very toxic substance and very often encountered in production liquids. Hydrogen sulfide-containing light hydrocarbon vapors are emitted and must be controlled at the oil well head. Uncontrolled emission of hydrogen sulfide gives rise to severe health hazards. Burning of such vapors neither solves problem of toxic gas nor is economical since the light hydrocarbons have significant economic value. Furthermore, hydrogen sulfide is often present in the underground water removed from the crude oil, in the crude oil itself and in the gases associated with such water and oil. When the water and oil are separated one from the other by the use of separation tanks, demulsification apparatus and the like, intolerable amounts of hydrogen sulfide are emitted as a gas which is associated with water and hydrocarbon vapors. Natural gases are often sour because they also contain some hydrogen sulfides. Patent Storm (2010);

7.1.2.3 Product Imports Potential Investigation

2X20 with PROSWEET S1736 from Brazil were delivered to the refineries of Ryazan and Yaroslavl owned by the Russian petrochemical giants. Why only 1 container each? Is it enough to run the business of refinery and oil production? The most probable answer is no. The most probable explanation is on the surface: this product formula was carefully studied and used for production of this reagent.

Map 6: TNK-BP operations in Russia
Source: TNK-BP Sustainability report (2009)

So in favor of this kind of possibilities of cracking a formula code of this product can tell one big fact that Ryazan Oil Refinery Company (RORC) where 1X20 of PROSWEET S1736 from Brazil was sent to be TNK-BP's biggest refining subsidiary. RORC logically produces a wide range of high-quality oil products: AI—80, AI—92, AI—95 and AI—98 motor gasoline, diesel fuel — including low-sulfur Euro-4 and Euro-5 grades — jet fuel, boiler fuel, road and construction bitumen, lubricants and other oil products. The refinery has a capacity of 17 million tons of oil per year and probably needs large amounts of such products as PROSWEET S1736.

Production of motor gasoline began at the Ryazan Oil Refinery as early as 19 October 1960. In 1993, the refinery was turned into a joint-stock company and in 1995 became part of TNK. In 2002, Ryazan Oil Refinery was restructured to form CJSC Ryazan Oil Refining Company, which became part of TNK-BP in 2003. TNK-BP Home page, Ryazan Refinery

From 1999 to 2002, Phase 1 of an extensive program of renovation work was carried out, affecting all the company's main process units, from primary refining to hydro treatment and dispatch. Upgrading work on the three primary oil refining units, including installation of an automatic control system, has resulted in an increase in output of high-quality motor fuel, and improved environmental and safety standards .

One has to mention that improvement of such standards is tightly connected with lowering of sulfur as in production liquids as well as in final products. Two diesel-fuel hydro treatment units have also been modernized and new types of diesel processing

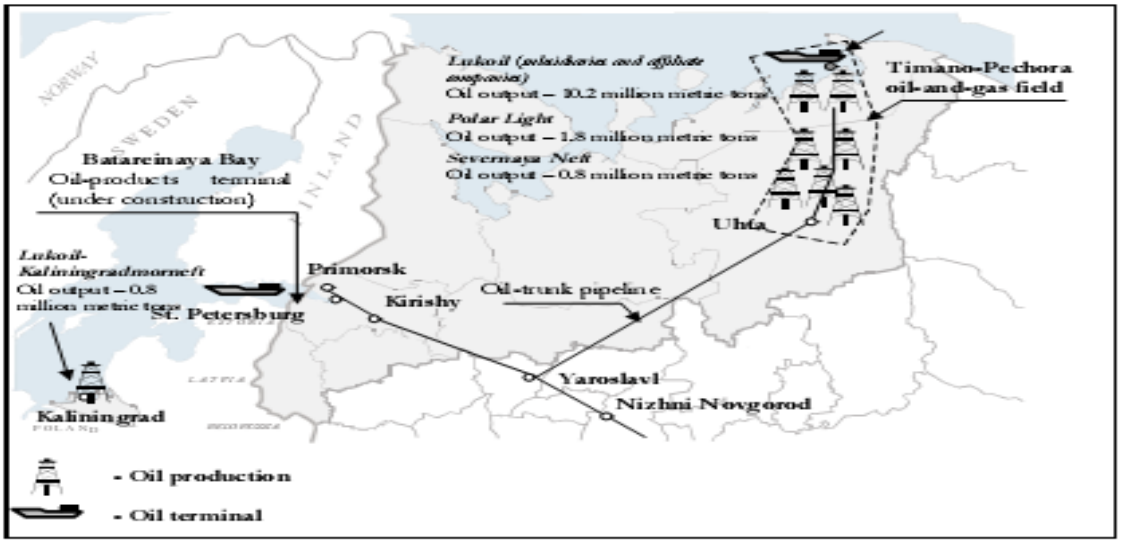
have been introduced, and a boiler-house has been built. In 2001, RORC's central processing unit — the catalytic cracker – was upgraded, boosting its productivity from 900,000 to 2.5 million tons of oil per year. TNK-BP Home page, Ryazan Refinery

Therefore, to reduce environmental impact and cut hazardous atmospheric emissions of the newly installed equipments the sulfuric acid unit was also upgraded. The selective oil hydro treatment unit was completely renovated, and the hazardous solvent phenol was replaced by a nontoxic biodegradable alternative which was probably based on improved technologies for hydrogen sulfide scavenging.

In 2007, in record quick time, the Ryazan Oil Refining Company upgraded 17 of its facilities. In 2008, RORC began producing Euro-5-standad diesel fuel with a sulfur content of no more than 0.001%. This kind of improvement is a sure sign of new scavenging technologies implementation success. TNK-BP (2010) Ryazan Refinery;

Another 1X20 of PROSWEET S 1736 from Brazil to was discharged at JSC Slavneft-YANOS refinery in Yaroslavl on 12/8/2009. Slavneft ranked as Russia's 8th largest oil producer in 2002 with annual production of 15 million tons. The company controls stakes in exploration and production enterprises in Western Siberia, the Volga region, and Eastern Siberia. Its refining assets include the YaNOS and Mendeleev refineries in Yaroslavl, and the Mozyr Refinery in Belarus. Slavneft also has about 550 retail filling stations throughout central and northwestern Russia.

Figure 13. The Oil Industry of Northwest Russia



Map 7: The Oil Industry of Northwest Russia
Source: Hannu Hernesniemi (2006) INDUSTRIAL CLUSTERS IN NORTHWEST RUSSIA, Lappeenranta University of Technology Northern Dimension Research Centre, 2006

Map 8: City of Yaroslavl Location regarding Moscow
Source: Evgeni Plushenko - News and Discussions, Yaroslavl Oblast in Russia, source: Wikimedia Commons, File:Map of Russia - Yaroslavl Oblast

OJSC Slavneft-YANOS is a fuel and oil producing plant with a deep oil refining facility, with an installed capacity of 15.2 million tons a year for the production of light and dark petroleum products for various technological and household uses. JSC GAZPROM NEFT ANNUAL REPORT (2009) ENERGY FOR LIFE ENERGY FOR PEOPLE

Gazprom Neft holds a 49.9% interest in JSC Slavneft (Slavneft) and a 50.0% interest in JSC Tomskneft VNK (Tomskneft), which are engaged in the development of oil and gas deposits in the Urals and Siberian Federal Districts. The Company accounts for investment in Slavneft and Tomskneft using the equity method.

The main refinery of Gazprom Neft is OJSC Gazpromneft - Omsk Refinery in the south-west of Siberia. The Omsk Refinery is the second largest and one of the most technologically advanced refineries in Russia. The Company also holds a 50.0% interest in Moscow NPZ Holdings B.V. which owns a 77.25% stake in OJSC Moscow Refinery. Furthermore, the Company has access to the refining capacities of OJSC Slavneft-YANOS (YANOS), owned by Slavneft.

Map 9: Gazprom Neft at a Glance - Geography of Operations

Source: Gazprom Neft official website

JSC Gazprom Neft and OJSC Rosneft, OJSC Lukoil, TNK-BP; OJSC Surgutneftegaz signed are among major producers of petroleum in Russia. Gazprom Neft Development History (1995-2009).

It is hard to underestimate potential demand of those two Russian oil production and refinery giants reinforced by their integration into the system of Russian state controlled petrochemical industry. Therefore, there is evident reluctance to build their production cycles to become reliant on imported chemicals due to strategic and economic concerns of securing export import balance in favor of Russian exports, especially in the face of the fact that almost half of motor petroleum is still has to be imported into Russia.

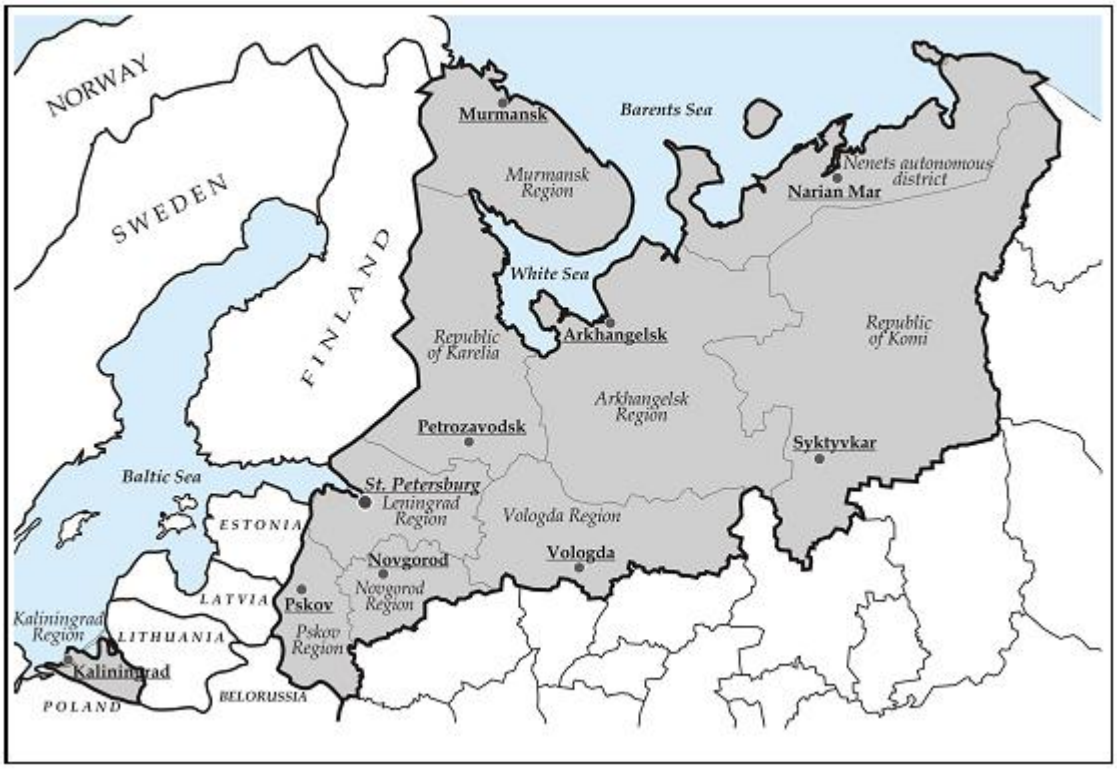
Probable explanation is that a lot of crude oil is exported and leaves less for domestic petroleum production, also the lack of necessary reagents in production of high quality products might be another reason. Plus the strategy of diversifying petroleum production business into the production of petrochemical feedstocks also pinpoints a policy for boosting of self sufficiency where it is possible.

Furthermore abundant supply of feedstocks within Russia will allow production of such fine chemicals as PROSWEET 1716 as soon as formula and production process is well established.

7.1.3 Russian Western Enclave Kaliningrad's and Saint Petersburg's Paper Industry Import Potential (20X20)

Several shipments of chemicals used in paper and pulp production delivered to the ports of Kaliningrad and St. Petersburg allow us to pay more attention to the Russia's North West Region.

Figure 8. Northwest Russia



Map 10: Map of North West Russia
Source: Hannu Hernesniemi (2006) INDUSTRIAL CLUSTERS IN NORTHWEST RUSSIA, Lappeenranta University of Technology Northern Dimension Research Centre, 2006

10X20 tanks with Optical Brightener Agent Tafluonol SCBP Liquid, from Pier Nhava Sheva, India were shipped to the premises of OJSC "St. Petersburg Cardboard and Printing Plant.

This product is used for **s**urface coating whitening of medium to high whiteness paper

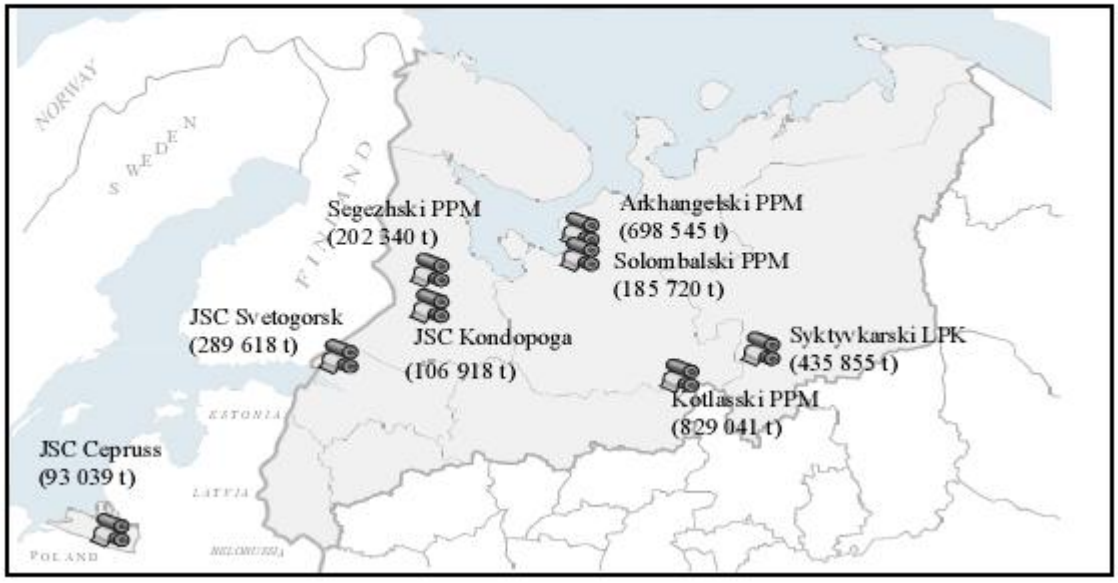
making, e.g. art paper, pigment paper lightweight coated paper, art card, etc. and size press whitening for medium to high whiteness paper making, e.g. high whiteness carbon paper; were shipped to the premises.

Kaliningrad region saw total imports of 10X20 from India with products used in pulp and paper production. Among them 8X20 with Para white VSP-AF liquid, from Nhava Sheva on behalf of Patvolk Division (Forbes Gokak Ltd) and 2X20 with Optical Brightener Agent Tafluonol SCBP Liquid from Nhava Sheva on behalf of SAMSARA SHIPPING PVT LTD.

The Para white VSP-AF Liquid is versatile urea free optical brightener for the paper industry. European approval had been received for safe use as an optical brightener in the manufacture of Paper & Boards for food packaging as well as of sanitary paper and sanitary tissue. Para white is VSP-AF is also applied internally in the pulp/stock production as well as on surface of size press for coating. Works in acidic and alkaline medium and gives bluish to neutral white shades to the paper. Paramount Minerals and Chemicals Limited (2007) Manufacturers of Spray Dried Optical Brightening Agents (OBAs) and Dye Intermediates: Products for the Paper Industry.

TAFLUONOL SCBP T/P is applied in surface coating whitening for medium to high whiteness paper making, e.g. art paper pigment paper lightweight coated paper art card, etc. Also used in size press whitening for medium to high whiteness paper making and in high whiteness carbon paper. This product characterized by high fluorescence strength, low fiber affinity appropriate only for coating and whitening, appropriate to apply with derivatives and organic solvents, can be used under high temperature and high pressure operation. TEH FONG MIN INTERNATIONAL CO., LTD (2010)

Figure 21. The Largest Companies of the Pulp-and-Paper Industry of Northwest Russia



Map 11: The Largest Companies of the Pulp and Paper Industry of Northwest Russia.

Source: Hannu Hernesniemi (2006) INDUSTRIAL CLUSTERS IN NORTHWEST RUSSIA, Lappeenranta University of Technology Northern Dimension Research Centre, 2006

There are 4 pulp mills and 1 paper mill in Kaliningrad and 400,000 tons of pulp produced annually (11% of total Russian pulp output), 150,000 tons of paper, and 30,000 tons of paperboard. The largest enterprises are JV ZAO Cepruss, OOO Nemansky Paper Mill, and OAO Sovietsky Paper Mill. Russia Profile.ORG (2010) Kaliningrad Region Economic Potential

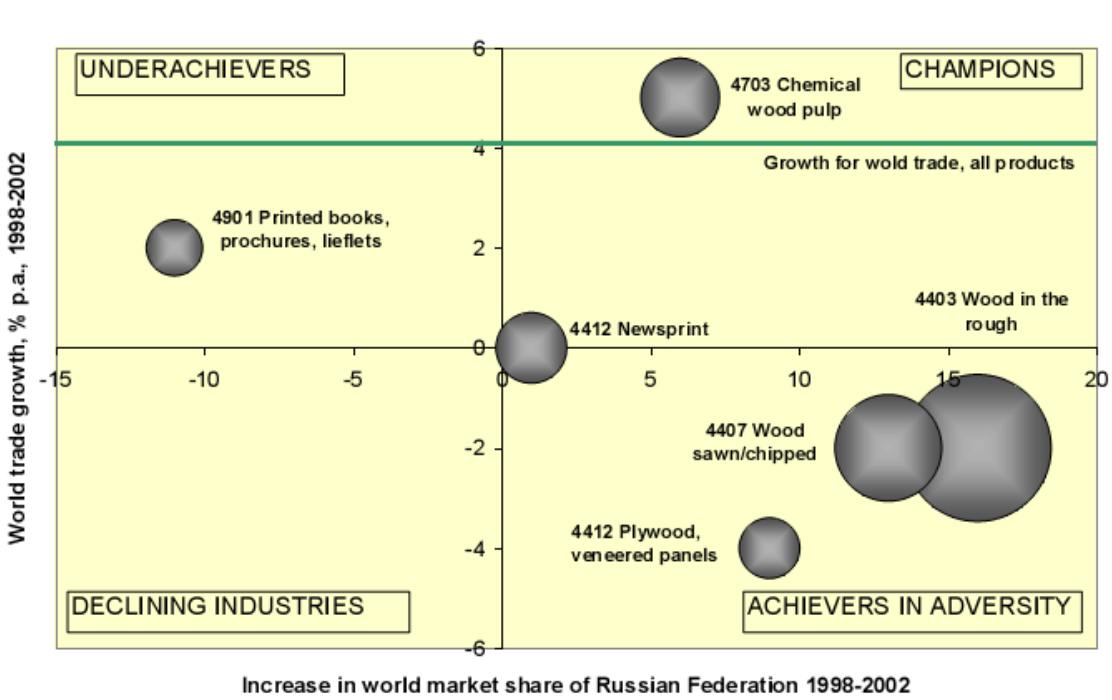


Figure 12: Exports of Russian Pulp and Paper Industry by Product Groups in 2003
Source: Hannu Hernesniemi (2006) INDUSTRIAL CLUSTERS IN NORTHWEST RUSSIA, Lappeenranta University of Technology Northern Dimension Research Centre, 2006

Estimation of potential demand chemicals used in the for pulp production and paper mills in North Western Russia requires insiders or engineering level knowledge about consumption rates of each product at the certain production facility with a certain production capacity. Despite that fact that finished paper is not absolute champion for exports one can see that chemical wood pulp production has a considerate share in Russia's export of wood materials.

However in this case one can not follow the logic that raw materials imported in order to export finished product. However, there always will be a strong demand for liquid chemicals applied in domestic production of paper in Russia. This fact brings nothing but very good news for the potential for import of tank containers into Russia with indicated type of ingredients and total of 20X20 of total imports proves this assumption

well. However, let's continue our search for the chemicals product which demand for import moves is driven by genuine growth in consumption of final products in the domestic market.

7.1.4 Port of Saint Petersburg: A mysterious gateway into Western Russia

The fact that large part of the imports to Russia were made to pier St. Petersburg widens the scope of potential end users search geographically and allows including entire west of Russia into the scope of investigation. In total there were 156X20 tank containers imported to Russia via port of SPB in the period of 3 years. From them 65X20 were filled with different products and 91X20 were empty repositioning moves.

7.1.4.1 The great in the sky, or from the cosmetics and personal care to household and industrial detergents ingredients in Russia (30X20)

Personal care items production intermediates like Cocoamidopropyl Betaine or PEG 400 which are used in majority of shampoos and cleaning products as surfactants carry the most potential for transportation market development. Therefore, study of Russian marketing strategy of such companies as Uniliver, P&G and others in the sector as well as level development of production capacities in Russia is needed. Therefore, we will follow our usual path of reconstruction of demand patterns via investigative methodology of reverse marketing and start with the most volumous product shipped into the port of Saint Petersburg over last 3 years period.

7.1.4.1.1 Product and how it applied

26X20 with Cocoamidopropyl Betaine were shipped from Pier Nhava Sheva to Pier SPB.

Cocoamidopropyl Betaine (CAPB) is a synthetic surfactant derived from and formulated using coconut oil and dimethylaminopropylamine. It is used as a surfactant in bath products such as shampoos, hair conditioners and hand soaps, as well as in cosmetics as an emulsifying agent and thickener. It also serves as an antistatic agent in hair conditioners due to its viscosity stabilizing qualities and reduced levels of irritation caused by purely ionic surfactants. Actually it is s a medium strength surfactant which most often does not irritate skin or mucous membranes. It also has antiseptic properties, making it suitable for personal sanitary products. It is compatible with other cationic, anionic, and nonionic surfactants. Cocoamidopropyl Betaine to a significant degree has replaced cocamide DEA. Alpha Chemicals Pvt., Ltd (2009-2010) Cocamidopropyl Betaine

In 2002, 87000 metric tones of Betaine were produced in the World: 59000 metric tons in Western Europe (CESIO-statistics, 2004) 18000 tons/year are produced in U.S.A and about 10000 tons/year in Asia (Goldschmidt AG, 2004) Cocoamidopropyl Betaine uses are divided equally 50% used as ingredient in cosmetics and 50% is used as a detergent (Consortium "Categories Betaine" Information, 11/2003). Its cosmetics uses are found in shampoos, bath products, cleaning agents, shower gels, bath foams, liquid

soaps, contact lens fluids and skin care products. Its uses as a detergent found in hand washing agents and hand dish washing agents.

Concentrations of Cocoamidopropyl Betaine in cleaning and personal care products range from 0.1 to 50% (0.03 to 15% active) (Hunter et al., 1998, Swiss Product Register, 2004). Cocoamidopropyl Betaine concentration levels in industrial cleaning products manufacturing is not described. In July 2004, about 200 consumer and items contained 10 to 50% of Cocoamidopropyl Betaine as well as 7 industrial products including car cleaning agents, washing powder and soap contained from 10 to 50% (3 to 15% active) of lauramidopropyl Betaine (Swiss Product Register, 2004).

According to manufacturer information, 4% lauramidopropyl Betaine is used in hand dish washing and personal care products (Sasol, 2004). In 1992, 521 out of 19000 cosmetic products manufactured in USA contained Cocoamidopropyl Betaine (de Groot, 1997). The percentage of personal care products in the USA using Cocoamidopropyl Betaine increased from 3.3% in 1989 to 6.2% in 1994 (Hunter et al., 1998). HERA (2005) Human and Environmental Risk Assessment on ingredients of household cleaning products: Cocoamidopropyl Betaine (CAPB): (CAS No: 61789-40-0, 70851-07-9, 4292-10-8), June 2005.

In 2009, 8 to 9 billion tons of personal care products produced in the World and almost all use Betaine as ingredients. Therefore we can confidently say that this chemical is a major intermediate in the production of personal care items. The personal care market includes bubble baths, body washers, hand soaps and cleaners, shaving products, hair shampoos and oral care products. Major surfactants products consumers and producers in this market around the world are Procter & Gamble, Akzo Nobel, Stepan, Cognis, Crompton, Croda Inc. (Personal care), Rhodia, Degussa (Specialties, surfactant blends), Lonza, and Uniliver, Uniquema. Personal care remains a very attractive sector for the chemical industry.

The global personal care market surpassed US $280 billion at the retail level in 2008 global sales of finished products are $200bn (€150bn) at the manufacturers' level, or nearly $300bn at the retail level, realizing global growth of at least 4.5%/year over the past five years. ICIS (2010) Personal Care Markets Expect a Swift Recovery from Recession: Recession Recipe, 04 May 2010 14:24 [Source: ICB]

7.1.4.1.2 Russian Market for Personal Care Products, Soap and Detergents and its potential

As early as 2001 personal care and washing products spending in Russia occupied 8% and 3% of total products and consumed in Russia. At that time most of consumption spending of average Russian consumers was concentrated in the area of food where only dairy and meet products amounted to 49% of total spending. However situation was changing towards more consumption in the cosmetics and personal care sector.

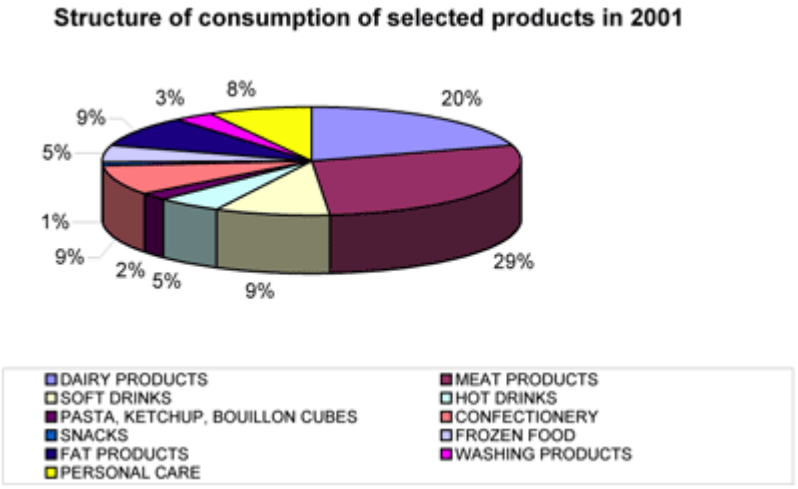


Figure 13: Structure of Consumption of Selected Products in Russia in 2001
Source: Svetlana Lobovikova (2001) Domestic Trade in Russia

Cosmetics and personal care market in Russia was actually growing steadily over period of last 10 years, and this is very well recorded in the table below, representing trend of Russian cosmetics and personal care market re numeration growth over period of 8 years. Over this period market volume doubled.

Table 15: Dynamics of the Russian Market for Cosmetics and Perfume Products for the Period of 1999 to 2006

Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Market Size (USD billions)	3.4	3.6	3.9	4.3	5.2	6.2	7.0	7.9

Source: Aginsky Consulting Group (2007)

Moreover, Russian personal care and cosmetics market was the fastest growing segment and already in 2001 the was ranked sixth among the world's fastest growing cosmetic markets and amounted to 20 % of total comparison, what is 10 times more then mere 2% in Western Europe. With such a tremendous growth pattern its volume doubled from USD 3.9 to USD 7.9 in 2006.

To trace sectoral trends in dynamics of Russian personal care and cosmetic market let's start from the base of 2001 when the largest portion of the Russian cosmetic and health products market was occupied by hair care products with 20 % , those were followed by make-up products and and soaps, bath gels and foams with 19 %; and 18 % respectively. Tooth pastes and perfumes shared 4th and 5th places with 13 and 11%. At that time skin care products, deodorants, and cosmetics for men and children were growing at the slower pace. In 2001 consumers bought mostly domestic shampoos and

creams 70 percent of which were produced locally. Anonymous web page (2001) recent trends in the Russian Beauty and Health Products Market

As we can see in 2003 Russian cosmetics and personal care market was already estimated to be EUR4.62 billion worth and all major international companies producing cosmetics and personal care products were already present in the Russian market with about 30% of it were controlled by eight world leaders (Procter & Gamble, L'Oreal Group, Beiersdorf, Colgate-Palmolive, Unilever Group, Henkel, Oriflame International and Gillette) another 23% of the market were represented by other foreign producers form Finland, Poland and other neighboring countries.

Most of multinationals already produced majority of their goods locally. Foreign players are traditionally stronger than local companies in producing make-up and perfumery, while leading Russian companies, such as Nevskaya Cosmetika, Kalina, Svoboda, Linda and several others, are able to supply good-quality personal care goods. PricewaterhouseCoopers (2004/2005)

In 2005 Russian perfumery and cosmetics market grew at still staggering by slower pace then in 2001, which amounted to 13% of year on year growth and reached USD 7bn in volume. Hair care and make-up products again enjoyed the most prolific growth in 2005 with 18% and 17.7% respectively. The figures, also highlighted other high performing sectors including oral care (+14%), skin care (+13.3%), perfumery (+12%), bath care (+10%), cosmetics for men (+8%), deodorants (+5%) and baby care (+2%). Among interesting trends was a strong development of contract manufacturing and private label as well as greater activity in regional players. In this year international raw material suppliers position in the market strengthened to the point when they started to think about more serious representation and market development strategies in order to cement their market share growth. Cosmetics Business (2006)

Taking into consideration 13% year on year growth in 2005 it was very easy to climb up to USD 7.9bn volume in 2006. In 2006 hare hair care unsurprisingly asserted leading position in the market with its 19 % market share. In 2006 Hair care showed a 1% higher growth rate then in 2005 growing at 19 % and being absolute leader. Within hair care sector conditioners and moisturizing body care products are the two fastest sectors of personal hygiene in Russia (with 29 percent growth, while skin care and fragrance sectors are predicted to continue to see the strongest growth between 2006 and 2011. Aginsky Consulting Group (2007)

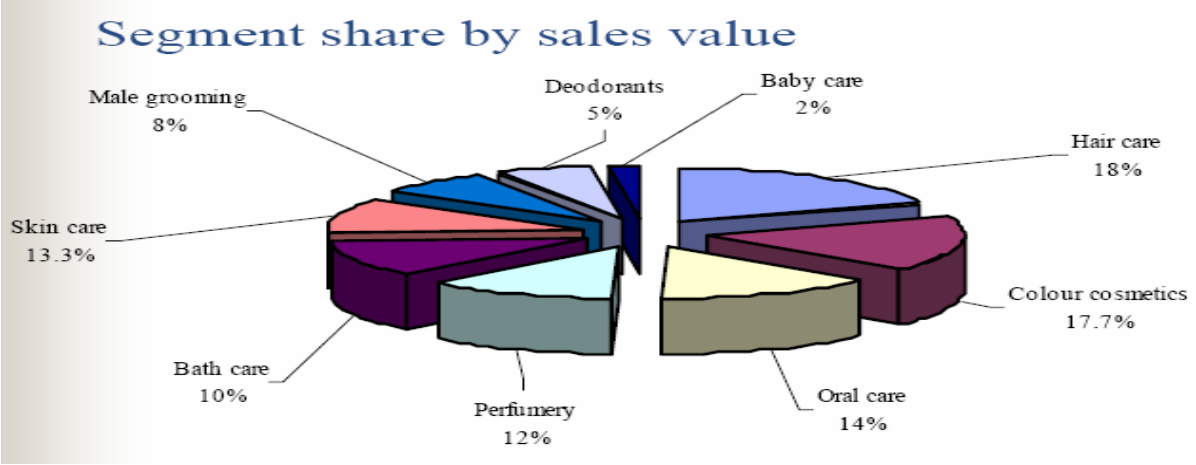


Figure 14: Russian C&T Market Segment Shares in 2007
Source: Aginsky Consulting Group (2007)

Baby care and male grooming became main niche, with soaps, bath gels and foams, and toothpastes being other important segments. Russian male grooming sales in 2008 reached USD 921m taking a 9.9% share of the total C&T market. In 2008 the Russian body care segment reported sales of €1.31bn, accounting for 14.1% of the total Russian C&T market.

In 2009 hair care in Russia stayed the of most developed sector of personal care industry occupying 17% Even though it gave up its leading position to color cosmetics it still totaled €1.4bn in value terms showing 4.3% year on year growth of according to Cosmetics Business (2009).

Shampoos and hair coloring products together represent 70% of sales in hair care category in Russia. Among other toilettes personal cleansing products is the leading product category with shaving products being the fastest growing consumption item.

Over the last 10 years Russia has been developing fast with many consumers now prepared to pay a premium for quality products. Color cosmetics becoming the biggest sector in the personal care market is another evidence of an accelerating shift from mass market cosmetics to higher quality products and premium brands as consumer incomes rise and Russians are more exposed to western lifestyle trends," said Ms. Mohiuddin. Cumulative salaries rise of 15% can be explained by increase in purchasing power within last 2 years. Plus as the fact that 70% of Russian consumer income is disposable, comparing to around 40% of a typical Western consumer makes Russia more then attractive of a market for cosmetics and personal care items. Aginsky Consulting Group (2007)

However, according to Kline, this is a clearly inflationary tendency which can influence economy growth negatively by rising prices for all the consumers' products. Kline also suggests that Russian cosmetics and toiletries usage is similar to the rest of the world, but is skewed slightly more toward basic toiletries and oral care. Meanwhile, Euromonitor is mentioning more products offering combination effects such as tinted

moisturizers and skin care and hair care with added sun protection. Imogen Matthews (2009)

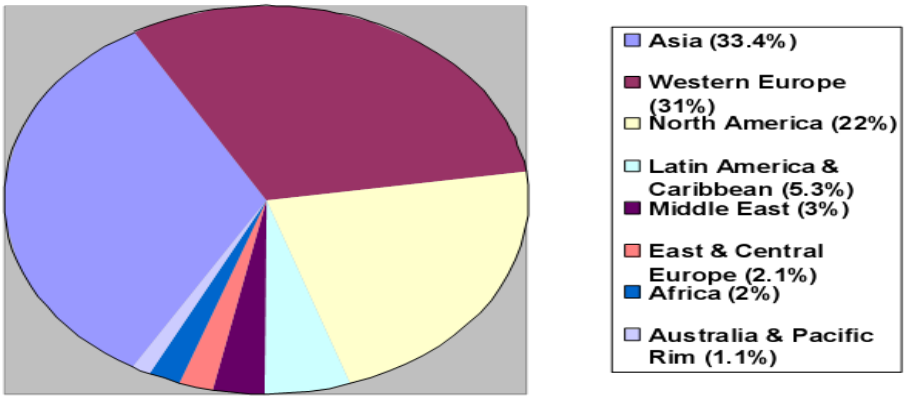
The market is diversified with local and international manufacturers offering a wide variety of brands in all categories. Consumers continued to show growing interest in products for specific treatments or specialist needs. Among leading Russian producers of personal care and bath items are Arnest OAO, Faberlic OAO, Kalina Concern OAO, Nefis Cosmetics OAO, Nevskaya Kosmetika Zao, Novaya Zarya-nouvelle Etoile Zao, Svoboda OAO, Vesna OAO KF. Leading producers in hair care sector among foreign brands are Henkel, P&G, Uniliver, L'Oreal, Oriflame, Avon, Amway and Mary Kay. All these producers rely on imported raw materials.

Soap is generally classified as a staple commodity alongside detergents. However, it also fits into the personal wash and personal care markets as central consumption item and it's a very hard to find direct statistics for soap separated from statistics for detergents or toiletries.

Market analysis of development in soaps and detergents industry made by Euromonitor (2000) shows that in 1999 soaps and detergents together represented around 12.4 % of consumer expenditure on household goods in industrialized countries and between 2.6 % to 5 % in the developing world. For the developed economies this reflects the growing maturity of the market and intense price competition in the market place.

The report however suggests that there is much greater scope for marketers to induce consumers in the emerging markets to raise consumption levels. The same analysis showed that bar and liquid soaps accounted for around 40% of the personal wash sector and around 7% of the total personal care market worldwide in 1999.

The world market for soaps and detergents was worth US$ 88 billion in 2000 Asia, Western Europe and North America accounted for about 87% of total industrial soap production in the World (Figure 5).



Source: Datamonitor

Figure 15: Regional Distribution of Global Soap Consumption in 2000

Source: THE LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE (2000)

Global soap and detergent consumption has grown by 29% in the five years to 2000. The primary sales growth regions were Western Europe (+31%), Asia (+59%) and Latin America as well as Caribbean (+41%) and North America market expanded only by 14%. Interesting that economic recession of 1997 in Asia has strongly influenced Australasia and the Pacific Rim during the last years of the last millennium. Soap sales in the Middle East and African regions grew by tremendous 72% and 65% respectively however from a rather low base. Emerging markets were key driver of growth in soap sales during last 10 years of the previous millennium.

The global market for soaps is dominated by a small number of multinational companies and top global players including Unilever, Procter and Gamble, Colgate Palmolive and Johnson & Johnson. Important regional players included Beiersdorf in Europe and Kao Corporation in Asia-Pacific, Paterson Zochonis in Africa and Nirma and Godrej in South Asia.20 global toilet soaps producers ranking is presented in the table below:

Table 16: The top 20 Global Player in the Soaps and Toiletries Market in 2000

Position	**Company**	**% Value of World**
1	Uniliver	10.07
2	Procter & Gamble	7.41
3	Gillette Group	7.66
4	Colgate Palmolive	4.5
5	Jonhson&Johnson	4.45
6	Shiseido	4.32
7	Estee Lauder	4.21
8	Revlon	3.42
9	Wella	2.27
10	Henkel	2.27
11	Kanebo	2.13
12	LVMH	1.94
13	Avon Products	1.91
14	Kao	1.88
15	Reckitt-Benckiser	1.88
16	Beiersdorf	1.56
17	Amway	1.55
18	Mary Kay	1.54
19	Coty	1.49
20	Lion	1.07

Source: THE LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE (2000)

The trend for the task specific products also effected market for bath products in particular, has shifted toward body cleansing, as well as moisturizing, as brands

become more specialized. Traditional soaps were fighting back and seem to be attracting consumers back in 2000.

In 1999 total consumption of soap in Central and Eastern Europe was estimated at US$222.2 million and the potential market is estimated at about $US663.8 million. Initial import of soap from the West found an enthusiastic response and growing consumption but can be seriously endangered by consumer spending power reduction. However, demand for soap products was growing steadily, and remained unsatisfied, due to a lack of products on the market. The demand for soap was expected to decline as expenditure on bath and shower products increased. THE LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE (2000)

In 2009 bar soaps remained significant contributor to sales in the personal cleansing products category in Russia, despite the fact that this market is already close to the saturation point and is growing at the slowest pace of all personal cleansing product segments.

Domestic Production and Foreign Brands is a combination that needs some attention as Russian consumers still consider imported to be of better quality than those produced locally and prefer Russian brands to those produced by such multinational giants as Procter & Gamble, Unilever, Beiersdorf, Palmolive and Evyap.

Therefore, till recently foreign companies report larger sales than Russian brands across all beauty segments, with the exception of skin care. Despite the fact that local Russian manufacturers are fighting back against such foreign leading companies as P&G, L'Oreal, Henkel, Colgate-Palmolive, Oriflamme, and Avon, Procter & Gamble is by far leading player on the Russian market where multinational companies account for more than 60% of industry sales and local producers account for 38% of total market sales.120 enterprises with 15 leading plants accounting for 80 percent of the total output volume of cosmetic production of beauty and health care products is concentrated in the hands of such top 10 local companies as Kalina, Faberlic, Svoboda, Nevskaya Kosmetika, Novaya Zarya, Krasnaya Liniya, Fratti, Rokolor, Unicosmetic, and Arnest.

For foreign companies setting up of a licensing agreement with a local manufacturer is a feasible alternative to acquisition or creation of a manufacturing operation in the target market. Thus, a number enterprises including Kapella, Amest, Mezoplast, and Gamma Kosmetika were involved of production of foreign brands products on the contract basis with foreign manufacturers since 2001, which proved to be a successful strategy for entering low-end segment of Russian personal care market for such brand names as Procter & Gamble and Beiersdorf (Nivea).

Plus Russian consumers traditionally trust foreign brands more than local because they guarantee stable quality. One of the major obstacles to the development of domestic production is lack of locally produced quality raw materials. Russian cosmetic manufacturers still have to import a significant portion of their raw materials.

Local Russian manufacturers compete in the mass market and middle market segments. Many Russian soap manufacturers are matching the big player's expansion strategies by expanding into niche markets where brand loyalties are yet to form. Quick, identification of consumer needs, and offering more competitively priced products than the multinationals is their main strategy.

Another strategy involves offering products at low retail prices and with small value shares in several sectors without occupying leading positions in any of them. While new product development will be important in the strategy of niche players, it is unlikely that it will be as innovative as that achieved by the global players. This is because investment funds are not readily available in the same way, and new product development will therefore tend to take the form of brand and line extensions.

Nonetheless, many local manufacturers are identifying and exploiting pockets of innovation in niche markets especially, where global players do not have dominant positions. This strategy is supported by the fact that there still some sectors of the Russian market for soap that still are not yet saturated. Kline&Company (2009)

From the chemical standpoint, specialties comprise 40% of the $10bn and $15bn global ingredients market. The personal care ingredients market is characterized by highly sustainable industry drivers, such as demographics, a low capital-intensive asset base, and a high return on capital. Personal care items market was affected by recession but stand high chances of getting out of consumers spending dip sooner then such sectors of economy which are mainly markets for commodity and specialty chemicals. Gillian Morris (2010)

Therefore, recovery for personal care items will be much quicker than for such other chemical end-use sectors as construction and automotive. However, those suppliers with a portfolio skewed towards functional ingredients such as surfactants and rheology control agents for everyday, mass-market categories like body washes, soaps, shampoos, and toothpastes weathered the recession much better than ingredient suppliers with portfolios skewed towards specialties for luxury skin-care brands. However, one has to mention that essential skin-care sector has appeared to be more resilient than fragrances, which viewed as rather dispensable items at the time of thrift. Gillian Morris (2010)

2X20 with Ethyl Acrylate, Stabilized were shipped from Tianjin to pier SPB**.** Acrylic and Meta acrylic polymers are used in a wide variety of application including personal care and hygiene products including such personal cleansing products as all kinds of soap: bar soaps, deodorant soaps, medicated soaps, novelty soaps, liquid soaps, multifunctional soaps and shower gels.

1X20 with Fatty alcohol was shipped from Pier Nhava Sheva. Fatty alcohols smaller molecules are used in cosmetics, food, and in industrial solvents. Fatty alcohols behave as nonionic surfactants and find use as emulsifiers, emollients and thickeners in cosmetics and food industry. Fatty alcohols are also common component of waxes, mostly as esters with fatty acids but also as alcohols themselves. Due to the described

reasons fatty alcohols orient themselves at interfaces, which allow their use in cosmetic emulsions (creams, lotions) where they provide consistency and in technical emulsions where they are used as co-surfactants and solution aids.

The economic significance of fatty alcohols is mirrored by the scale of production capacities that installed worldwide. These installments guaranteed yearly production of approximately 2.0 million mega tons in 2008, and will increase to approximately 2.3 million mega tons per year by the year 2010. In summary, approx. 50 % of the fatty alcohols are produced from natural raw materials; however, the split per geographical region is different from continent to continent. The worldwide production and consumption was around 1.5 million mega ton per year in 2008. In Europe only approx. 5 % of this volume is used directly as fatty alcohols. A share of 70 - 75 % is used in surfactants exclusively. Dr. Z Presents (2000)

In the US the synthetic fatty alcohol capacities predominate with approx. 70 % share of the total capacity. Natural fatty alcohols are produced by Procter & Gamble and Henkel. In Western Europe approximately 60 % of the production capacities are based on natural raw materials. The largest manufacturer is the CONDEA Group, using all three technologies, i.e. Ziegler-, Oxo- and natural production processes.

The other European manufacturers, like BASF, ICI, EXXON and Shell, predominantly use the Oxo-process. The second largest Western European manufacturer for fatty alcohols is a Henkel Group. The currently largest manufacturers of natural fatty alcohols are the Salim Group and Kao Soap Corp. Synthetic fatty alcohols are manufactured using the Oxo-process among others by Mitsubishi Chemical, Mitsubishi Petrochemical and Fushun in Jilin using the Ziegler- process. Dr. Z Presents (2000)

In Eastern Europe fatty alcohols are manufactured predominantly on the basis of the paraffin oxidation process. Considering the existing production capacities and based on the announced capacity increases, assuming an estimated yearly increase of the fatty alcohol demand of 2% to 3%, approximately 80% to 90% of the capacities were utilized through the year 2000.Dr. Z Presents (2000)

Among major product groups using fatty alcohols and acids in around the globe and in Russia are powder synthetic detergents, liquid detergents for table ware, household soap, toilet soap, perfumery and cosmetics, stearates, rubber, tires and rubber products, as siccatives in paint and varnish industry. Market Publishers (2010)

1X20 Flexi tank from Pier Alexandria, Egypt with Linear alkyl benzene (sometimes referred to as Linear Alkylbenzene or simply LAB) is an intermediate in detergent production. The drive towards more environmentally friendly end-use chemicals since the 1960s resulted in LAB emerging as the dominant precursor of biodegradable detergents. The Asia Pacific region accounts for nearly half of the global capacity. North America and West Europe capacity has been reduced in recent years.

Linear Alkylbenzene (LAB) is a very important surfactant for the production of household care items together with such a raw materials and surfactants as Zeolite,

Sodium Tri-Poly Phosphate, Soda Ash, Protease Enzymes, Sodium Carbonate Peroxyhydrate and Persalt and Sodium Percarbonates for bleaching agents.

Household care market, dishwashing products market, surface and specialty cleaner's market potential consumption shouldn't be underestimated. Plus these market's potentials should be analyzed separately, however, due to the fact that they are large and distinctive markets.

A mainstay for household cleaners manufacturers is heavy-duty hand cleaning products, laundry products, detergents that need more of bio degradable ingredients; laundry acids, fabric and sheet softeners, chlorine and oxygen based bleaches, stain removers, fabric fresheners, whiteners and brighteners and bluiners, uv-protective laundry products, hand and automatic dishwashing products, detergents, film removers, rinse agents, lime and rust removers to name a few.

Major products within specialized household cleaning products subgroup are all-purpose and specialty cleaners, glass cleaners, metal cleaners, tile, tub and sink cleaners, toilet bowl cleaners, abrasive cleansers, drain openers, multi-surface cleaners, oven cleaners, rug shampoos etc.

Packaging is made of such plasticizing ingredients as PET and C-PP. ReportLinker (2009) Global Soaps and Detergents Industry

Among major global laundry detergents and dishwashing producers are Procter & Gamble, Unilever Group, Henkel and Reckitt Benckiser.

Major household detergent producers and distributors in Russia are presented in the table below:

Table 17: Major Household Detergent Producers and Distributers in Russia

No.	Name	Location
1.	COLGATE-PALMOLIVE PJSC	Moscow
2.	AKVIKON	Irkutsk
3.	BENCKISER PJSC	Moscow
4.	PROCTER & GAMBLE - NOVOMOSKOVSK LLC	Tulskaya Oblast
5.	ECOLAB ZAO	Moscow
6.	KHITON OAO	Kazan
7.	HENKEL-YUG OOO	Engels
8.	CHELIABKOMMERS	Chelyabinsk
9.	ALTAYKHIMPROM	Altaiski Krai
10.	N.NOVGOROD FAT & OIL COMBINE PJSC	Nizhniy Novgorod
11.	ASTRAL	Irkutsk
12.	RECKITT BENCKISER PRODUCTION OOO	Moskovskaya Oblast, Klin
13.	BAYKALSKAYA KOSMETIKA	Angarsk

14.	MAGAZIN 32 TOVARY DLYA DOMA LLC	Yekaterinburg
15.	CHP MEDVEDEVA	Tambov
16.	KAZAN CHEMICAL PLANT NAMED AFTER M.VAKHITOV NEFIS COSMETICS PJSC	Kazan
17.	KHENKEL-ERA OAO	Tosno, Leningradskaya Oblast
18.	NEFIS COSMETICS-KAZANSKI KHIMICHESKI KOMBINAT IM. VAKHITOVA O AO	Kazan
19.	RUSKHENK OOO	Moscow
20.	PRONTO-TYUMEN	Tyumen

Source: Euro Pages (2010)

Total Russian detergent production in 2002 was around 520,000 tons, up from 469,000 in 2001. Russia largest producer, Novomoskovskbytkhim increased production by 50% in the first half of 2002 and accounted for a third of national output. Foreign trade in detergents also rose over the same period. Exports were up from 43,500 to 70,000 tonne, while imports rose from 50,300 to 80,000 tons. Nitekhim (2003)

Among the recent trends in personal care production is evident inclination towards cheaper and renewable ingredients and drive towards environmentally friendly compounds because hazardous chemicals are becoming a big issue for the soaps & detergent items producers. This forms a major dilemma for personal care items producers and a tough choice between plant-based and petroleum-based feedstocks of ingredients for the personal care items production.

This trend pushes personal care products manufacturers towards more natural care products in the face of growing uncertainty over raw materials costs. Innovation is a key growth driver and products are continuously reformulated. Demand for liquid soaps and shower gels will stay strong while bath additives are already perceived as a necessity.

There some new demand for hand sanitizers and cleansers as well as for the multifunctional products while bar soaps will not lose their all-time importance. A great potential consumer segment for specialty products is men personal touch items market and children's bath product market is also an augmenting niche market.

Furthermore, teenagers are becoming more and more of a driving force for personal care products demand. High-end product lines of fragranced bath products and luxury soaps are on the way to stronger demand assertion. Packaging is growing more innovative and will be linked to the plastics. ReportLinker (2009) Global Soaps and Detergents Industry

Main conclusions that should be drown from this extensive piece of market study is that there is huge market for imported raw materials that are used in production of all kind of cleaning items: personal cleaning starting from soaps to shampoos and conditioners, household cleaning starting from dishwashing detergents and detergents for cloth

washing and finalizing with all kind of specialized home cleaning items as well as stretching as far as industrial detergents and solvents production. This market is the major driving force for the imports and will grow steadily it is hard to estimate growth rates and consumption rates but there are special paid market studies reports available for purchase and now as demand is estimated it can be quantified with the help of market specific information provided by such reports.

7.1.4.2 Imports potential for Plasticizers, Rigid/Flexible Foams and Solvents Production Intermediates

15X20 were shipped from Wuyi, China with HCFC-141b (Dichloro-1-fluoroethane (1, 1)) to SPB. HCFC-141b is used as blowing agent for polyurethane and phenolic foams as well as solvent in foaming and cleaning agents. Polyurethane foams are widely employed for thermal insulation in the appliance and construction industries. Solvent industry end-user groups: electronics cleaners (Vehicular Light Equipment Manufacturing), metal cleaning (Automobile Manufacturing), precision cleaning (Guided Missile and Space Vehicle Manufacturing), aerosol solvent cleaning methods are used for specialized spot cleaning of confined areas of machinery and other equipment parts. ICF Consulting (Sep 2004)

HCFC-141b has been used as a solvent and as a foam blowing agent in the manufacture of diverse products ranging from refrigerators to building insulation. In US was banned from many of its foam blowing and solvent production uses. HCFC-141b is still acceptable for use as an aerosol solvent in certain specific uses such as for aircraft maintenance or for cleaning electrical equipment and electronics. U.S. Environmental Protection Agency (2010)

1X20 with Tris (2-chloroethyl) phosphate 95% was shipped to SPB on behalf of ESTICHEM OU. Tris (2-chloroethyl) is used for production of rigid foam in building insulation. Phosphate Easter Flame Retardants Consortium (2005)

4X20 with Triethylene Glycol were shipped from Houston to SPB on behalf of Dow Chemical Co Ltd. TEG is ideal for air disinfection purposes in occupied spaces as it inactivates a lot of harmful bacteria in the air and often used for air fumigation .It is also useful in manufacture of insecticides and synthesis of some organic derivatives. TEG is a component in the formulation of some pigments, printing dyes, inks and paste Pure TEG is useful in the production of plasticizers for cellophane, glue, cork, powdered ceramics and some plastics. TEG is an important non-volatile industrial solvent. SABIC Global (2006)

10X20 with Triethylamine from Shanghai on behalf of Henan Harvest International Co Ltd and Ehs Tank Container Logistics (Shanghai) to SBP**.** Triethylamine is used as an intermediate in organic chemical synthesis processes in the range from disinfectants to plastics products where it used as flotation agent; accelerator activator for rubber; in wetting, penetrating, and waterproofing; in the curing and hardening of polymers; as a

corrosion inhibitor or propellant. Triethylamine is used as an insect attractant, warning agent in natural gas. U.S. Department of Labor, Occupational Safety &Health Administration (2010)

The common for all the chemicals described above is that they all are used in the production of plastics and polyurethane. PU production raw materials include PMDI, MMDI, TDI, Specialty Isocyanates, Polyether Polyoles, PTHF, Acrile polyoles, polyester polyoles which together with additives and solvents amount to the 4522945 tonnes. Almost 70% of propylene oxide production is consumed by the manufacture of polyether polyoles.

Table 18: PU Raw Material Consumption by Item

Raw Material	Volume (Tonnes)
PMDI	1,020,190
MMDI	206,488
TDI	505.467
Specialty Isocyanates	62,718
Polyether Polyols	1,523,167
Graft Polyether Polyols	144,731
PTHF	32,412
Acrylic polyols	78,001
Polyester polyols	377,730
Additives inc water, solvents	572,041
Total	4,.522,945

Source: IAL Consultants (2005)

Improvements in living standards in Eastern Europe and Russia will continue to drive demand for PU in this region. European Imports of MDI go mainly into Eastern Europe, especially the Russian Federation and CIS, plus growing amounts of row materials are imported from plants in China and Korea. Import levels are expected to increase over the next few years as more production capacity comes on stream in China and supply remains tight. For example, China's Yantai Wuyi chemical Co. will open a storage facility in Northern Europe for redistribution of PMDI to Russia. Demand for rigid PU foam has increased by 8-10% in Eastern Europe in the past 2 –3 years; this has been reflected in the growth in demand for MDI. Overall, demand for MDI is expected to grow by 3.2% per year averaged over the next 5 years. IAL Consultants (2005)

In the period from 2004 to 2009 PU production grew from 566700 tonnes to 773610 tonnes in Eastern Europe, showing 6.4% growth over last 5 years. According to the statistics of raw materials consumption for polyurethane production of additives and solvents accounted for 12.6 % of total volume of the raw materials used.

Major end user markets that drive demand for polyurethane in the period from 2004 to 2009 were: Automotive - 508, Refrigeration - 400,800, Furniture & Bedding - 962,750, Footwear -230,000, Construction -747,320 tonnes. IAL Consultants (2005)

Automotive industry seas continued substitution of TDI by MDI in automotive seating foams, 1-K coatings, rebond foam, and elastomers. 3.3% demand growth per year for the next 2-3 years is predicted for molded foam products (the major form of polyurethane foam consumed in the automotive sector)

Construction industry uses polyurethane for thermal insulation; it also drives demand for rigid foam the total production of rigid polyurethane foam in 2004 is estimated to be 1,160,600 tones, of which the bulk is used for thermal insulation in the construction.

Refrigeration Industry uses rigid foam in the form of panel, boards and in-situ foam. EMEA production of rigid polyurethane foam in 2004 is estimated to be 1,160,600 tones. Production of refrigerators and freezers in Eastern Europe is growing as more global manufacturers establish plants in the region.

Furniture and Bedding industry Uses viscoelastic foam a sort of flexible foam although total production is small at 25,500 tones, the industry forecasts this to be a high growth product in future years. The production of flexible foams uses more than of 86% of all TDI consumed. Total production of flexible polyurethane foam in 2004 was an estimated 1,782,100 tones, of which 1,397,200 tones was slabstock and 384,900 tones was molded foam. The production of flexible slabstock remains dominated by polyether foams, standard, high resilience (HR) and combustion modified (CM) accounting for some 1,267,550 tonnes, whilst production of polyester slabstock amounted to 104,050 tonnes. Furniture and bedding is also drives demand for the flexible foam market and slabstock, overall growth forecasted to remain positive at around 6.4% per year. IAL Consultants (2005)

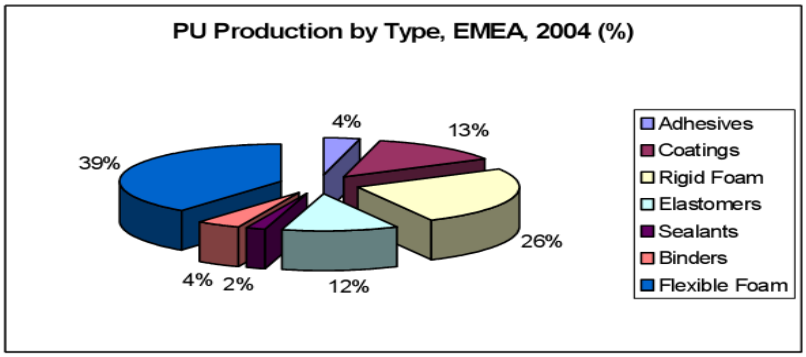


Figure 16: Polyurethane Production by End Product in 2004

Source: IAL Consultants (2005)

The demand for polyurethane continues to be dominated by its use the production of furniture and bedding, whilst the demand for rigid foam in the construction industry is catching up fast. Polyurethane materials are mainly used in the form of rigid foam as an insulation material, but also as adhesives, sealant and as a binder in wood products such as MDF and other types of fiberboard. Rigid foam insulation used by the appliance industry is also exhibiting growth in the emerging markets of Eastern Europe, where demand is strong and production costs comparatively low.

Plasticizers occupy the largest segment among additives. Eurasian Chemical Market expects the global production of plasticizers to amount to 1.5 million tons. Phthalic esters are the most important plasticizers and occupy 90 percent share of the total plasticizers. IAL Consultants (2005)

The main manufacturers of plasticizers in Russia are Salavatnefteorgsintez, Ural Chemical Company, Kamtex-Khimprom, Khimprom (Novocheboksarsk) and Kuskov Chemical Plant. In recent years the production has fallen from 113,000 tons in 2000 to just 95,000 tons in 2004. However Russia still managed to export over 10,000 tons of plasticizers in 2004. The Moscow International Conference "Plastics and Rubber Additives 2005"

Plasticizer producers that were looking for potential cooperation and market development in Russia during Moscow International Conference on Plastics and Rubber Additives 2005" include Arkema, Bang Bonsomer, BASF, Continental Industries Group, Degussa, Du Pont, Kaneka Belgium, LG Chem, LRS, Sibur, Azot, Naphtachem, Novatec-Polymer, Plaspolykhim, Polyplastic-technopol, Sayanskkhimplast, Khimprom (Novocheboksarsk) and Shchekinoazot. The Moscow International Conference "Plastics and Rubber Additives 2005"

For the full list of Russian rubber and plastic producers please refer to the Appendix 7.

Russian market for plastic and plasticizer production raw materials will stay stable as Russia has to satisfy demand for the materials in automotive, construction and bedding and furniture and refrigerator industries. Another evidence for need in MDI, TDI and other plastic production raw materials is reflected in the activities of such Russian chemical distribution companies as Polychem that have a distribution of plastic production raw materials on the front lines of their sites.

7.1.4.3 From Resins and Rubbers for Tiers to Drugs and Fertilizers producers

2X20 with Tert-Dodecyl Mercaptan were shipped from Houston TX to SPB on behalf of BARTHCO INTERNATIONAL. Tert-Dodecyl Mercaptan applied as “synthetic rubber and synthetic resin production material, synthetic fiber polymerization regulator, particularly used in SBR, ABS resin manufacturing. Commonly used to make germicides, pesticides, anti-rust agents, lubricant additives, drugs; Ceramic Industry also can use it as "Jinshui" for its good acidification”. ChemYQ (2010)

3X20 with Ultrene Dicyclopentadiene from Cymetch Houston, TX on behalf of Sojitz Corp of America. Ultrene dicyclopentadiene (DCPD) finds its uses in “polymerization of DCPD, in production of unsaturated polyester resins, EPDM rubber, fragrances, insecticides, specialty lubricants and oils, electrical insulating coatings, specialty polymers, fertilizers and other organic compounds”. Cymetech Corporation (2010)

Sintezkauchuk, the association of synthetic rubber producers of Russia has been formally elected to became a member of the European section of the International Institute of Synthetic Rubber Producers (IISRP)

Major producers of synthetic rubber and synthetic resins in Russia manage to produce enough to supply domestic end users and also to export lots of products abroad. Therefore imports of resin production ingredients have a perspective to a certain degree if one will follow the logic that Russia will have to import some ingredients to export more of final products.

Furthermore, lots of foreign producers want to produce tiers in Russia due to abundance of feedstock, technology and relatively cheap working force.

Despite the fact that Russian tyre industry reduced production due to the crisis Italian tire manufacturer Pirelli announced a new agreement with the Russian government to build a new production facility in Samara, with an estimated capacity of 4.2 million units per year. Pirelli says production is due to start in Russia before the end of 2010, with construction of the new building scheduled for summer 2009. The whole investment costs approximately 300 million euros, Pirelli said in a press statement. Bogdan Popa (2008)

In the face of Yaroslavl Tyre Plant, JSC suffering increasing loses in H12009 U.S. Company Goodyear was considering a $200-250-mln project in Yaroslavl region to produce up to 5 million car tires. Center for Management Technology (2008)

Despite the downturn, Yokohama Rubber, Itochu is going to Establish Russian Car Tire Plant, Omskiy Kauchuk; JSC underwent production upgrade and Voltyre-Prom JSC Worked Profitably in H1 of 2009.
OAO Tatneft’s Nizhnekamskshina factory produced tires will be shipped to the OAO KamAZ for OE one of the major vehicle producers in Russia.

According to Sibur Russian Tyres, the decision to was made following a joint request by it and Nizhnekamskshina to the Russian government. Sibur Russian Tyres asks government to raise tariffs on imported retreads in a push to reduce imports of used and

retreaded tires, which are environmentally harmful. Tire Review (2010)

Map 12: Sibur Company Branches in the Western Russia

Source: JSC Sibur Holding (2010)

All the information about recent developments says not only about export driven mass production of tires in Russia but also above all measures lobbied by major tyre producers are protectionist by nature.

It also might be that Ultrene Dicyclopentadiene was imported for purposes of production of insecticides, pesticides and germicides or fertilizers that are also well produced consumed and exported product of Russia. However, the question arises why those products were shipped in such a small quantities of 2 or 3 containers? Study of consumption rates of those products in production of fertilizers and demand for those in Russia is needed in order to prove or disapprove this end use hypothesis. Another fact is for sure that Russian chemical exports were traditional dominated by fertilizers. Russia is fully self-sufficient in terms of production and supply of nitrogen, phosphate and potash fertilizers.

Production of fertilizers in Russia is rising mainly due to constantly increasing demand for it in the world. Russia fertilizer production is several time higher than consumption i.e 3 million tons in consumption versus 16 million tons of total production in 2005. The surplus, which is mainly seen in output of nitrogen and potash fertilizers, is exported. Exports account for around 80% of total fertilizer output and in 2005 totaled around 13 million tons of nutrients. Year on year growth in exports was 6% Anatoly G. Lomakin (2006);

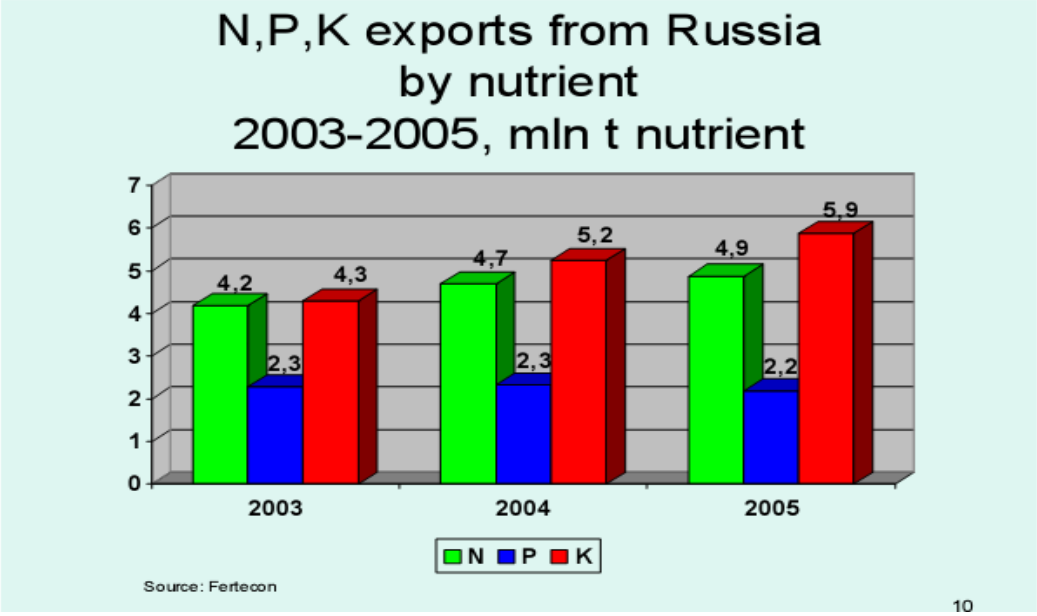


Figure 17: Exports of Fertilizers from Russia by Nutrient during 2003-2005

Source: Anatoly G. Lomakin (2006) Recent developments in the fertilizer industry and agriculture in Eastern Europe and Central Asia; IFA Vice-President for Eastern Europe and Central Asia Director General at JSC International Potash Company

Among major fertilizer holdings and mineral fertilizers producers in Russia are: EuroChem, Acron Holding, PhosAgro, Konstruktivnoe Bureau, Uralkali, Silvinit, Togliattiazot, Kuibishevazot, Novomoskovsky Azot (EuroChem), Nevinnomyssky Azot (EuroChem), Ammophos (PhosAgro), Acron Holding, Minudobreniya (Voronezh Region), Kemerovo Azot, Dorogobuz (Acron), Cherepovech Azot (Phos Agro), Berezniki Azot (Konstruktivnoe Bureau); Interfax-CAN (2007) Russia's Fertilizer Industry in 2006-2007.

Finally, Tert-Dodecyl Mercaptan is also used in production of drugs in and this assumption also requires study of these chemicals use in pharmaceutical industry. Interesting fact about Russian pharmaceutical industry is that it going to be growing at a very fast pace due to governmental support via insurance based reimbursements for Russian citizens who purchased drugs according to medial prescription.

RNCOS industry research group forecasts that Russian pharmaceutical industry will grow at a CAGR of around 26% during 2010-2013. Growing prices for drugs will be another driving force together with growing healthcare spending and obligatory and voluntary insurance schemes that have boosted the intake of high-priced drugs in the country. PRLog.org (2010) RNCOS - Russian Pharmaceutical Industry Set for Blistering Growth.

Conclusions for the first part of investigative marketing will be in several dimensions. First of all we can see that hypothesis about market entering possibility at any of 3 petrochemical sights is proved to be correct by Sakhalin project, Ryazan Refinery and Yaroslavl YaNOS and other end user industries starting from Paper and Pulp production in North West of Russia ending with Fertilizers production. However one has to conclude that the greatest potential for import of raw materials lay in serving needs of personal care, cosmetics, soaps and detergent production in Russia, as this industries become more and more reliant on sophisticated ingredients imported from Western Europe. The next will be a cluster of plastic, resin producers and fertilizer producers who act according to the logic of importing some in order o produce and export a lot. Plus there is a growing potential for serving pharmaceutical industry in Russia. Overall this sends a strong signal for action, but the second part of the research is waiting for our attention yet.

7.2 Estimation of Potential Demand for HGT Export Moves from Russia

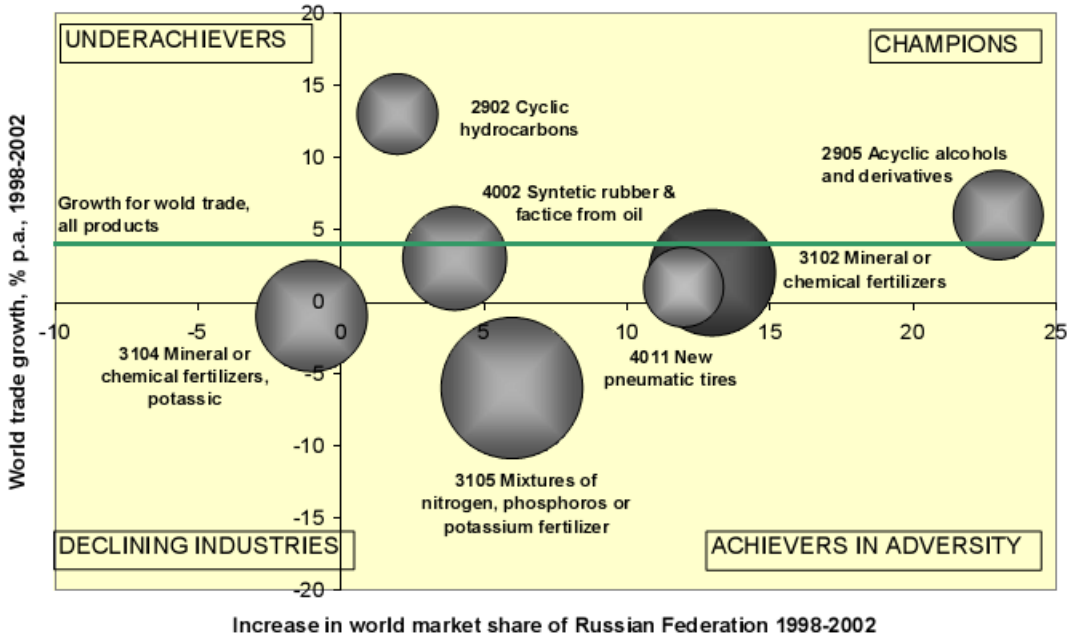


Figure 18: Main Export Products of Russian Chemical Cluster and Their Export Success; Source: International Trade Center;

Just before we go into the investigations of exports moves it will benefit us a lot if we take a look at his performance map for the Russian chemicals exports in 2003. While reconstructing major trends for exports one can certainly say that the even though the biggest exports from Russia were of Mixtures of Nitrogen, phosphors and fertilizers, there is a clear trend towards championship of such chemical clusters as *synthetic rubbers* & factice from oil as well as *new pneumatic tiers* exports. Overall chemical exports of Russian chemicals in 2002 were estimated around USD 2.5 billion and main destination markets for Mixtures of Nitrogen, phosphors or potassium fertilizers were

Switzerland absorbing 31% and China absorbing 26% of total exports of this chemical exports during 2002. Hannu Hernesniemi (2006) INDUSTRIAL CLUSTERS IN NORTHWEST RUSSIA, Lappeenranta University of Technology Northern Dimension Research Centre, 2006

Therefore, now we are well equipped with an indication of main directions of exports as well as about main chemical groups that exported from Russia. Therefore we can predict what will change and what will go out or stay in the picture.

7.2.1 Potential of Acrolein Export to U.S.

Let's start with 13X20 with Acrolein from JSC VOLZHSKY ORGSYNTHESE in Russia to BARBOURS CUT TERMINAL in Houston;

Acrolein is mainly used as a chemical intermediate in the production of acrylic acid used to make acrylates and its esters (lower alkyl esters) and in synthesis of D,L-methionine (essential amino acid as an animal feed supplement). Acrolein is used directly as an aquatic herbicide and algaecide in irrigation canals, as a microbiocide in oil wells, liquid hydrocarbon fuels, cooling-water towers and water treatment ponds, and as a slimicide in the manufacture of paper. Acrolein is added to other highly toxic substances as a warning agent. IARC (1985);

Acrolein is usually used in the preparation of polyester resin, polyurethane, propylene glycol, acrylic acid, acrylonitile, and glycerol. Wikipedia (2010) Acrolein

Acroleins first official implementation was originally registered in USA at least as early as 1959, and at that time Shell Chemical Corporation was the registrant. Now the major producer and user of Acrolein in California is Baker Petrolite Corporation.

Major producers of Acrolein in US are: Baker Petrolite Corporation, Taft, California; Degussa Corporation, Theodore, Alabama; and Dow Chemical U.S.A., Taft, Louisiana (SRI 2006).

Although California is the largest importer of Acrolein and uses up to 1 million pounds of products containing Acrolein, Louisiana State uses up to 10,000,000,000 pounds for different purposes, while Texas has 44 facilities that produce and use about 9,999,999 pounds of Acrolein. Therefore one can say that there is a strong demand for this intermediate in US. Larry Turner, Ph.D. and William Erickson, Ph. D. (2003)

In 2000, more than 17 million lb were imported (ITA2001). In contrast, a sizable fraction of acrylonitrile is exported from US, with over 1.5 billion lb exported in 2000 (ATSDR 1990, ITA 2001).

7.2.2 Potential for Export of Epichlorohydrin to Asia

104X20 from SPB to Chennai India with EPICHLOROHYDRIN an extremely versatile chemical intermediate used to produce a wide variety of other products, including: 1) production of epoxy resins; 2) textiles production to improve wool's resistance to moths, prepare fibers for dyeing, impart wrinkle resistance and for anti-static agents and textile sizing's preparation; 3) production of inks and dyes and papers due to it is quality of giving wet-strength to paper sizing, special printing inks, textile print pastes, and ultimately paper and paperboard products because it improves their printability, pigment retention, folding endurance and gloss. 4) In Ion exchange resins used to clean polluted air and water. 5) EPI used in production of surface active agents for cosmetics and shampoos;6) used in rubbers exhibiting resistance to extreme temperatures, fuel, oil and ozone for automotive and aircraft parts, seals and gaskets, as well as for agricultural products such as insecticides, bactericides and fungicides. Dow (2010) Epichlorohydrin;

68% of the epichlorohydrin produced has been used in the production of epoxy resins, 19% to produce synthetic glycerin, 3% to produce elastomers and 10% to produce others things. It has also been used to cure propylene-base rubbers, as a solvent for cellulose esters and ethers and in resins with high wet-strength for the paper industry. Epichlorohydrin is also used in the production of Zeospan, a specialty polyether rubber used for automobile parts. There is widespread use of epichlorohydrin as a stabilizer. U.S. Environmental Protection Agency (2009) Solvents Study, January 18, 2009

Demand for epichlorohydrin is dictated by situation on the markets for its main products – epoxy resins and synthetic glycerin. The rate of consumption of these chemicals largely exceeds their production rate. Omnitech (2010)

Epichlorohydrin is an essential feedstock in epoxy resins production, which is used in applications such as corrosion protection coatings as well in the electronics, automotive and aerospace industries. Omnitech (2010)

Epoxy resins consumption will grow by 7-8% a year by 2010, whereas their production rate will augment by just 4% a year. Similar situation occurs in the case of synthetic glycerin, whose global production capacity reaches 1mln metric tones per year. Marina Kulikova (2007)

The United States and China are the world's largest epichlorohydrin producers. In 2005, global epichlorohydrin capacity totaled 1.3 M ton per year. Of this, Dow, Shell and Solvay accounted for 51%, and geographically, the US, Western Europe and Japan combined accounted for 62%. Global markets for the chemical are essentially balanced. Chinese consumption of epichlorohydrin totaled 200,400 tons in 2005, 17.5% more than for 2004. Chinese leading epichlorohydrin producers include Epoxy Resin Plant of Hunan Yueyang Petrochemical Co (34,000 tons per year), Chlor-Alkali Plant of Sinopec and Qilu Petrochemical Co (32,000 tons per year) and Tianjin Chemical Plant (28,000 tons per year). Chemical Business News Base (2006)

In 2008, China became the epoxy resin production and consumption champion, the main end product in production of which epichlorohydrin is used as one of the main intermediates and ingredients. Chinese domestic production capacity of Epichlorohydrin is growing, but still at slower pace than it is necessary to satisfy the needs of epoxy resin production.

In 2004 Russia's largest manufacturer of epoxy resins was closed and demand for the epichlorohydrin in Russia became limited to 8000 tons per year. Reduction of epoxy resin production in Russia led to an oversupply of epichlorohydrin in Russia. Russia has become exporter of epichlorohydrin and importer of epoxy resin. 90% of Russian epichlorohydrin oversupply was exported to China and 10% to Europe.
Due to geographical advantages imports of epichlorohydrin from Russia come to China by means of rail transport.

Therefore, *deep sea transport* of exported epichlorohydrin to India have a great potential to grow as due to lack of common land borders, growing demand for the product in India and predominant overcapacity of it in Russia that stimulates Russia India trade.

7.2.3 Potential for Export of Nonylphenol and Nonionic surfactants from Russia to Israel

3X20 containers with Nonylphenol Alkylphenol were shipped from pier Novorossiysk to pier to Pier Haifa. **"**Nonylphenol Alkylphenol is widely used in production of industrial surfactants, detergents, and as pesticides. It also used in production of and as a surfactant in cleaning and cosmetic products surfactant, and as a spermicide in contraceptives such as Nonoxynol-9". Wikipedia (2010) Nonylphenol;

Plus 3X20 containers with nonionic surfactants were shipped from Novorossiysk to Haifa. ". It is thought that nonionic surfactants are mild on the skin even at high loadings and long-term exposure; nonionic surfactants are used as a wetting agent, a detergents, or emulsifiers." Chemilland21.com (2010) Nonylphenol Ethoxylates;

1X20 with Technical Ethylcellosolve was shipped from NIZNEKAMSK to PIER HAIFA. Technical Ethylcellosolve is used as addition in paints and fuels. Nizhnekamsk Neftekhim (1996); actually ethylene glycol monomethyl ether (EGME) is applied in wide range of applications from a solvents to anti-freeze in jet fuels. "Quick drying varnishes, enamels, nail polishes, and wood stains - contain EGME". Prioritization of Toxic Air Contaminants - Children's Environmental Health Protection Act (2001) Ethylene Glycol Ethers (EGME, EGEE, EGMEA, EGEEA) October, 2001

As all the above mentioned substances are applicable in the production of wide range of final products from detergents to nail polishers and jet fuels; If one had to make a choice which industry should be targeted there is no definite answer, however amount of common uses all this fine chemicals lead us to the cosmetics and personal care market with a bit of influence of solvents production which can be applied for production

of nail polishers. Therefore ones and again personal care and cosmetics industry is the major demand driver not only in Russia but in Israel. Therefore one has to look carefully into the opportunities of mutual trade between these two countries in raw materials for personal care and cosmetics production as well in some areas of high technological applications as jet fuels additives.

7.2.4 Extender Oil for Chemical Rubbers Export Potential is the Greatest

2X20 with NORMAN-346 (Distillates, Solvent-Refined Heavy Paraphinic) were shipped from SPB to PUSAN. Application: extender oil for chemical rubbers and softener for rubber compounds in tyre production and mechanical rubber goods. The product was produced by Orgkhim leading resins manufacturer, headquartered in Nizhniy Novgorod, Russia. Orgkhim Biochemical Holding (2009);

This year word rubber industry produced 22 million metric ton of rubber. Global rubber consumption will rise 4.1 percent annually through 2013. The Asia/Pacific region will remain the largest and fastest-growing market. Non-tire rubber demand will outpace demand for tire rubber. Tire rubber will continue to benefit from strong growth in Asia, despite a decline in rubber usage for tire production. Freedonia (2010);

An interesting fact to mention is that on 14 July, 2009, Arizona Chemical the world's largest producer of naturally derived specialty resins and pine-based chemicals for the adhesives, inks and coatings, lubricants, fuel additives, mining and oleo chemicals markets and Orgkhim leading resins manufacturer in Russia recognized for its advanced technology platforms for the tire and rubber industry entered strategic cooperative Agreement to Market extender oils to the tire and rubber Industry mutual cooperation to expand their geographical market. Arizona Chemical News Release (2009);

Very well developed and export oriented resin industry of Russia is represented by at least 10 major producers, that are listed in the compilation list that dear reader can see in the appendix 7

After carefully reviewing a list one can come to only one conclusion: Russian rubber producing industry is very well prepared to be a driving force for exports of finished rubber products and import of some intermediates. However a huge potential is also exists for exports of fine chemicals developed during improvement of tire making resin production technology bu Russian producers as Orgkhim.

Furthermore this proves that not only export oriented tyre production in Russia has a very big potential but fine chemicals used in production of rubber have a great potential for exports. However as import export dynamics resembled in HGT shipments database more of fine chemicals are imported;

7.2.5 General use Polyethylene Glycol (PEG 400) exports potential to Asia

3X20 with PEG400 (Polyethylene Glycol Containing Poly Tetra Ethylene Ether Glycol) were shipped from SPB to Pusan PEG are used to make emulsifying agents and detergents, plasticizers, humectants, and in solvents. Chemicalland21.com (2010) Polyethylene Glycol;

A very wide range of application for this chemical makes it almost universal and applicable in many industrials and personal care industries end products. From plasticizers and polyester resins to solvents, soaps and detergents range of applications is quite wide and will have a great demand not only in Asia but around the Globe.

7.2.6 TCEP and TCPP products export potential

16X20 with Tris (2-chloroethyl) phosphate 95% were shipped from pier SPB to pier Chicago, (TCEP) is used in production of fire rigid foam in building insulation, flame retardants, insulation foams, paints, coatings, plastics, and textiles. Tris (2-chloroethyl) phosphate is mainly used in the production of liquid unsaturated polyester resins. It is also used in textile back-coating formulations, PVC compounds, cellulose ester. Production and use of TCEP has been in decline since the 1980s. Annual worldwide demand was less than 4000 tones in 1997. World Health Organization (1998);

2X20 with Tris (chloroisopropyl) phosphate or (TCPP) were shipped from KHIMPROM PLANT to CELLCHEM INTERNATIONAL LLC, CHICAGO; TCPP is Effective flame redundant with, low viscosity, low acidity and excellent cost efficiency. Its mainly used in rigid polyurethane & polyisocyanurate and flexible polyurethane foams; unsaturated polyester resins, PVC (Poly Vinyl Chloride), adhesives, coating & elastomers; TCPP is also used to produce cellulose acetate, nitrocellulose and epoxy resins.

One of the major uses of TCPP is for production of *unsaturated polyester resins*. Primary markets for unsaturated polyester resin are construction, automotive and marine. Dynamics of future growth in demand for unsaturated polyester resins in (2007–2012) was paced down by U.S. demand considerable drop in 2008, with a decline of 15–16% in 2009.

Future demand growth forecasts for Europe, the Middle East and Africa looks sluggish. In fact in 2008, demand was down, especially in the last quarter of 2008. Highest growth in the region is forecast for Russia, which will continue to grow at a double-digit rate, albeit from a small base. Slow demand growth is also expected in Asia.
The most dynamic market for unsaturated polyester resins is wind energy. On a global basis, new installed wind energy capacity in 2007 was about 20 (GW). For 2012, new installed capacity worldwide is forecast to grow to almost approximately 53 GW (or 18% per year). Unsaturated polyester resins (including vinyl ester) are used to produce rotor blades, engine housings and gel coats in competition with epoxy resins. In Western Europe, annual growth of 7–8% is forecast for unsaturated polyester resin consumption in this segment during 2007–2012. Fastest growth is expected in Asia. SRI Consulting (2009);

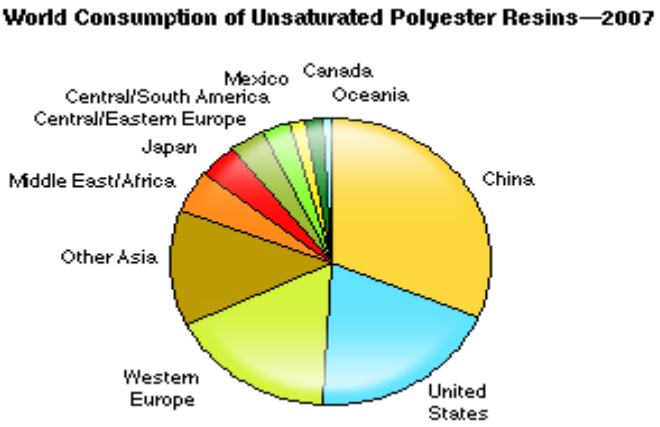


Figure 19: World Consumption of Unsaturated Resins in 2007

Source: SRI Consulting (2009) Unsaturated Polyester Resins Report by Henry Chinn, Yosuke Ishikawa, and Uwe Loechner.

7.2.6 Interesting Case of Structural Demand for Acetonitrile in Asia

148X20 with Extra Pure Acetonitrile were exported to Kotka and then shipped further to the final destinations in the Far Eastern ports of Yokohama, Dalian, Shanghai and Guangzhou. Acetonitrile extra pure is mainly used as a polar aprotic solvent in purification of butadiene; Wikipedia (2010) Acetonitrile ;1) Acrylic Fiber Manufacture; 2)Laboratory Chemicals; 3) Polystyrene Manufacture; 4)SBR Latex Production; 5) as a chemical intermediate in pesticide manufacturing; 6) solvent for both inorganic and organic compounds. 7) starting material for the production of acetophenone, alpha-naphthalenacetic acid, thiamine, and acetamidine; 8) remove tars, phenols, and coloring matter from petroleum hydrocarbons not soluble in Acetonitrile; 9) production of acrylic fibers; 10) in pharmaceuticals, perfumes, nitrile rubber, and ABS (acrylonitile-butadiene-styrene) resins.

Acetonitrile is essential a lot in chemical analysis by means of High-Performance Liquid Chromatography (HPLC) a technique used by pharmaceuticals, prepared foods, agricultural business and fine chemicals producers who use a lot of Acetonitrile to purify on a small scale. It is mostly used as a Solvent and dissolves a wide range of compounds. Industrially it is used in the manufacture of pharmaceuticals and photographic film as well as in the purification of butadiene.

Interesting fact about this chemical is that even though lots of chemists and chemical producers need it, no one specializes in making it**.** Unlike the situation with other solvents, such as methanol, there are no facilities dedicated to the manufacture of Acetonitrile. Instead, the world's supply of Acetonitrile is a byproduct in the manufacturing of a material that goes into everything from carpets and car bumpers to

refrigerators and LEGO plastic. Alan Dove (February 15, 2010) Acetonitrile is a by-product of acrylonitile production, a major component in a plastic used in automobile components and other products. So as long as polymers are in high demand, Acetonitrile is a cheap and abundant solvent.

As a consequence of the collapse in the automotive industry and the associated overall reduction in demand for acrylonitile, there has been a significant decrease in the supply of Acetonitrile. Some companies believe that Acetonitrile will be scarce well into 2010 or even 2011, depending on the global economy. Lars Fischer (August 28, 2010) Acrylonitile price increased 6 to 8 times since the summer of 2008. Global consumption of Acetonitrile is expected to grow at 5 percent per year over the next five years. This is based on the expected increasing use of Acetonitrile in the production of engineered drugs, generic pharmaceuticals and pesticides, particularly in China and India. Consequently, many laboratories continue to seek solutions to conserve solvent usage within their chromatography protocols. Lab Manager Magazine, How it Works (2009) China and India will need Acetonitrile because of the increasing production of engineered drugs, generic pharmaceuticals and pesticides there.

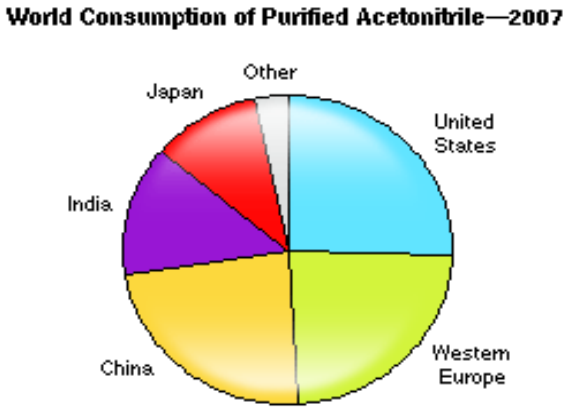


Figure 20: World Consumption of Purified Acetonitrile -2007

Source: SRI Consulting (2008)

Acetonitrile mainly used for in the pharmaceutical industry as extraction and processing solvent. It is used extensively in the isolation of antibiotics, insulin and vitamins. Pharmaceutical industry applications have grown rapidly in recent years and currently represent more than 70% of global Acetonitrile consumption. In the face of tight global Acetonitrile supply, Asahi Kasei of Japan plans to recover supply of Acetonitrile as a by-product of a 200 thousand metric ton-per-year acrylonitrile plant in scheduled to be built in Thailand. All producers of acrylonitile by ammoxidation of propylene also produce Acetonitrile as a by-product. However, only a few giants as Ineos and Asahi Kasei have a technology for effective isolation and refinement of Acetonitrile at their own facilities.

The shortages allegedly started after a Chinese factory stopped production for the 2008 Olympic Games and U.S factory stopped after receiving of considerable damages

during Hurricane Ike. These two huge obstacles were overwhelmingly fortified by economic slowdown that bought about reduction in global production of acrylonitrile an intermediate for Polyacrylonitrile production used in manufacturing of many things starting from car parts to Lego bricks and Acetonitrile is a by product of Polyacrylonitrile production. This has left pharmaceutical, food, environmental and chemical industries all searching for more Acetonitrile or ways to save it as the price of the compound increases. SRI consulting (2008) CEH report abstract on Acetonitrile, by Barbara Sesto, February 2008;

This logically explains overwhelming quantity of export containers with Acetonitrile sent to Asia from Russia via Kotka since 2009 till now. Ongoing demand reflected in build up of shipments towards present time says that shortage of Acetonitrile in Asia is still very strong and creates an opportunity for expansion of transportation business of Acetonitrile from Russia to Asia. However, this might be not a structural demand but only the one that connected to temporary circumstances within end user industry.

7.2.7 Conclusions: Evidence Confirmed by Practice

Fast economic growth attracted billions in investments and oil and gas reserves guarantee feedstock for chemical industry but not all the ingredients for production of end products for automotive, construction, food, personal care and pharmaceuticals can be produced in Russia and must be imported. Chemical distribution in Russia is a challenging business but it has huge growth potential despite the economic downturn. Demand for raw materials in Russia is growing steadily and main Personal Care and Pharmaceuticals industries have the most potential to become main drivers behind the demand for imported raw materials growth.
Western distributors make a very optimistic prognosis for sales and put up aggressive targets to reach double-digit levels of growth and continue investment and expansion into the Russian market.

Western Europe and Scandinavia are the closest sources of high quality fine chemicals. Among major western distributors who peruse aggressive push into Russia: Azelis (European group), Brenntag, Biesterfeld (Germany), Bang & Bonsomer (Finland). Will Beacham (2009);
Azelis chemical distribution group plans to earn €100m ($129m) just in 5 years of presence in Russia starting from €20m projected for 2009. Michel Dubois Azelis group marketing director said that the company is planning to expand operations further east into Siberia and already employed 3 new staffs for their warehouse. Azelis Company had established Azelis Rus branch in 2008 for purposes of Russian market development. Azelis Rus is specializing in: 1) performance and coatings chemicals;2) plastics; 3)food; 4) personal care. This branch employs 10 people and has warehouses in Moscow and St. Petersburg.

Azelis is looking forward to serve purposes of western companies supply chains by becoming a single distribution channel for them. This scheme will allow overcome hurdles of using a number of local import export chemical distribution companies. Azelis is also looking forward to provide technical advice and an expertise in marketing. Main aim of Azelis is to serve needs of raw materials supply for personal care and food

industries because those are the most perspective due to the trend among Russian consumers to become more sophisticated and demand more advanced and sophisticated products. However Mr. Dubois Azelis CEO believes that all the segments that Azelis serves have a good long-term growth prospects. Azelis (2010) Corporate Web-site;

Biesterfeld AG German chemical distribution company has an ambitious target of 20%/year sales growth at its specialties operations in Russia. Biesterfeld Spezialchemie is a branch of Biesterfeld which has its warehouses in the St. Petersburg and Moscow regions. Company CEO Birger Kuck says the he plans doubling of staff in Russia from 5 to 10 people. He also plans to open a new warehouse in Niznij Nowgorod in 2010. Group's portfolio in Russia include: 1) chemicals for the silicone-consuming industries power and electronic applications. Sales target in specialties is estimated to be worth of €5m in Russia this year. Therefore, Biesterfeld Company will focus on its existing specialty portfolio of chemicals for the 1) *coatings industry including*: adhesives, sealants and elastomers and *2) construction and textile*: polyurethanes (PUs), catalysts and dispersants. There are plans to expand into serving of plastics injection molding and extrusion industries in Russia via Biesterfeld Plastic. Biesterfeld AG (2010) Corporate Web-site;

Dipol in Ukraine was acquired by Brenntag in 2008. For Dipol, 2009 was a year of consolidation with Brenntag's operation in Russia. Merging the two groups could save around 30% on overheads. Management and marketing offices will probably also merge. Although Moscow and St. Petersburg are the most important regions, in the longer term, establishment of a warehouse in central Russia at Ekaterinburg, the main city in the Urals region is a very important strategic move. The merged group is strong in areas such as *specialty polymers*, *food*, **personal care**, *adhesives*, *coatings* and *oil and gas* and will operate under the Brenntag brand much better known than Dipol in Russia. In 2009 the company is close to signing a distribution agreement with a major European manufacturer of performance polymers for the automotive industry. The combined Brenntag/Dipol is targeting sales growth of about 10% during 2010. BRENNTAG Nederland BV (2010) Corporate Web-site;

Danish distributor R2 Group has its representative Chem Tec. in St. Petersburg.

Bang&Bonsomer has offices in Moscow, Yekaterinburg, Nizhniy Novgorod, Novosibirsk, Rostov on Don, St. Petersburg. Propose services in supply chain and logistics: sourcing, transporting, warehousing, storage and distribution of chemicals. Main aim is to connect supply and demand. Have warehouses in Moscow, St. Petersburg, Novosibirsk, and Yekaterinburg.
Therefore, Hoyer Group engagement with Russia should start from cooperation with these Western chemical distributors as it is easy to find a common ground for cooperation between Western companies first. Next very desirable step will be acquisition of clients and customers relations with Russian chemical distributors. Bang&Bonsomer (2010) Corporate Web-site;

Export import balance together with balance of empty containers moves can be preserved by maintaining of geographically balanced transport portfolio with reposition

moves focused in one certain geographical market in our case Russia. Therefore setting up of operations base in Russia is a very important strategic decision that will allow for sensible container fleet management dedicated to one geographical market. However operational set up in Russia can be perceived only in case if there is certain level of profitability necessary to maintain operations. Success of expansion in Russia depends on skillful a successful client base development by tapping into Russian industrial demand for export and import moves.

Thus, if one will sum up major trends in export import dynamic of HGT shipments from and to Russia he can see that export moves with strong bias on the Asian destination outweigh import moves. Therefore, in order to keep up the balance between export and import moves one has to look for the area of the most probable improvement in export moves. In our search we make an assumption that given that moves to and from EU are repository and most of the trade is happening between Russian industrial end users and producers and Asian country's end users and producers one has to look into the possibilities of gaining a balance mostly within trade dynamics with Asia and Russia. However he also has to be aware of long term perspectives of this dynamics sustainability and look for potential cooperation with EU and US partners to the levels that global trade in fine chemicals permit.

Chapter 8: Conclusions and Recommendations for HGT Russia Market Potential Development

I would like to start conclusions of this work by summing up of major findings provide and answer to the major research question of defining demand potential for the services of tank container transportation of liquid chemicals from an to Russia as well as guide you through the most important points of research process.

Defining of demand potential involved several steps of work: approving and testing investigative marketing methodology and technique, defining producers and potential end users for the products shipped. This allowed following two paths: first is localize certain production facility or a project and make an attempt to quantify yearly demand of the certain chemical or a group of chemicals. However, many underwater obstacles started to come up one by one starting from necessity to study all the production process and role of the particular chemical in it and then make estimation. Therefore it was possible to quantify demand only for one type Projects that involved usage of two chemicals MEG and anti corrosive additives. Plus to the lack of engineering and technical expertise consumption rates were calculated by means of proportional comparison of both projects.

Therefore, the second path was taken and estimation was generalized down to the strength of demand for the chemical in the certain production sector of industry. This path leads to the findings that in many cases Russian producers of plastics, resin, rubber and tiers and pesticides as well as oil refineries import small amounts of fine chemicals in order to produce and export a huge amount of output in final products and materials for their production.

Furthermore, industrial producers of personal care items, soaps, liquid detergents as well as pharmaceuticals and cosmetics import considerate amount of raw materials and intermediates in order to manufacture final products that will find their end users on domestic markets. Plus detailed study of demand in Russia for the final products of the above mentioned industries showed that this demand is growing steadily and has a good potential. Information available at the open sources allowed reconstructing capitalization of the markets for these final products in Russia that use imported raw materials and intermediates.

Although an attempt was made to collect and intelligibly use information on consumption rates of these raw materials, but it only allowed receiving a general insight on world average consumption rates of this ingredients for the target products group. Nevertheless, one has to stress on the significance of the finding a prove of tremendous potential for imports of personal care raw materials and pharmaceutical ingredients into Russia, which gives a great insight for practical implementation of this marketing research results by HGT in its Russian market development strategy. Plus this study also includes information on major producers and dynamics of demand growth for the personal care items in Russia.

Results of our research showed that Russia represents a great potential for the HGT business of international tank container shipping of fine chemicals. Plus we also can

see that market is already start to be populated with different participants of world chemical industry from western chemical producers and distributors to competitors and all of them already made sizable investments into the development of Russian business and expect a very good profits in a short to mid term period.

However, one has to be warned that investing into Russia will bring immediate returns. Work with Russia requires a lot of patience and orientation for the long term perspective. Therefore one has a very clear vision of strategy and tactics that should be applied in order to be successful.

First of all it will be necessary to update market potential study made in this thesis to include very detailed and precise leads for potential partners, clients and customers with their contact information listed in priority order from those who have the most potential for demand and most likely will need HGT services to those who will have the least potential. For each perspective partner, customer or client calculation of it possible business generation should be made. Some attempts to quantify potential demand for particular projects, enterprises or plants were made in this work but due to lack of technical expertise an author of this work was able to come up with a general determination of potential demand for the industry sectors where product is used and gather some information about end user industry growth in Russia and in the World.

Mainly based on the market research in this thesis, we conclude that the Russian market has sufficient potential for future development to support the establishment of an HGT office. We have found that the initial operational and set-up expenses can be covered by the activities in the Russian market and thus conclude that, the next logical step of capitalizing on findings of this study about Russian market potential will be setting up of independent operations in Russia with office in St. Petersburg and later in Moscow. First office in St. Petersburg should be opened.

This will allow for step by step setting up of operations by means of establishing relations with distributors, agents, and customs brokers who also have their offices in St. Petersburg. One has to mention that current HGT agent is also headquartered in St Petersburg. It is better to search for operations professionals in St. Petersburg as there is a better pull of professional knowledgeable about shipping business then those in Moscow. Also these professionals will require lower salaries then in Moscow where costs of life are very high. All in all a St. Petersburg is more suitable for running of shipping business operations in Russia then Moscow.

Furthermore, after setting up of this operational base it is necessary to go ahead and open representative office in Moscow. Moscow is a trading city, city with the spirit of commerce and entrepreneurship based on harsh competition for an opportunity to have an opportunity to seize a business.

Therefore opening of an office in Moscow is necessary for business generation, client base build up and making a statement of strong presence on the Russian market what has very good message that first company made its home work, then set its operations in Russia and now can afford to come out and fight for the leading positions on the market.

There is still a lot of room for capturing a good share of Russian market for international tank container shipment. With only 3 to 4 western tank container companies on the market Russian market Hoyer Group has all the space necessary to capture a large share of market for international tank container shipping business in Russia. Furthermore, to my personal opinion there are no more reasons to postpone entering Russian market.

Plus there are already several western chemical distribution companies on the Russian market and building of good and long term relationship with them should become a first priority for Hoyer office in St. Petersburg. Initial set up costs and initial business generation period can be easily covered by carrying out of transportation services for the projects of these western companies by contracts secured before even starting independent operations in Russia. This kind of tactics will allow acquiring experience of independent operations in Russia for HGT and Hoyer Group while earnings will be assured by the contract agreements.

Consequentially, during this initial period of first 6 to 12 moth work for acquisition of contract relations with Russian chemical distributors should be accomplished. After these tasks are fulfilled next step is setting up of an office in Moscow, and Moscow means a big game.

One has to be very well prepared for the everyday struggles for “the opportunity to have an opportunity” and when such an opportunity will come up there is no room for mistakes because there will be only one chance to close the deal. And to provide for this requirement everyday and routine work should be done, such as establishing ongoing dialog with all the potential business partners links that were procured by internal marketing intelligence leads, advertisement, presence at all the possible conferences and exhibitions and seminars.

It is very important to build a good image of presence and readiness to serve in the minds of managers of big Western chemical companies as well as Russian petrochemical giants that have their representative offices in Moscow and engagement with Russia will finally bring its results. These so much desirable results will come after efforts spent on client base build up and cultivation of good image of constant presence and excellent to work of high standard service provision will be done.

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Appendices

Appendix 1: Russia Regions with Developed Petrochemical, Chemical, Fuel, Oil industrial clusters

Federal Districts	Republics and Regions	Industry Description
Volga Federal District	The Republic of Bashkortostan, Volga Federal District	Petrochemical industry accounts for approximately 15% of the industrial production. The Republic's exports comprise oil products at 44%, petrochemical and chemical products at 16%. Bashkortostan is the country's largest producer of many oil refining, chemical and petrochemical products. Its enterprises produce more than half of Russia's butyl and isobutyl alcohols, caustic ash and chemical weed and pest killers, half of the country's plasticizing agents and polystyrene, one fourth of PVC, and one fifth of caustic soda and synthetic rubbers.
	The Republic of Mari El, is a part of the Volga Federal District,	Overall production chemical industry in Mari EI region stands at 2.3% of the total industrial output. A steady increase in production of paint-and-varnish products, plastics, plastic foil contributes to a stable and profit-making development of the industry. The main enterprise is the Shelanger Chemicals Plant, Saiver.
	The Republic of Mordovia part of the Volga Federal District bordering on the Nizhny Novgorod Region in the north	Petrochemical and chemical sector accounts for 5.3% of the industrial output and is represented by the Saransk Rezinotekhnika plant, which produces some 15,000 rubber technical goods used in automobile manufacturing
	The Republic of Tatarstan, a constituent entity of the Russian Federation, is a part of the Volga Federal District bordering on the Kirov Region in the north, the Perm Region in the east, and the republics of Bashkortostan and Tatarstan in the south.	Chemical and petrochemical industry The chemical and petrochemical industry mainly produces synthetic resins and plastics, polyethylene, synthetic rubber, tires, film, polymer sheet and piping, rubber footwear, medicine, and commercial carbon. Oil industry Oil accounts for 33.8% of the republic's industrial output. The products it offers are: oil, petroleum, fuel oil, and diesel fuel. Twenty-six companies produce oil in the republic, the largest of which is Tatneft. The republic produces 30 million tonnes a year, or 6.7% of Russia's total (second in the country).
	The Samara Region, part of the Volga	Chemical and petrochemical industry The industry accounts for 12.8% of the industrial output, with the

	Federal District	main products including man-made fibers and yarn, mineral fertilizers, and sulphuric acid.
	The Chuvash Republic, Volga Federal District	Chemical and petrochemical industry The chemical and petrochemical industry accounts for 9.5% of the industrial output. Its largest plants are: Khimprom (organochlorine, organophosphorus, and organosilicon products, domestic chemicals, herbicides, and polyether polyols), the Vurnar Compounding Plant, and Lakokraska.
	The Perm Territory, part of the Volga Federal District, bordering the Komi Republic in the north, the Republic of Bashkortostan in the south	Chemical and petrochemical industry The chemical and petrochemical industry accounts for 17.1% of the industrial output and includes 27 major and medium-sized enterprises.
	The Kirov Region, part of the Volga Federal District	Chemical and petrochemical industry major enterprises are the Konstantinov Kirovo-Chepetsky Chemical Plant (mineral fertilisers, fluorine plastics, monomers, halocarbons, and inorganic chemistry products) and the Kirov Tyre Factory (different purpose tires).
	The Nizhny Novgorod Region, part of the Volga Federal District	Chemical and petrochemical industry The industry accounts for 7.7% of the industrial output and specialises in producing engine fuel, lubricating oils, hydrocarbon materials for the petrochemical synthesis, ammonia, polyurethane PVC pipes, synthetic corundum, plastic products and polymer film.
	The Ulyanovsk region, part of the Volga Federal District	Oil industry In terms of extracted oil reserves the region's oil fields are ranked as small and very small. The oil here is heavy and sour. The region has nine fields ready for industrial development, five fields under exploration and two suspended discoveries. The recoverable oil reserves of 26 prospective areas calculated using C_3 Category are estimated at 33.2 million tonnes. Annual oil production is approximately 0.5 million tonnes. The level of explored reserve depletion is 6.4%. The majority stake in all four enterprises is held by Slavneft.
Siberian Federal District	The Irkutsk Region, part of the Siberian Federal District	Fuel industry The biggest enterprise is Lukoil-Kaliningradmorneft. Oil production stands at 700,000-750,000 tons a year.
	The Altai Territory, Siberian Federal District	Chemical and petrochemical industries Chemical and petrochemical industries make up 7% of the industrial output in the Altai Territory and are represented by

		Altaisky Polimer, Barnaul Geophysical Plant (polymers, plastics, polyethylene, polypropylene, plastic, and foam plastic products), Kuchuksulfat (high-grade environmentally safe potassium sulphate used in detergent production, pulp and paper, chemical industries, and glass production), Altaikhimprom, the only Russian producer of luminophores, (lacquers, enamels, solvents, organic synthesis products, and household chemicals and consumer goods).
	The Krasnoyarsk Territory, part of the Siberian Federal District bordering the Tyumen, Tomsk, Irkutsk and Kemerovo regions, and the republics of Khakassia, Tyva and Sakha (Yakutia).	Chemical and petrochemical industry This is a non-integrated industry as it operates on imported feedstock. In comprises production of chemical fibres (PO Khimvolokno), carbon char, synthetic rubber, automobile tires (the Krasnoyarsk SK Plant), low enriched uranium, isotopes, magnetic audio- and video tapes, and industrial and home electronics (FGUP Electrochemical Plant). All the enterprises are located in Krasnoyarsk.
	The Kemerovo Region, part of the Siberian Federal District, bordering Tomsk and Novosibirsk regions	Chemical and petrochemical industry region boasts one of the most developed chemical industries in Siberia, with a complex structure that includes manufacturing organic synthesis products, chemical fibres, fertilisers, synthetic resins, plastic, and other products. The industry is comprised of 15 large and medium-sized enterprises, with eight of them located in the city of Kemerovo.
	The Tomsk Region, part of the Siberian Federal District	Chemical and petrochemical industries Chemical and petrochemical industries account for 2.3% of the industrial output. The increasing volumes of lacquer and paints, plastics, and polymer film ensure the stable and profitable development of the industries. The major plant is the Shelanger chemical plant Saiver. Fuel industry The leading oil producer in Western Siberia is Tomskneft, which extracts oil and gas; develops oil fields; conducts prospecting, geodetic and mine surveying, and mapping; constructs surface facilities for deposit development. Tomskgazprom,. Tomskneftegazpererabotka, a daughter company of Vostokgazprom
	The Novosibirsk Region, part of the Siberian Federal District	Chemical and petrochemical industry The companies operating in the industry are cosmetic, fragrance, and spray manufacturer Sibiar, polyvinyl chloride products manufacturer Khimplast, Sibtekhgaz, which produces bulk and live oxygen, nitrogen, argon and mixed gas, the Plastics Manufacturing Plant, the Rare Metals

		Manufacturing Plant, which produces a scope of high purity metals compounds, such as cesium, rubidium, lithium, gallium, indium, bismuth salts, and rare earth metals salts, fertilizer manufacturer Novosibirska gropromkhimiya, and Sigma-Sibir, which supplies ascorbic and citric acids for the chemical, food, pharmacological, and cosmetic industries.
	The Omsk Region, part of the Siberian Federal District	Chemical and petrochemical industries The leading enterprise in the industries is Omsky Kauchuk, which specializes in synthetic rubber and marketable latexes. The plant is capable of producing fine chemical technology and complex organic synthesis products such as acetone, acetaldehyde, phenol, ethyl acetate, methyl ethylpiridin, and methyl vinylpyridin, as well as products for the company's internal use. Tekhuglerod produces over twenty brands of technical carbon. LiKOM is the major lacquer and paint producer in the region. Fuel industry The major company in the industry is Sibneft-ONPZ, which produces motor petrols, diesel and jet engine fuels, lubricating oils, toluol, paraxilol, orthoxilol, technical sulphur, fuel oil, catalysts. The refinery's capacity is 19.5 million tons a year. ECOOIL produces methyl tert-butyl ether (MTBE) - a high octane oxygen-containing ingredient for unleaded gasoline production.
Southern Federal District	The Chechen Republic, Southern Federal District	Chemical and petrochemical industry A linoleum manufacturing plant is located in Argun.
	The Voronezh Region, south-west of the European part of Russia	Chemical and petrochemical industry The chemical and petrochemical industry accounts for 16.5% of the region's industrial output. The largest companies include Minudobreniya (phosphatic and nitric fertilisers) and Voronezhsintezkauchuk (synthetic rubber, thermoplastic rubber and latex).
	The Stavropol Territory, Southern Federal District	Chemical and petrochemical industry The chemical and petrochemical industry accounts for 17.2% of the territory's overall industrial production. The largest companies in the sector are Nevinnomyssky Azot (mineral fertilizer, organic synthesis products, household chemicals), Vneshtradeinvest (mineral fertilizer), and Starveling (low-pressure polyethylene).
	The Volgograd Region, Southern Federal District	Chemical and petrochemical industry The industries utilise local raw materials, including oil, natural gas and cooking salt, manufacturing oil derivatives, artificial rubber and fibre, car and tractor tires, caustic soda, chemical weed and pest killers, synthetic resin

		and plastic, fibres and threads. The chemical and petrochemical industry accounts for 15.2% of the region's industrial output.
North Western Federal District	The Novgorod Region, a part of the Northwestern Federal District	Chemical and petrochemical industry The industry accounts for 26.9% of the industrial output. Its major enterprises include: Acron (ammonia, mineral fertilisers, products of organic and non-organic synthesis, and catalysers), Flaiderer-Chudovo (long glass fibre and related products), and the Novgorod Plant of Glass Fibre (glass fibre plastic, glass fabrics, heat insulators, long basalt fibre, basalt fabric, basalt roving, and basal heat insulation).
	Arkhangelsk, a part of the Northwest Federal District	Timber and woodworking industry
	The Vologda Region, part of the Northwestern Federal District	Chemical and petrochemical industry The sector accounts for some 6.5% of the industrial output. Its leading enterprises include: the Cherepovets Azot (ammonia, nitrate of ammonium), Ammofos (ammophos, diamonnium phosphate, and diammophoska), and Agro-Cherepovets (carbamide).
	The Leningrad Region is a constituent entity of the Russian Federation, part of the North-Western Federal District and the North-Western Economic Region.	Chemical and petrochemical industry share of industrial output is 5-7%. The chemical and petrochemical industry in the Leningrad Region comprises 150 large and medium companies, including Fosforit (production of mineral fertilizer, animal feed additives and other chemicals), Henkel-Era (synthetic detergents), Volkhovsky Khimichesky Zavod (household chemicals production), Khimik (solvents) and other companies.
	The Murmansk Region, part of the Northwestern Federal District	Chemical and petro-chemical industry The industry accounts for 16.5% of the region's industrial output. The chemical industry initially utilised phosphate feedstock, natural gas and ferrous and non-ferrous metallurgical waste. The Apatit production association, Russia's largest phosphate ore producer accounting for two-thirds of nationwide phosphate ore output, supplies this feedstock to domestic and global markets.
	The city of St Petersburg, a constituent entity of the Russian Federation, is a part of the Northwestern Federal District.	Chemical and petrochemical industry The industry accounts for just over 1% of the city's industrial output. The biggest companies are NPF Pigment (dyes and varnish industry), Krasny Treugolnik (rubber ware), Petrospirt (organic synthesis products) and Plastpolimer (plastics).

	The Nenets Autonomous Area, part of the Northwestern Federal District	Fuel industry The local oil and gas sector has considerable reserves of hydrocarbons.
Central Federal District	The Kursk Region, Central Federal District	Chemical and petrochemical industry accounts for 5.8% of the industrial output and specialises in production of rubber technical goods, man-made fibres, polymer and composite products. The leading enterprise is the Kurskrezinotekhnika, which produces 70% of the industry's output. Timber and woodworking industry
	The Kaluga Region, Central Federal District	Timber and woodworking industry
	The Vladimir Region, Central Federal District	Chemical and petrochemical industry The chemical and petrochemical industry accounts for over 5% of the region's industrial output. The most promising sub-branches include fiberglass material, plastic and fertilizer production. The largest companies are the Vladimir Chemical Plant, the Vladimir Sheeting Plant, Profil, the Research and Production Company Macromere, and Membranes.
	The Moscow Region, part of the Central Federal District	Chemical and petro-chemical industry The industry accounts for just over 8% of the industrial output, primarily producing mineral fertilizer, plant-protection means, plastics, chemical fibres, varnishes and paints.
	The Ryazan Region, part of the Central Federal District	Chemical and petrochemical industry The industry accounts for approximately 3% of the industrial output, and its major enterprises include the Ryazan Chemical Fibre Plant (Ryazanskoye Khimvolokno), and Ryazan Carton-Rubberroid Plant (Ryazansky Kartonno-Ruberoidny Zavod) (soft roofing). Fuel industry The sector accounts for some 12% of the industrial output. Its major enterprise is the Ryazan Oil Refining Company. The region's oil refining capacities stand at approximately 13 million tonnes annually.
	The Smolensk Region, part of the Central Federal District	Chemical and petrochemical industry The industry accounts for 8.3% of the industrial output. Dorogobuz is the industry's leading enterprise and one of the largest producers of mineral fertilisers and chemical synthesis products in Russia.
	The Tambov Region, part of the Central Federal District	Chemical and petrochemical industry The industry accounts for over 13% of the industrial output. The major enterprises include Pigment (aniline dyes), Biokhim (ferments, mineral fertilisers, premix

		moulding compounds, plastic materials), Kotovsky LKZ (varnishes, paints, solvents, and others), Kotovsky Plastics Plant, Tambovmash (polyethylene pipes, safety products, oil filters, and others).
	The Tver Region, part of the Central Federal District	Chemical and petrochemical industry The industry accounts for 5.6% of the industrial output. The region's enterprises produce polyester threads, glass reinforced plastics and items made from such material, thermoplastic sheets, polymeric foils, polygraphic resins, and offset printing inks. The major companies in the region include the Redkinsky Testing Factory (ferrocene and its derivatives, corrosion inhibitors, tosol, halocarbon, high-temperature materials, etc), the AKVA-KhIM (automatic water reactant treatment systems of various categories), the MNPK Biotekhindustria, the Tver Pharmaceutical Factory (pharmaceutical products), the Tverkhimvolokno-Poliefir, and the Tverkhimvolokno-Viskoza (polyether and viscose yarn), the Tverstekloplastik and the Nelidov Plastics Plant (glass reinforced plastics, thermoplastic sheets, and polymeric foils), and the Torzhok Polygraphic Inks Factory (polygraphic resins and offset printing inks).
	The Tula Region, part of the Central Federal District	Chemical and petrochemical industry The chemical and petrochemical industry comprises 22.2% of the region's industrial output. Local chemical factories produce synthetic rubber, plastic, chemical fibre and technical rubber fibre. The largest enterprises are Azot company (producing ammonia, nitrogen fertilizers and methanol), Shchekinoazon company (manufacturing caprolactam, methanol, ammonium sulphate, sulphuric acid, carbon dioxide and household chemicals), and the Yefremov Synthetic Rubber Plant (producing synthetic rubbers, resin, latex, polymeric compounds and other precursors and semi-products).
	The Yaroslavl Region, part of the Central Federal District	Chemical and petrochemical industry The chemical and petrochemical industry accounts for 19% of the region's industrial output. Raw materials for the industries are delivered from other regions, specifically from Republic of Komi and the Khanty-Mansi Autonomous Area. The region's two oil refineries are supplied by oil pipelines. The refineries produce gasoline, fuel oil, and diesel fuel and supply the region's chemical industry enterprises. A significant portion of the production is sent to other regions of the country.

Urals Federal District	The Tyumen Region, part of the Urals Federal District	The oil and gas complex is the basic part of the region's economy. The region holds most of Russia's oil and gas reserves. The largest oilfields are Samotlorskoye, Kholmogorskoye, Krasnoleninskoye, and Fyodorovskoye; the largest gas fields include Urengoiskoye, Medvezhye, and Yamburgskoye. According to estimates, rich hydrocarbon deposits are located on the Gydan Peninsula and the Kara Shelf, and significant prospects are connected with the development of the Uvatsky project in the southern part of the region.. Fuel industry The largest companies are the Tyumen Oil Company, Sibnefteprovod, and Zapsibgazprom.
	The Kurgan Region, the Urals Federal District	Chemical and petrochemical industry represented by healthcare products manufacturer Sintez, the largest one in Russia's pharmaceutical industry, is the only enterprise to continue producing natural and semi-synthetic antibiotics, such as erythromycin, phenoxymethylpenicillin, kanamycin, ampicillin, oxacillin, and bicillin.
	The Sverdlovsk Region, part of the Urals Federal District	Chemical and petrochemical industry The industry's largest companies are: the Ural Industrial Rubber Products Manufacturing Plant, which produces conveying bendings, rubber belts and gauntlets, wedge belts, technical slabs, moulded and non-moulded general mechanical rubber goods, rubberised fabric, and unvulcanised rubber mixtures; Uralplastik, which is one of Russia's largest polymer packing and foam material suppliers; Ural Chemistry Company, which manufactures artificial resins, structural and special plastic materials, polyvinyl chloride based plasticised rubber, and pentaerythritol.
	The Yamalo-Nenets Autonomous Area is one of Russia's most economically developed regions, part of the Ural Federal District's Tyumen Region	Natural gas production and transportation are the basic parts of the region's economy, Over 90% of all Russian gas is produced there Fuel industry: The leading oil companies of the region are affiliates of the vertically integrated companies Sibneft (Sibneft-Noyabrskneftegaz, Zapolyarneft, Meretoyakhaneftegaz) and Rosneft (Rosneft-Purneftegaz, Selkupneftegaz). Thirty nine companies have been developing 81 gas fields. The major gas companies are Gazprom's affiliates: Urengoigazprom, Yamburggazdobycha, Nadymgazprom, and Noyabrskgazdobycha.
Far Eastern Federal District	The Sakhalin Region, part of the Far Eastern Federal District	Fuel industry main oil and gas producers are located in the northern part of Sakhalin Island. The fuel industry accounts for 26.8% of marketable industrial

		products of the region. Crude oil is pumped to an oil refinery in Komsomolsk-on-Amur. Forest and timber-processing industry

Source: Government of Russian Federation (2010) Russia by the numbers, http://government.ru/eng/russia/83/economics.html#text

Appendix 2: Partial List of Liquid Chemical Products Acceptable for loading into HGT ISO TCs

Note: Whisky, rum, wine, grape juice, orange juice, tomato juice are not acceptable.

Load List of Acceptable Chemicals

Acetic acid
Acetone
Acid oils and fatty acid distillates - only from vegetable oils and fats and/or mixtures thereof
Agar, Alanine
Alginic acid
Ammonium polyphosphate
Arginine
Asparagine
Beeswax
Benzyl alcohol - pharmaceutical and reagent grades only
Beverages - alcoholic and non-alcoholic including fruit juices and potable water NOTE: potable water is acceptable only where the immediate previous cargo is on the Vitusa Products
N-Butyl acetate
sec-Butyl acetate
Tert-Butyl acetate
Calcium chloride solution
Candelilla wax
Carnauba wax (Brazil wax)
Di-alpha-Tocopheryl acetate (Vitamin E)
Diethylene glycol dibenzoate
Dipropylene glycol dibenzoate
Disodium ethylene diamine tetra acetic acid (EDTA)
Deoxidized soybean oil should be with a minimum 7% oxirane oxygen content.
Ethanol (ethyl alcohol; spirits)
Ethyl acetate (acetic ester; acetic ether; vinegar naphtha)
Ethylene vinyl acetate emulsion (latex) - 21 CFR 175.105, 176.170, or 176.180 compliance
2-Ethylhexanol (2-ethylhexyl alcohol)
Fatty acids:
Arachidic acid (eicosanoic acid)
Behenic acid (docosanoic acid)

Butyric acid (n-butyric acid; butanoic acid; ethyl acetic acid; propyl formic acid)
C 10 Fatty Acids
Capric acid (n-decanoic acid) (C 6)
Caproic acid (n-hexanoic acid)
Capronic Acid (C 10)
Caprylic acid (n-octanoic acid) (C 8)
Erucic acid (cis 13-docosenoic acid)
Heptoic acid (n-heptanoic acid)
Lauric acid (n-dodecanoic acid)
Lauroleic acid (dodecenoic acid)
Linoleic acid (9, 12-octadecadienoic acid)
Linolenic acid (9, 12, 15-octadecatrienoic acid)
Myristic acid (n-tetradecanoic acid)
Myristoleic acid (n-tetradecenoic acid)
Neadecanoic Acid
Oleic acid (n-octadecenoic acid)
Palm oil
Palmitic acid (n-hexadecanoic acid)
Palmitoleic acid (cis-9-hexadecenoic acid)
Pelargonic acid (n-nonanoic acid)
Ricinoleic acid (cis 12-hydroxy octadec-9-enoic acid; castor oil acid)
Stearic acid (n-octadecanoic acid)
Valerie acid (n-pentanoic acid; valerianic acid)
Fatty acid esters:
Butyl myristrate
Oleyl palmitate
Cetyl stearate
Methyllaurate (methyl dodecanoate)
Methyloleate (methyloctadecenoate)
Methyl palmitate (methyl hexadecanoate)
Methyl stearate (methyloctadecanoate)
Fatty alcohols - natural alcohols:
Butyl alcohol (1-butanol; butyric alcohol)
Caproyl alcohol (1-hexanol; hexyl alcohol)
Capryl alcohol (1-n-octanol; heptyl carbinol; methyl hexyl carbinol)
Cetyl alcohol (alcohol C-16; 1-hexadecanol; cetylic alcohol; palmityl alcohol; n-primary hexadecyl alcohol)
Cetyl stearyl alcohol (C16 - C18 blend)
Decyl alcohol (1-decanol)
Enanthyl alcohol (1-heptanol; heptyl alcohol)
Lauryl alcohol (n-dodecanol; dodecyl alcohol)
Lauryl myristyl alcohol (C12 - C14 blend)
Myristyl alcohol (1-tetradecanol; tetradecanol)
Nonyl alcohol (alcohol C-9, 1-nonanol; pelargonic alcohol; octyl carbinol)
Oleyl alcohol (octadecenol)
Stearyl alcohol (1-octadecanol)
Fatty alcohols - synthetic primary alcohols (C9 - C15)
Food starch

Glacial acetic acid
Glucose (glucose syrup; corn syrup; dextrose solution)
Glutanic acid
Glycerine (glycerol; glycerin; glycyl alcohol; trihydric alcohol)
Glycols:
Poly glycol
Polypropylene glycol (PG)
Propylene glycol (1, 2 propylene glycol; 1, 2-propanediol; 1, 2-dihydroxypropane; Monopropylene glycol (MPG); methyl glycol)
1, 3-Propylene glycol (trimethylene glycol; 1,3-propanediol)
Honey
Hydroxypropyl cellulose
Hydroxypropyl methylcellulose
Isobutyl acetate
Isopropanol (IPA; isopropyl alcohol; 2-propanol; dimethyl carbinol)
Lactic Acid
Magnesium chloride solution (magnogene)
Methyl isobutyl ketone (MIBK; hexone; 4-methyl-2-pentanone; iso propylacetone)
Methylcellulose
Mono Isopropyl amine
Neadecanoic Acid
Paraffin wax - only food additive grades
Pentane (amyl hydride)
Polyvinyl acetate emulsion (latex) should be in compliance with 21 CFR 175.105, 176.170, or 176.180
Potassium hydroxide solution (KOH, Potash Lye, Lye, Lye solution, Liquid Caustic Potash)
Propane-1-ol (propyl alcohol; 1-proponal)
N-Propyl acetate
Propylene tetramer (tetra propylene; dodecane)
Softanol
Sorbitol (d-sorbitol; hexahydric alcohol; d-sorbite)
Soybean oil
Sucrose
Sunflower steryl
Sunflower steryl esters
Triacetin (1, 2, 3-Propanetriol, triacetate, Glycerin triacetate)
Triethyl citrate
Vegetable oil
Vinyl Acetate emulsions - 21 CFR 175.105, 176.170, or 176.180 compliance
Vinyl Acetate Ethylene emulsions (latex) - 21 CFR 175.105, 176.170, or 176.180 compliance
Whey
White mineral oil (liquid paraffin oil), CAS No. 8042-47-5/Codex No. 905a, only food additive grades
Xylitol

Appendix 3: HGT Organizational and Functional Chart

Department	Date / time	Issues	Taken care of by / Signature
Safety Instruction		- emergency procedures - handling of personal safety equipment	Ton van Kalken
Human Resources		- responsibility HRM - explanation personnel handbook (incl. holiday leave procedure, sickness procedure) - HR communication cycle (incl. assessments, evaluations, salary system, trainings) - organization charts	Mirjam Valk
Quality		- responsibility Quality - SHEQ policy - SHEQ management systems - Quality manual	Ron Remeeus
ICT		- responsibility ICT - ICT question procedure - Citrix	Dave Hoeing
Commercial Department		- responsibility Commercial department - customer relationship - customer requirements - incident reporting investigation - sales organization Europe / Global - market forces - quotations + profit guidelines	Andreas Essinger
Operations		- responsibility Operations Import/Export/Trucking - Real - organization of operations - operating procedures - emergency response - incident reporting procedures	Patrick de Heide
Special Logistics		- scope - flexitanks	Chris Booij

Fleet		- responsibility Fleet management - organization of Fleet - working method of Fleet	Aad van Vugt
Procurement		- responsibility Procurement - external communication / networking - information filing - internal communication (inter-office and inter-company)	Bart van Woensel Signature
Bookkeeping		- responsibility bookkeeping - suppliers payments - bank controls - cash management - fleet administration	Danielle van der Leer Signature
Cost Control Centre		- responsibility CCC - cost control & charges - job control - group invoice control - inter departmental relations	Antal Amptmeijer Signature
Global Pricing Analyst		- responsibility Global Pricing Analyst - strategic repositioning price setting in co-operation with commercial reasons	Heiko Peitsch Signature

Appendix 4: Russia Agent Addresses

Russia (St Petersburg) Tek Poseidon Ltd. Govorova Str 35 Liter A, Business-Centre Resurs Office 610 St Petersburg Contact: Mrs Irina Lapkovskaya Tel. No: +7 8127403571 Fax No: +7 8127406394 Mobile: +7 4951308370 Email: lapa@tekposeidon.spb.ru	**b. Russia (Moscow)** Tek Poseidon Ltd 117393 Profsoyuznaya Str. 66 Office 205 Moscow Contact: Mr Alexander V. Tysyachnikov Tel. No: +7 4957854840 Fax No: +7 4957850740 Mobile: +7 4951308370 Email: a.tysyachnikov@tekposeidon.ru

Appendix 5: Additional Services and Surcharges of HGT

1.BL Revision (after approval)
2. Chassis Rental (p/calendar day)
3. Cleanliness Certificate (Third Party)
4. Extend customs clearance Form
5. Customs Clearance
6. Terminal Surcharge
7. Depot Handlings (p/handling, empty tank)
8. Depot Handlings (p/handling, loaded tank)
9. Depot Handlings (p/handling, loaded tank)
10. Trucking detention
11. Demurrage (p/day)
12. Evacuation fee
13. EX-1 document
14. Handrail (fitting) excluding multistep
15. Heating/Steaming Per hour
16. Warm Water Heating
17. Kosher Cleaning
18. Local shunt (loaded tank to storage)
19. Labeling
20. Multi stop
21. Pressure test
22. Pump surcharge
23. Rest load (disposal of)
24. Spillage
25. Spraying cost
26. Storage costs (loaded tank, in depot)
27. Tank rental p/day
28. T-1 document
29. Weekend surcharge (Saturday)
30. Weekend surcharge (Sunday and public holidays)
31. Weighing (weigh costs + multistop)

Appendix 6: Kharyaga Project Quarterly Warehousing Report

			Assigned to	Current quantity	Current quantity
	Product Name	**Product Type**		**Drums**	**Litters**
01	ISO VG 46	hydraulic oil for Manitou f/lift	Maintenance	6.75	1417.5
02	Equivis XV 46	high viscosity hydraulic oil		1	210
03	Royco 756	hydraulic fluid		2	420
04	Rubia TIR 8600	10W-40 diesel engine oil		0	0
05	Mono Ethylene Glycol	antifreeze		12	2520
06	Isovoltine II	dielectric transformer oil		11	2310
07	Isovoltine II (60 l can)	dielectric transformer oil		0	0
08	Solvesso 100	Solvent		0	0
09	Rubia TIR 6400	15W-40 motor oil		13	2730
10	Azolla ZS 32	hyd. oil w/anti-wear properties		12	2520
11	Azolla ZS 46 (can 25L)	hyd. oil w/anti-wear properties		2	420
12	Carter EP 68	Industrial gear oil		2	420
13	Tran Syn FE 75W90 Total	Gear box oil SAE 75w90		1	210
14	Oil lub Preslia 32 TOTAL	(20 liters can)		1	210
15	Oil lub Preslia 46 TOTAL	Drum		37	7770
16	Oil Carter EP 100	(20 liters can)		1	210
17	Dacnis VS 46	Oil for rotary air compressors		1	210
18	Dacnis SH 46	Synthetic compressor oil		1	210
19	Dacnis P-100	Oil lubricant (20 liters per can)		1	210
20	Rubia TIR 7400 FE	10W-30 motor oil		1	210
21	Equivis ZS 32	High viscosity anti-wear hydraulic oil		1	210
22	Carter SH 220	synthetic based gear oil		1	210
23	Dacnis SH 32	synthetic		5	1050

		compressor oil			
24	Rubia TIR 9200 FE	5W-30 motor oil		2	420
25	Grease Arctic CHEMOLA	Arctic valve lubrication		0	0
26	Glacelf classic (TOTAL)	Antifreeze for cooling system		8	1680
27	Fluid wash liquid 25l	Liquid for Siemens turbine(ZOK)		7	1470
28	Loctite 7840 natural blue	20l can (s.s. ZOK for turbine)		13	2730
29	Atlas Copco	Fluid Roto-inject 20L can		3	630
30	ULTRACOOLANT 25L INGERSOLL RAND	ULTRACOOLANT		3	630
31	Oil ELF Polytelis 150	Oil Circan RO 150 equivalent		19	3990
32	OIL QUARTZ ENERGY 9000	0W-30 motor oil		8	1680
		1.845375		36907.5	
33	Desulphon	Mercaptan scavenger	Production	0	0
34	Prochinor AM 2774	Defoamer		32	6720
35	Bactiram 446	Biocide		16	3360
36	Inipol AD 100	Scale inhibitor		0	0
37	Inipol AD 15E	Scale inhibitor		18	3780
38	Norust SC 43	Oxygen scavenger		39	8190
39	Norust 760	Corrosion inhibitor		85	17850
40	Prochinor DN 14	Demulsifier		154	32340
41	Tretolite DMO 86552	Demulsifier		0	0
42	DMO 86176	Demulsifier		0	0
43	SCW 82697	Scale inhibitor		28	5880
44	Therminol 59	Heat transfer fluid		87	18270
45	DMO 80046	Demulsifier		0	0
46	Anticor SP 751	Paraffin solvent		0	0
47	Anticor PA 500	Paraffin dispersant		2	420
48	Prochinor AP104	Paraffin dispersant		0	0

49	Prochinor AP 757	Paraffin dispersant		12	2520
50	Dodigen WS 180	Biocide		0	0
51	Therminol FF	Flushing fluid		0	0
52	Therminol ADX-10	Heat transfer fluid		0	0
53	HSW-82677	Mercaptan scavenger		16	3360
		5.1345	102690		
54	Solvent Finasol MF	Solvent	Laboratory	1	210
55	Toluene (Toluol)	Solvent			0
56	Oil Finavestan A100B TOTAL	(20 liters can)		1	210
57	KO - 25	Clarified kerosene		1	210
58	Oil Solvent	Solvent		0	0
59	Butanol	Solvent		1	210
60	Methanol (5 liter bottles)	Solvent		0	0
		0.042	840		
61	Equivis ZS 15	Hydraulic oil	DOD/WO	4	840
62	NFC - 2	Acid generator		0	0
63	NFC - 5	Acrosolve starch enzyme		0	0
64	NFC - 3	Acrosolve		0	0
65	Musol (R) Solvent	Solvent		0	0
66	UO 66 Mutual Solvent	Solvent		0	0
67	MO-75	Gelling agent		0	0
68	MO-76	Oil gel activator		0	0
69	Aerohydraulic 520 (TOTAL)	Hydraulic oil		4	840
		0.084	1680		
70	MF-A-210 alkaline	Alkaline solution NaOH	Camp/WTU		0
71	MF-B-220 acid	Acid solution HCl			0
72	AMINAT-K	Antiscalant		0	0
73	Calcium Hypochlorite	Calcium hypochlorite		0	0
		0		0	
74	Lessorb-Extra Sorbent (bags)	Hydrophobic sorbent	HSE	86	18060
75	Fabric absorption wadded wool	Sorbent		22	4620
76	FOAM AGENT PO-	Foam agent		9	1890

	6 TS 3% 200L DRUM				
77	Inipol +	Bio degradant		36	7560
	1.6065		32130		
	Total quantity		8.7	**829.75**	174247.5

Source: Anonymous

Appendix 7: A list of Major Russian Rubber and Plastic Producers

1) Sterlitamak - is an important center of chemical production. Sterlitamak Petrochemical Plant has shipped to consumers goods with total cost of 3 billion 868 million rubles. SNHZ remains Russia's only supplier of phenolic antioxidants for rubber production, continued development of the production stabilizers series Agidol. Wikipedia (2010) Sterlitamak

2) Kazan Synthetic Rubber Plant produces irregular butadiene rubber, latex, civil engineering products, polysulfide products, rubber compound R-5, silicone products, urethane.

3) JSC “Synthez-Kauchuk” was established in 2004 on a technical base of CJSC “Kauchuk”. Today it is one of the major Russian producers of isopropene rubbers- SKI-3, SKI-3S, SKI-3D, SKI-5, SKI-5PM. Catalyst IM-2201, nickel on kieselghur, TIBA, etc. and also absorbents, fractions: hexane and piperylene are in the assortment of its production. Production is realized through the trade branches of JSC “Synthez-Kauchuk. JSC Synthez Kauchuk (2010)

4) Kazan'orgsintez OAO, Kazan’orgsintez OAO or Kazanskoe OAO Organicheskiy sintez or Kazanorgsintez JSC is involved in the production of polyethylene, polyethylene pipes, phenol, acetone, ethylene glycols, ethanol amines, bisphenol, polycarbonate and other products of organic synthesis. The Company operates ethylene plant, Low Density Polyethylene (LDPE) plant, High Density Polyethylene (HDPE), Organic products plant, plant for production of nitrogen, oxygen and cold; plant for preparation and making overhauls; bisphenol plant, and polycarbonates plant. Its product range includes more than 170 different items. The Company distributes its products on the domestic market, as well as exports over 25% of its production, mainly to Ukraine, China, Kazakhstan and Turkey. Google Finance (2010) Kazan'orgsintez OAO

5) Omsk Synthetic Rubber or Omskiy kauchuk OAO products portfolio consists of acetone, butadiene-nitrile rubbers, phenol, propylene and such Styrene-Butadiene Rubbers (SBR) as SBR-1500, SBR-1502, SBR-1705 and SBR-1712. Omskiy kauchuk OAO operates on the territory of Russia through six subsidiaries and one affiliated company located in Omsk. It is a part of Titan Group CJSC, a chemical products distributor. Credit Risk Monitor (2010) Omskiy kauchuk OAO (P)

6) Efremov Synthetic Rubber Enterprise (Yefremovskiy zavod sint. kauch. OAO) is engaged in the production of synthetic rubber. Its main products are butadiene rubber produced under the SKD brand and polybutadiene rubber. The Company sells its products to such Russian companies as Tatneft'Neftekhimsnab OAO, Khimelast OOO and Innovatsionnye tekhnologii OOO, as well as exports them to Elastomer Trading Ltd, the United Kingdom and S S Ost-West-Handelgeselschaft MBH, Germany. The Company has one Germany-based affiliated company, EFREMOV-KAUTSCHUK Gmbh, engaged in the purchase and sale of raw materials and chemical products. Google Finance (2010) Yefremovskiy zavod sint. kauch. OAO (P)

7) Nizhnekamskneftekhim is engaged in the production of petrochemical products in the Russian Federation. The Company products are exported to more than 50 countries of Europe, America, and South East Asia. Its products portfolio include general purpose and special purpose synthetic rubbers; plastics: polystyrene, polypropylene and polyethylene; monomers, being the feedstock for production of rubbers and plastics, and other petrochemical products, such as ethylene oxide, propylene oxide, alpha-olefins and surfactants. The Company's commercial products include synthetic rubbers, monomers, plastics, polymers, oxides, glycols, oligomers and ethers. Google Finance (2010) Nizhnekamskneftekhim OAO

8) Togliatti-Kauchuk Ltd (Togliatti) together with Nizhnekamskneftekhim Inc. (Nizhnekamsk), and Synthez-Kauchuk JSC (Sterlitamak) is one of major Russian companies making isoprene rubber which cumulative output of this sort of rubber in 2008 amounted for more than 408,000 tonnes of SKI. Eurasian Chemical Market (2009)

9) Voronezh Syntezkauchuk OAO or Voronezhskiy sintet. Kauchuk OAO (P) main products are polybutadiene rubbers, styrene-butadiene and butadiene acrylonitrile rubbers, synthetic styrene-acrylate latex and emulsion styrene butadiene rubbers, among others. The Company is active mainly on the territory of Russia, as well as exports its goods to Western Europe, the Commonwealth of Independent States countries and Asia. Its clients are companies engaged in the production of tires, cables, construction materials, carpets, artificial fur, and road construction companies. It has two wholly owned subsidiaries, Siburenergomanagement OAO located in Voronezh, which is involved in the wholesale trade of electric power and thermal energy, and Moscow-based SintezInvest OOO, which is active in the trade industry. As of October 15, 2009, it was a 48.71%-owned affiliate of Sibur Holding OAO. Shinichi Kato Office (2005);

10) Karbolit OAO (P) The Company's main activity is the production of synthetic, phenolic, phenol-formaldehyde and urea-formaldehyde resins, plastics, frictional materials, formalin, styrene co-polymers, press powders and others. Karbolit OAO sells its products on the domestic market, as well as exports them to the Commonwealth of Independent States countries. In addition, it has two affiliated companies, Karbodin OOO and MK Khimstroy OOO. Google Finance (2010) Karbolit OAO (P)

11) Uralkhimplast OAO (UKhK OAO or Ural Chemical Company OJSC), previously known as Ural'skaya khimicheskaya kompaniya OAO, specializes in the production of synthetic resins, including the polymeric and urea-formaldehyde resins, plastic mass,

like thermoplastic materials and polyvinylchloride elastron, and organic chemistry products, including the high-boiling alkyl phenols and technical formalin, among others. Google Finance (2010) Uralkhimplast OAO

12) Iskozh OAO (P) KCIK (Kirov Artificial Leather Integrated Works JSC) specializes in the production of synthetic materials for insoles, outsoles and heels; soft multipurpose artificial leather; technical rubber articles, and thermoplastic rubber granules (TR) compounds. Credit

13) Vladimirskiy khimicheskiy zavod OAO main activity is the production of plastics. The Company's product portfolio includes polyvinyl chloride (PVC) plastic compounds, PVC-plastic compounds (without cable), plasticized granulated polyvinylchloride, plasticized PVC sheet materials, rigid polyvinyl chloride (RPVC), polyethylene terephthalate (PET) films and fiberglass goods, among others. VKhZ OAO also produces a wide range of polyether used for foamed polyurethane, foam-stabilizers and others. The Company operates through one representative office located in Moscow, as well as two subsidiaries: Dzerzhinsky khimicheskiy zavod OOO and Profil' OAO. Google Finance (2010) Vladimirskiy khimicheskiy zavod OAO (P)

14) Plastpolimer OAO (P) produces fluorescent polymers, polyvinyl acetate polymers, polyolefins, and inorganic chemistry, including potash alum and ammonia alum technical grade. Google Finance (2010) Plastpolimer OAO (P)