Chemical Logistics Cooperation in Central and Eastern Europe

**SWOT-Analysis**

Germany (Saxony-Anhalt)

- **Strengths**
- **Opportunities**
- **Weaknesses**
- **Threats**
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1 Structure

Description of chemical logistics in the region/country

Description of transport infrastructure

Description of Chemical Industry

Introduction to Region / Country

Needs for future actions and improvements - Conclusions

Internal Strengths of Chemical Companies and Logistic Providers

Internal Weaknesses of Chemical Companies and Logistic Providers

External opportunities and chances for chemical logistics in Central and Eastern Europe

External Threats, Problems and Barriers for chemical logistics in Central and Eastern Europe

Literature
2 INTRODUCTION TO REGION / COUNTRY

Saxony-Anhalt is one of the 16 Federal States (Länder) in Germany. It boarders to four neighbours Brandenburg, Saxony, Thuringia and Lower Saxony and has no boarder to foreign countries. Saxony-Anhalt is the eight largest (in terms of surface and the ten largest (in terms of population) Land in Germany. The surface of Saxony-Anhalt equals to 20.445 square kilometres (5.7 % of the surface of Germany) and 2.52 million inhabitants (3.5 % of German population) live here. The northern areas have a rather low density of population, whereas the central a southern parts of the region have more than 150 inhabitants per square kilometre. The average is approximately 123.5 inhabitants per square kilometre. The capital of Saxony-Anhalt is Magdeburg with 229.725 inhabitants. Halle/Saale is the largest city with 234.802 inhabitants.

The infrastructure has been constantly extended and improved in the past years. A dense transport network connects the Land with its neighbouring countries. The highway A2 (Hannover-Magdeburg-Berlin), A9 (Nürnberg-Halle-Berlin) und A14 (Dresden-Magdeburg) are crossing Saxony-Anhalt. The highway through the southern Harz (A38) is under construction. The international Airport is located in Halle-Leipzig. Moreover Saxony-Anhalt has important inland waterways (Elbe, Saale, Mittellandkanal, Elbe-Havel-Kanal). Already since the establishment of the railway network in the 19th century, several important railway routes are crossing Saxony-Anhalt (e.g. connection Nürnberg-Halle-Dessau-Berlin). The river Elbe is one of the most important central European waterways and connection of the inland water transport to the oversee ports in Hamburg. The Elbe flows from Southeast to Northwest of Saxony-Anhalt 303 kilometres

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<td>Inhabitants in Mio</td>
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<td>Area in km²</td>
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Gross Domestic Product in billion EUR:

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<td>43,3</td>
<td>44,0</td>
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<td>47,3</td>
<td>49,2</td>
<td>51,6</td>
<td>53,8</td>
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Gross Domestic Product / capita (employee):

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<tbody>
<tr>
<td>40.892</td>
<td>42.331</td>
<td>44.787</td>
<td>45.703</td>
<td>46.937</td>
<td>47.733</td>
<td>49.381</td>
<td>51.030</td>
<td>52.790</td>
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</table>
Map of Saxony-Anhalt and its location in Central Germany and Europe
3 DESCRIPTION OF CHEMICAL INDUSTRY

The chemical industry is the 2nd biggest industrial sector in Saxony-Anhalt and has high importance for the regional economy, international trade and innovation capacity. Since the early 1990s, investments in the amount of 17 billion euro were made at the major sites in Saxony-Anhalt - Leuna, Schkopau, Bitterfeld-Wolfen, Zeitz, Piesteritz and Böhlen (Saxony) and Schwarzheide (Brandenburg) into rehabilitation and new construction of infrastructures and production plants. The Central German Chemistry Triangle has a chemistry park area of more than 5,500 ha and ultramodern product integration schemes. These sites with their synergetic potentials provide best prerequisites for new business settlements. Key competence areas in the region include fine and specialty chemistry, polymer chemistry and plastics development, composite materials and agro-chemistry, while eminent international potentials are also available in the fields of nanotechnology and material research and development for the solar industry.

The chemical industry in the regions Saxony-Anhalt, Saxony, Thuringia and Brandenburg have initiated the Chemistry/Plastics Cluster Central Germany as the business community as a platform of inter-state collaboration at the future conference of ‘Economic Initiative for Central Germany’ in 2003. Membership includes large-, medium- and small-scale enterprises, their associations, education and research institutions, service providers as well as politics and administrations. The Future Cluster builds on established network and cooperation structures and promotes formation of value-added chains as are formed from research via feedstock materials to final products. One generic feature of clusters is a concentration of value-added chains. This applies in particular to Central Germany because the corporate landscape in Saxony, Saxony-Anhalt, Thuringia and Brandenburg is characterised by chemistry. The region between rivers Elbe, Saale, Havel, Spree and Neiße is a land of chemistry.

Chemical industry and plastics processing have written an impressive success story following introduction of market economy in Eastern Germany and today are among the major growth branches in Central Germany. This industry takes a combined share of about 14 per cent in the total sales of the processing trade in the federal states of Saxony, Saxony-Anhalt, Thuringia and Brandenburg. Some 750 chemical and plastics companies generated a turnover of ca. 20 billion Euros in 2007 – an increase of some 15 per cent compared to previous year figures. Thus, a development was kept up that has continued for eleven years. Sales have risen by 200 per cent from 1995 to 2006. The chemical and plastics industry in Saxony, Saxony-Anhalt, Thuringia and Brandenburg has also proven an employment motor and currently provides 76,000 jobs in 2007- a growth by approximately 40 per cent compared to 1995. Another proof of the successful road is also the sharp rise in productivity which was 120 per cent in 2006 with sales of 251,000 euro per employee as compared to 1995.
The turnover of central German chemical industry and plastic and rubber industry have increased above average compared to German and global levels. From 2002-2007 the turnover of the chemical industry has increased by 11.4 % p.a. and by 10.0 % p.a. in the plastic and rubber industry. These growth rates are twice as high as the German average. The leap becomes even more obvious when looking at the time before restructuring. In Leuna, for instance, 27,000 employees generated a turnover of the equivalent of 1.5 billion euro in 1990. In 2006, 9,000 staff generated six billion euro, i.e. quadrupled the economic performance.

The strengths and challenges but also the economic importance of the chemical industry differs between the central German Länder. In Saxony-Anhalt and Brandenburg the turnover productivity and export rate is higher than the German average. “The Plastic Region” Thuringia is characterised by many small and medium sized companies and the “Chemistry Region” Saxony-Anhalt has larger companies. The joint challenges are especially the relatively low R&D expense of the enterprises, which are important for the international competitiveness. The wage level has seen a small equalisation to the Western regions. The wage levels are in both branches at approximately 70%.

### 3.1 CHEMICAL SALES

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<td>Manufacture of basic chemicals*</td>
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<td>Manufacture of pesticides and other agro-chemical products</td>
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<td>Manufacture of paints, varnishes and similar coatings, printing ink and mastics</td>
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<td>Manufacture of pharmaceuticals, medicinal chemicals and botanical products**</td>
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<td>Manufacture of other chemical products***</td>
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<td>Manufacture of man-made fibres</td>
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<td><strong>Manufacture of chemicals and chemical products</strong></td>
<td>3.634</td>
<td>3.678</td>
<td>3.901</td>
<td>3.844</td>
<td>4.365</td>
<td>4.961</td>
<td>5.522</td>
<td>6.557</td>
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<td>Manufacture of rubber products****</td>
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<td>Manufacture of plastic products*****</td>
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<td>1.543</td>
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<tr>
<td><strong>Manufacture of plastic and rubber products</strong></td>
<td>879</td>
<td>1.037</td>
<td>1.071</td>
<td>1.305</td>
<td>1.447</td>
<td>1.509</td>
<td>1.704</td>
<td>1.789</td>
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<table>
<thead>
<tr>
<th>Share of chemical sales in processing industry</th>
<th>2000</th>
<th>2001</th>
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<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td>Manufacture of chemicals and chemical products</td>
<td>19 %</td>
<td>18 %</td>
<td>19 %</td>
<td>16 %</td>
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<td>Manufacture of plastic and rubber product</td>
<td>5 %</td>
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### 3.2 Company Structure – Size of Enterprises and Employees

<table>
<thead>
<tr>
<th>Number of enterprises</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
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<td>Manufacture of chemicals and chemical products</td>
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<td>250 - ... employees</td>
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<th>Number of employees</th>
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### 3.3 International Trade

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<th>Export quota in %</th>
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<th>2001</th>
<th>2002</th>
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<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td>Manufacture of chemicals and chemical products</td>
<td>32 %</td>
<td>39 %</td>
<td>40 %</td>
<td>42 %</td>
<td>43 %</td>
<td>44 %</td>
<td>45 %</td>
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<tr>
<td>Manufacture of plastic and rubber products</td>
<td>23 %</td>
<td>26 %</td>
<td>27 %</td>
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<td>27 %</td>
<td>28 %</td>
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<table>
<thead>
<tr>
<th>Import of chemicals in Mio EUR</th>
<th>2000</th>
<th>2001</th>
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<th>2004</th>
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<tr>
<td>Manufacture of basic chemicals*</td>
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<td>Manufacture of pesticides and other agrochemical products</td>
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<tr>
<td>Manufacture of paints, varnishes and similar coatings, printing ink and mastics</td>
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<tr>
<td>Manufacture of pharmaceuticals, medicinal chemicals and botanical products**</td>
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<td>Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations</td>
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<tr>
<td>Manufacture of other chemical products***</td>
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<tr>
<td>Manufacture of man-made fibres</td>
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</table>

| Manufacture of chemicals and chemical products | 1.177 | 1.426 | 1.552 | 1.619 | 1.883 | 2.196 | 2.458 | 2.763 |
| Manufacture of rubber products**** |      |      |      |      |      |      |      |      |
| Manufacture of plastic products***** |      |      |      |      |      |      |      |      |
| Manufacture of plastic and rubber products | 201 | 269 | 286 | 324 | 361 | 363 | 458 | 505 |
### Geographic breakdown of chemicals export in %

<table>
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<th>Region</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
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<th>2004</th>
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<td>EU 15</td>
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<td>Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Czech Republic, Hungary, Cyprus</td>
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### Geographic breakdown of chemicals import in %

<table>
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<tr>
<th>Region</th>
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<tr>
<td>Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Czech Republic, Hungary, Cyprus</td>
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<td>Bulgaria, Rumania</td>
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</tbody>
</table>

### 3.4 Regional Structure of Chemical Industry

<table>
<thead>
<tr>
<th>Major Companies and chemical sites</th>
<th>Turnover 2007 in Mio EUR</th>
<th>Location / chemical site</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Olefinverbund GmbH*</td>
<td>4.890</td>
<td>Schkopau</td>
<td>2.300</td>
</tr>
<tr>
<td>BASF Schwarzheide GmbH</td>
<td>1.032</td>
<td>Schwarzeide</td>
<td>1.898</td>
</tr>
<tr>
<td>SALUTAS Pharma GmbH</td>
<td>920</td>
<td>Barleben</td>
<td>1.400</td>
</tr>
<tr>
<td>Domo Caproleuna GmbH</td>
<td>610</td>
<td>Leuna</td>
<td>470</td>
</tr>
<tr>
<td>Bayer Bitterfeld GmbH</td>
<td>580</td>
<td>Bitterfeld-Wolfen</td>
<td>513</td>
</tr>
<tr>
<td>SKW Stickstoffwerke Pisteritz GmbH</td>
<td>473</td>
<td>Lutherstadt Wittenberg</td>
<td>769</td>
</tr>
</tbody>
</table>

* turnover of company
The network of the Central German chemical sites, the Central European Chemical Network (CeChemNet), combines the six sites in Bitterfeld, Leuna, Schkopau, Böhlen, Zeitz and Schwarzheide with about 5500 hectares. There are 600 companies operating with 27000 employees. CeChemNet is a network of chemical companies and chemical park operators, which successfully links competencies and know-how of chemical park management. The network concentrates regional strengths of chemical park development, creates synergies with the feedstock integration in the Central German chemical triangle and forces the knowledge transfer among its six chemical sites in three federal states such as Saxony-Anhalt, Saxony and Brandenburg. Moreover CeChemNet coordinates the exchange between industry, sciences and politics and supports the marketing of chemical park area in close collaboration with investment and marketing agencies at national and federal state level.

CeChemNet partners are:

**Chemical site Leuna / InfraLeuna GmbH**

Investments and competence have made Leuna into a leading industrial site in Central Germany. More than twenty international groups and numerous SMEs are relying on its location at the heart of Europe and have invested some 5.5 billion euro to date. InfraLeuna GmbH and its affiliated companies are owners and operators of the infrastructure facilities at the chemical site Leuna. The attractive range of services provided by InfraLeuna comprises, inter alia, power generation and supply, water supply and effluent disposal, security services, including fire brigade, analytics, logistics, and telecommunications. InfraLeuna acts as site development company and supports and assists new firms in every respect.

**Chemical site Bitterfeld-Wolfen / P-D ChemiePark Bitterfeld Wolfen GmbH**

Today, The ChemiePark’s industrial profile is mainly characterized by chlorine, phosohor, dyestuffs, pharmaceuticals, silica glass, fine and specialty chemicals as well as metallurgy. By the settlement of Q-Cells AG the region developed to one of the most efficient solar sites in Europe. The P-D ChemiePark Bitterfeld Wolfen offers ideal conditions for companies to focus on their core business while they are free to buy all services (infrastructure, media etc.) as required. 230 million euro has been invested in modernizing the whole infrastructure on site. An own wastewater treatment plant provides sewage disposal at reasonable prices. An immediate availability of commodities due to comprehensive feedstock integration, a favourable cost structure and an innovation friendly environment attract investors to come, succeed and grow.

**Dow Olefinverbund GmbH / Dow ValuePark®**

Dow ValuePark® is far more than a mere Industrial Park where different firms do business at the same site. As Dow is one of the biggest global players and one of the most modern chemical companies in Central Germany, we ensure that all partners are integrated into our extensive material flow system, the supply and production chains and, of course, our joint service and safety management system. Whether we are talking about the quality of
feedstock, reliability of delivery or availability of special services, Dow ValuePark® provides almost everything investors may need.

Our partners here are handpicked to optimize potential synergy effects and our selection criteria guarantee a well-balanced mix of manufacturers, logistics service providers and suppliers. A broad range of research and development services makes the Dow ValuePark® particularly interesting for innovative companies. www.dow.com/ValuePark

**Chemical site Schwarzheide / BASF Schwarzheide GmbH**

Lower Lusatia offers a chemical site of European standing – BASF Schwarzheide GmbH. 21 state-of-the-art plants produce polyurethane base products and systems, engineering plastics, crop-protection agents, water-based coatings and refining chemicals. There are three attracting site advantages: the proximity to Eastern Europe markets, modern infrastructure and the Verbund concept of The Chemical Company. 15 companies do already profit from the intelligent networks. They are not only using the supply chains and selected services; they are even extending the value-added chain by obtain raw materials from the Verbund or supply products for further processing. Companies in the plastics and chemical sector are offered interesting prospects at BASF site in Schwarzheide.

**Chemical and Industrial Park Zeitz**

The Chemical and Industrial Park Zeitz is an internationally attractive and economically successful site. National and international companies in the chemical industries, Life Science and renewable resources, Research and Development as well as industrial and construction services have settled at the site of 232 hectares. Apart from the traditional petrochemical industry, the Chemical and Industrial Park Zeitz is also focusing on:

- promoting the current establishing of firms by expansion, realization of optimized supply and production chains and by using the site’s synergetic effects.
- the extension of the Chemical and Industrial Park Zeitz for industrial exploitation of renewable resources.
- Developing projects for the material and energetic exploitation of native brown coal.
4 DESCRIPTION OF CHEMICAL LOGISTICS IN THE REGION / COUNTRY

4.1 INTRODUCTION

The country Saxony-Anhalt - located in the middle of Germany – owns a powerful transport infrastructure. All kinds of traffic infrastructure are represented: street traffic, railways, air freight services, fright traffic on the rivers Elbe, Saale, on different canals and in the ports and at least combined traffic.

Road transport:

Street traffic ranges over a supra-local network of 10951 km (383 km superhighways, 2700 km state highways, 4000 km country highways, 4300 km county highways).

Railway freight transport:

The railway network in Saxony-Anhalt contains 3100 km (1100 km of them are not federal owned railways).

800 km of them are reserved to freight traffic, and 226 km of them are public accessible.

Intermodal Transport:

Intermodal transport– i.e. freight transportation using at least two traffic carriers without changing the container – is using 5 ports as interface between railway, road and waterway. There exist trimodal terminals for combined traffic.

It is planned to build a new terminal for combined traffic nearby the centre of chemical industry in the south of the country.

Trimodal interfaces are located in:

- Port Aken
- City Port Haldensleben
- Port Halle-Trotha
- Port Dessau-Rosslau
- Hanse Port Magdeburg
- Value Park Schkopau

Air freight transport:

Centre of the air freight traffic in the catchment area of Saxony-Anhalt is the Air Freight Hub Leipzig/ Halle (dominated by DHL).

It is planned to rise the fright transhipment within the next 10 years up to 1 Mio tons p. a.
In 2009 the privatisation of the Airport Magdeburg/Cochstedt will be finished.

In the future this location will be developed to middle sized Air Freight Logistic Centre.

**Freight transport on rivers, channels and in the ports:**

Saxony-Anhalt owns 580 km shippable waterways and is part of the European waterway net. The backbone of the local waterways is the river Elbe which connects the hinterland to the North Sea. The waterway net is completed by the Lower Havel Waterway, Mittelland Channel and the Elbe-Havel-Channel.

Saxony-Anhalt holds 5 ports.

In 2007 the volume of transhipment in ship freight traffic assessed 7.5 Mio tons.

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**4.2 INTERMODAL TRANSPORT**

Intermodal transport mainly takes place in the 5 ports of countrywide importance. Since 1995 the country government invested in the ports to guarantee the intermodality of the ports. For example replacements and expansions of the port railways happened.
There were created powerful trimodal terminals for combined traffic. In the Value Park Schkopau was built a new combined terminal which is working since December 2005. It offers very good assumptions for bimodal fright transport, especially for the chemical industry in this area.

In order to further developments of the chemical industry location Leuna and in order to better connect the centres of the chemical industry and to keep the sustainable ability of the logistics industry it is planned to build a further new terminal for combined traffic nearby Grosskorbetha. This site is facing national and international transports.

### 4.2.1 Actual and Planned Figures

**Goods traffic according to transport modes - quantity**

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</thead>
<tbody>
<tr>
<td>Total</td>
<td>305.7</td>
<td>276.1</td>
<td>282.9</td>
<td>309.5</td>
<td>301.1</td>
<td>306.1</td>
<td>298.0</td>
<td>305.8</td>
</tr>
<tr>
<td>Road</td>
<td>268.6</td>
<td>238.5</td>
<td>240.4</td>
<td>261.3</td>
<td>251.3</td>
<td>250.4</td>
<td>245.0</td>
<td>254.2</td>
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<tr>
<td>Railway</td>
<td>30.4</td>
<td>31.6</td>
<td>36.4</td>
<td>41.7</td>
<td>42.8</td>
<td>47.8</td>
<td>45.5</td>
<td>44.0</td>
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<tr>
<td>Inland waterway</td>
<td>6.7</td>
<td>6.0</td>
<td>6.1</td>
<td>6.5</td>
<td>7.0</td>
<td>7.9</td>
<td>7.5</td>
<td>7.6</td>
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<td>Pipeline</td>
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</table>

**Goods traffic – performance in 1000 tkm (quantity * km):**

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<td>Railway</td>
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<td>Inland waterway</td>
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<td>Pipeline</td>
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**Forecasts about development of intermodal transport (quantities and terminals):**

### 4.2.2 Main Corridors and Major Infrastructure

Main corridors for road transport are the superhighways A14, leading from the agglomeration Leipzig-Halle to the north, the E-W directed A38 in the south of the country, A2 Berlin-Hannover and A9 Munich-Berlin and a number of highways cross through the country.

Logistic nodes/ terminals are located between Leipzig and Halle (Air Freight Hub Leipzig/ Halle), furthermore are to annotate the 5 ports mentioned above.

All fright ways are integrated in the tightly middle European traffic system. In the country are crossing old traffic routes from N to S and E to W.
4.2.3 GOVERNMENT PLANS AND POLITICAL PROGRAMS

Extension plans, financing - PPP, investment volume, focus on corridors, etc.

There exist plans to enforce the intermodal transport. Reason for this are the necessity for a better use of capacities, to avoid bottlenecks in road freight traffic and to increase the attractiveness of the logistic locations by a higher value added.

Due to the new built and extended 5 trimodal port locations, the new built bimodal terminal Schkopau and the local important terminals in Leuna and Bernburg was created a intermodal network.

Federal government and the government of the country do support the shift of traffic from road to railway and waterway. At least one of the intermodal inland harbours Haldensleben, Magdeburg, Aken, Dessau-Rosslau and Halle-Trotha are accessible within 90 minutes from every point in Saxony-Anhalt.

One example for meeting the requests is the setup of container trains from the harbour Halle-Trotha to the North Sea harbours Hamburg and Bremerhaven. In the beginning of this connection in 2002 just 178 containers were transported. This number was rising until 2007 up to 36000 containers.

Excellent conditions for bimodal transport exist in the terminal Value Park Schkopau, where by help of a further new terminal especially chemical products are shipped to Ludwigshafen, Duisburg or Munich.

The capacity of the first terminal in Schkopau was exhausted in 2004 (15000 containers), but by setting up the new terminal the transhipment did increase. More terminals of local relevance are located in Leuna, Bernburg and respectively in Nessa.

According to the roadmap of the federal government the country is interested in strengthen, extending and developing the locations.

Combined Traffic:

Further facilities of the combined traffic are to develop, if existing facilities are not threaten and if there are needs. Principally such development is possible in the “Chemiedreieick” (triangle of the chemical industry).
4.3 **ROAD TRANSPORT**

The following map offers an overview over the mainly road net in Saxony-Anhalt.
As already mentioned in the introduction the road traffic ranges over a supra-local network of 10951 km (383 km superhighways, 2700 km state highways, 4000 km country highways, 4300 km county highways). According to the population density the roads are concentrating in the south of the country. Road transport uses a mainly well developed network of roads of all categories from superhighways to local streets. The density of the supra-local road net is 4539 m/ 1000 inhabitants (date: 31.12.2007) and ranges matchable to other German Länder. The fraction of rebuilt, extended and renewed roads is 94 % (federal roads), 54 % (country roads). It shows that there is a higher need for rebuilding country roads.

4.3.1 ACTUAL AND PLANNED FIGURES

<table>
<thead>
<tr>
<th>Actual and planned road network in km</th>
<th>in operation</th>
<th>in progress</th>
<th>planned</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>383</td>
<td>5</td>
<td>108,1</td>
<td>496,1</td>
</tr>
<tr>
<td>State road (Bundesfernstrassen)</td>
<td>2708</td>
<td>23,5</td>
<td>312,9</td>
<td>3044,4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goods traffic in % according to traffic area - road</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td>Domestic traffic</td>
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<td>Cross-border entrance</td>
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<td>Cross-border dispatch</td>
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<td>Other transportation abroad</td>
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</table>

The further development in the traffic sector, especially the long term development in freight traffic, stays a challenge for the road infrastructure in the country. A prognosis found out, that the road freight traffic in total Germany will continue to rise in the years to come. In conclusion of this development the volume of transported freights will grow as well as the distances of transports.

Due to the extension of the EU to the East and the central location of the country we expect a growing of transit traffics. But also in smaller distances (up to 50 km) - in reaction to changing transport modes and the creation of logistic networks (like distribution traffics) - we expect a growing transport volume and performance. Regarding federal motorways the efforts are concentrating to the realisation of the traffic project “German Unity” (new building and extension) and to close the gap of the A14 between the both country capitals Magdeburg and Schwerin. Furthermore a link between A14 and A38 (A143) is planned.

Maintaining achievements will rise in a noticeable amount in the next few years. The progressing new build of B6n (up to now the half of the total length of 93 km in Saxy-Anhalt is useable) offers a capable W-E-link which is of enormous importance for the development in the Harz mountains region. For the new construction of the “North Harz Mountains Highway” EU, federal government and country government provide 600 Mio €. According to the federal traffic ways plan 2003 more city bypasses are in the planning phase.
With the “Investment Framework Plan Until 2010 For The Traffic Infrastructure of Germany (IRP)” a guideline exists. For a need oriented traffic infrastructure the condition of the bridges is of importance. Bridges at federal highways were almost completely renewed. That is why the focus of bridge-maintenance is directed to federal roads and country roads. It is to notice that the condition of bridges at country roads is worse then at federal roads.

### 4.3.2 Main Corridors and Major Infrastructure

Main corridors of road transport are the federal motorways A14, A9 (both N-S directed) and A38, A2 (both W-E directed).

Besides them an efficient network of subordinated roads exists.

<table>
<thead>
<tr>
<th>Location</th>
<th>Transport Carrier</th>
<th>Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Aken</td>
<td>Trimodal railway/road/water ways</td>
<td>Köthen-Halle/Magdeburg, B 187a, in Nähe A 9, A 14</td>
</tr>
<tr>
<td></td>
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<td>Elbe-Containerlinie (ECL 2000)</td>
</tr>
<tr>
<td>Haldensleben City Port</td>
<td>Trimodal railway/road/water ways</td>
<td>Hannover-Magdeburg-Berlin, A 2, A 14, B 71, Börde Container Feeder</td>
</tr>
<tr>
<td>Port Halle-Trotha</td>
<td>Trimodal railway/road/water ways</td>
<td>Halle-Bremerhaven/Hamburg, Halle-Leipzig-Dresden, A 9, A 14, A 143, B 6, B 100</td>
</tr>
<tr>
<td>Schkopau Value Park</td>
<td>Bimodal railway/road</td>
<td>Halle-Großkorbetha-Leipzig, A 9, A 38, A 143, B 91</td>
</tr>
</tbody>
</table>

The countries railway network is fully integrated in the European network.

### 4.3.3 Government Plans and Political Programs

The extension of the A14 is of enormous importance for the road transport in Saxony-Anhalt.

The traffic ministers of the countries Brandenburg, Mecklenburg-Vorpommern and Saxony-Anhalt and the federal minister for traffic agreed to finance the extension of this highway from Magdeburg to Schwerin.
The extension costs will amount 1.3 billions € and will be realised in tree steps. The extension will close a gap in the highway net because it will connect to the highway Berlin-Hamburg and to the “Baltic Sea Highway” A20.

Especially for the north of the country this will be a improvement in accessibility. But also the accessibility of the German Sea Ports will be improved and the role of the country as a hinterland hub will be strengthened.

The first part of the extension (between Wolmirstedt and Stendal (rd. 36 km), Osterburg and Karstädt (rd. 45 km) and Ludwigslust-Süd and the highway triangle Schwerin (rd. 16km)) will be useable until 2015.

For this first phase of realization costs of 775 Mio. € are planned (financed at up to 42 % by EU and up to 29 % by funds of the countries and up to 29 % by special financing.

This cost sharing will be continued after 2015 for the second and third phases. In phase B the parts between Stendal and Osterburg (25 km) and between Karstädt and Ludwigslust-Süd (22 km) will be realised. At least the parts between Dahlenwarsleben and Wolmirstedt (11 km) will be built. For the phases B and C costs of 425 Mio. € estimated.

The motorway B6n will connect the A14 (Bernburg) with the A395 (length 94 km).

4.4 RAILWAY TRANSPORT

Actually the railway network in Saxony-Anhalt extends to 2000 km (DB Netz AG) and 1115 km (non federal railways). Approximately 800 km of them are reserved to freight traffic (226 km of it is public accessible).

The railways density is 18.3 km/km² and ranks over the average of the “new” German countries and is a leading value worldwide at country base.

Besides the leading enterprise DB Netz AG there are several other private enterprises.

Important railway nodes are located in Magdeburg, Halle, Dessau-Rosslau, Halberstadt, Stendal, Bitterfeld and Wittenberg. Backbone of the railway freight traffic are 76 freight traffic points, the shunting station Halle (which is going to get extended), the train building facility Magdeburg-Rothensee and the freight station Grosskorbetha.

Interfaces between railway traffic, air freight traffic and inland waterway traffic are realised by 5 trimodal ports and the trimodal Airport Leipzig/Halle.
4.4.1 ACTUAL AND PLANNED FIGURES

<table>
<thead>
<tr>
<th>Actual and planned railway network in km</th>
<th>in operation</th>
<th>in progress</th>
<th>planned</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main railroads - public</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Standard gauge¹ - public</td>
<td></td>
<td></td>
<td>270²</td>
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</tr>
<tr>
<td>Narrow gauge – public</td>
<td></td>
<td></td>
<td>169</td>
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<tr>
<td>Private</td>
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<tr>
<th>Goods traffic in % according to traffic area - railway</th>
<th>2000</th>
<th>2001</th>
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Explanations:

To match the rising demands of freight traffic in the future it is necessary to push the electrification of the routes, to raise the maximum travelling speed, to extend routes with 2 tracks and to avoid the back building of railway infrastructures.

At highly frequented freight routes the electrification should be fully realised.

4.4.2 MAIN CORRIDORS AND MAJOR INFRASTRUCTURE

Main corridors of railway are the routes

- Hannover-Berlin,
- Dresden-Leipzig/Halle-Magdeburg-Stendal-Bremen/Hamburg,
- Berlin-Halle/Leipzig,
- Halle/Leipzig-Erfurt-Nuernberg,

Logistic nodes / Terminals

<table>
<thead>
<tr>
<th>Location</th>
<th>Transport Carrier</th>
<th>Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Aken</td>
<td>Trimodal railway/road/ water ways</td>
<td>Köthen-Halle/Magdeburg B 187a, in Nähe A 9, A 14 Elbe-Containerlinie (ECL 2000)</td>
</tr>
<tr>
<td>Haldensleben City Port</td>
<td>Trimodal railway/road/ water ways</td>
<td>Hannover-Magdeburg-Berlin, A 2, A 14, B 71, Börde Container Feeder</td>
</tr>
<tr>
<td>Port</td>
<td>Trimodal</td>
<td>Halle-Bremerhaven/Hamburg,</td>
</tr>
</tbody>
</table>

¹ Regelspurstrecken öffentlich
² non federal owned – nicht-bundeseigene Eisenbahnen
Because of its central location in middle Europe the railway transport network in Saxony-Anhalt is well integrated into the European Transport Corridors.

### 4.4.3 Government plans and political programs

Remarkable are ambitions of the DB AG to enforce the “Amerika-Linie” i.e. the railway Uelzen-Salzwedel-Stendal.

This route potentially can develop as a bypass of the route Hamburg – South Germany and can function as axis to Sea Port hinterland traffic.

Another project – called “EU4Sea-rail” – focuses the railway connection of four seas in Europe.

Concerning the “TEN” network we refer to the standpoint of the country.
4.5 **WATERWAY TRANSPORT**

![Map of waterway transport network](image)

**Abb. 3 Wasserstraßenverkehrsnetz**
- Oberzentrum
- Mittelzentrum mit Teilfunktion eines Oberzentrums
- Trimosaler Hafenstandort
- bedeutende Verladestelle
- 50 km-Einzugsgebiet
- Bundeswasserstraße
- Schiffbares Netz

Project Partner: GERMANY
The waterway network in Saxony-Anhalt consists of 580 km federal water ways like Elbe, Saale, Lower Havel waterway, Mittelland Channel and Elbe-Havel-Channel. It is well integrated into the European waterway network.

The river Elbe is an international waterway, but the channels mentioned above are parts of the trans-European traffic network too.

The five trimodal ports Magdeburg, Aken, Dessau-Rosslau (all at the river Elbe), Haldensleben (Mittelland-Channel) and Halle (river Saale) are of importance not only as interfaces for the trimodal freight traffic.

Inland navigation is a important and indispensable transport carrier for the country. The ship-transhipment in the ports and stevedoring points in Saxony-Anhalt was rising since 1991 (2.7 Mio t) to 7.6 Mio t in 2007. The importance of container heavy cargo and project cargo traffic is going up.

### 4.5.1 Actual and planned figures

<table>
<thead>
<tr>
<th>Goods traffic in % according to traffic area - waterway</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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Explanations:

Forecasts about development of waterway transport (quantities and terminals):

### 4.5.2 Main corridors and major infrastructure

Main corridors of waterway are the rivers Elbe and Saale, Lower Havel waterway, Mittelland Channel and Elbe-Havel-Channel.

Logistic nodes are the trimodal ports Halle, Dessau-Rosslau, Aken, Magdeburg, Haldensleben, completed by ship-transhipment points in Piesteritz, Bernburg, Calbe, Schönebeck, Vahldorf, Rogätz, Bülstrigen, Parey, Niegripp, Genthin and Arneburg.

The waterway net of the country is well integrated in the European net. The ports along the rivers are important logistic nodes.

### 4.5.3 Government plans and political programs

Actually the port Magdeburg gets a floodgate to make the port independent from level variations of the river Elbe.
4.6 Pipeline Transport

About pipeline transport in the country don’t exist many information, because the whole pipeline net is private owned. The attached map shows the location of the pipelines and the refineries in Saxony-Anhalt. Traditionally the pipeline net is existentially for the chemical cluster in Saxony-Anhalt. Crude oil is delivered from Russia to Spergau via Schwedt. Product pipelines are leading from Rostock, Hartmannsdorf and Böhlen (both located in Saxony) to Spergau.

4.6.1 Actual and Planned Figures

Pipeline transport:

<table>
<thead>
<tr>
<th>Pipeline transport in thousands of tons</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
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<th>2005</th>
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Explanations:

Forecasts about development of pipeline transport (quantities and terminals):

4.6.2 Government Plans and Political Programs

Chemical sites in Central German are pioneers in the global restructuring process in the chemical industry The Chemistry Triangle with a chemistry park surface totalling 5 500 hectares boasts comprehensive raw material and synergy potentials that are jointly used by local companies. A 430-km-long feedstock pipeline starting in the Baltic Sea port of Rostock connects the chemical sites of Dow Olefinverbund GmbH in Böhlen and Schkopau to global material and commodity flows. A specific strength of the Central German Chemistry Triangles is the feedstock integration of several sites, such as Leuna, Schkopau, Böhlen, Bitterfeld, Piesteritz and Schwarzheide (see Map).

Feedstock Integration in the Central German Chemical Triangle

The Central German Chemical Triangle has a big raw material and synergy potential that is jointly used. A complex and direct access to raw material exists with the help of the feedstock integration inside and between the chemical sites in Central Germany. Feedstock integration enhances each site in terms of attracting international investors because it offers many different ways to get integrated in the value added chain (see graph).
Explanation:

Short description of chemical logistics, Transported chemical goods share of modes road / rail / river
Relevance of the logistics sector in general for the region / country:

- number of logistics companies
- gross added value of the sector
- sectoral turnover
- number of employees
- gross investments within logistics sector

Chemical logistics:

- major logistic companies providing services for the chemical industry
- products transported
- development trend
- transportation costs and structure
- regional / national peculiarities of chemical logistics
- short description of chemical logistics in the region / country

Transported chemical goods – share of transportation modes

<table>
<thead>
<tr>
<th>Transported chemical goods – thousands of tons</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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Dow Locations and Infrastructure

Seite 21
5 **INTERNAL STRENGTHS OF CHEMICAL COMPANIES AND LOGISTIC PROVIDERS**

5.1 **STRONG INTEGRATION OF PRODUCTION PROCESSES**

The chemical industry in Central Germany has due to its strong integration and optimised structures of the production processes a good competitive position. High investments and a large-scale restructuring process in the framework of the privatisation after the reunification have created the basis for a highly modern and competitive chemical industry, which has grown above average in the past years. The establishment and the further development of clusters and networks alongside the value added chain are another location advantages for the central German chemical industry.

5.2 **CENTRALISATION OF „ON-SITE“ LOGISTICS**

Improvements of efficiency of the chemical logistics have been especially achieved by centralisation of logistics on the chemical sites. The chemical companies have developed an intensive cooperation with logistics service providers for strategic and operative logistic activities. A large part of the operative logistic services have been outsourced in the framework of new partnership concepts. Strategic steering activities have remained in the chemical companies.

5.3 **INTERNAL OPTIMISATION OF SUPPLY CHAIN COSTS**

The chemical enterprises have undertaken successful efforts in the past years to improve internal process and structures for the optimisation of logistics costs.

5.4 **CONTRACT LOGISTICS FOR STORING RAW AND PACKAGING MATERIAL**

Consignment stores for raw and packaging material increase flexibility of chemical logistics and reduce costs for the producing company. The supplier can develop a more intensive connection with the producing company. In this respect the selection of qualified and reliable enterprises (SQAS certification) is very important.

5.5 **STOCK MANAGEMENT AND CONTROL**

The chemical enterprises have developed innovative solutions for the stock management and control in order to contribute to optimisation of logistic processes. An efficient planning allows to early influence production and logistic processes.

5.6 **LOCATION DEVELOPMENT CONCEPTS**

The development of specific location concepts contributes to the improvement of location attractiveness and international competitiveness by settling enterprises alongside the value added chain. The optimisation of logistic processes has a special importance in this area.
5.7 **ON SITE TERMINALS FOR INTERMODAL TRANSPORT**

Some chemical locations have established public terminals for intermodal transport on their sites or in their proximity. These terminals are especially specialised for the handling of chemical goods and play a central role for the improvement of chemical logistics.

5.8 **PIPELINE NETWORKS**

Selected chemical location in Central Germany and larger chemical companies have developed extensive pipeline networks, in order to ensure cost effective and safe transport of raw and intermediate materials. Pipelines are also an active contribution to environmental protection and avoidance of transport on road and railway.

5.9 **RESPONSIBLE TREATMENT WITH MATERIALS AND PROCESSES IN THE PRODUCTION, LOGISTICS AND TRANSPORT - HIGH SAFETY STANDARDS**

The chemical industry in Central Germany has achieved a high safety standard in the production, logistic and transport in the past years. This ensures a responsible treatment of chemical products and processes in relation to the employees, clients and environment. Initiative such as Responsible Care and SQAS play an important role in this respect.

5.10 **PERFORMANCE IMPROVEMENTS BY JOINT EFFORTS AND COOPERATION**

In close cooperation between chemical enterprises and logistic service providers, a clear improvement of performance of the chemical logistic has been achieved by active support of the processes. There are a lot of best-practice solutions in this area. The chemical logistic is in a constant process of optimisation.
6 INTERNAL WEAKNESSES OF CHEMICAL COMPANIES AND LOGISTIC PROVIDERS

6.1 HIGH SUPPLY CHAIN COST

The logistic costs are 8 to 12% of the turnover of the chemical enterprises (or even higher). These costs are an important factor; its optimisation plays an important role for the improvement of competitiveness.

6.2 DEPENDENCE OF MARKET VOLATILITY REGARDING INTEGRATION

The specific product portfolio of the enterprises is underlying different market changes. Changes in production and exchange of products cause increasing logistic costs.

6.3 INSUFFICIENT RELIABILITY OF SELLING FORECASTS

The enterprises have problems with an insufficient reliability of selling forecasts, which are the basis for planning of the production. A high optimisation of production processes reduces in this framework the flexibility and market volatility can cause problems.

6.4 INSUFFICIENT ABILITY TO PLAN THE DEMAND OF RESOURCES

There are general problems caused by modest possibilities to plan the demand for resources.

6.5 CUSTOMER RELATIONS

The stability of customer loyalty in Central and Eastern Europe is lower than in Western Europe.

- Reliability and fulfilment of agreements
  In the business relations to Central and Eastern Europe there are partially problems with reliability and fulfilment of agreements.

- Often changing contact persons
  The often change of responsible employees and contact persons of customers in Central and Eastern Europe is a big problem

- Communication and Language Barriers
  The communication and language barriers especially for international business activities are a weakness, which has to be especially respected.
7 EXTERNAL OPPORTUNITIES AND CHANCES FOR CHEMICAL LOGISTICS IN CENTRAL AND EASTERN EUROPE

7.1 CENTRAL LOCATION IN EUROPE AT THE CROSSROADS OF TRANSPORT AXES BETWEEN WESTERN EUROPE AND ASIA

The central location of the chemical industry in central Germany at the crossroads of transport axes is a strategic advantage. The central German chemical locations can take over a turning platform function for logistics in Central Europe with special proximity to Eastern Europe.

7.2 POSITIVE ECONOMIC DEVELOPMENT AND INCREASING FREIGHT TRANSPORT

Despite the current financial and economic crisis, the expected positive long term economic development and the increasing freight transport volumes are a chance for the growth and the further development of the central German chemical enterprises. This can be an important contribution for the stabilisation of markets and the improvement of customer satisfaction.

7.3 GOOD INFRASTRUCTURE ESPECIALLY ROAD IN CENTRAL GERMANY

In the years after reunification a modern and capable infrastructure has been developed in Central Germany. Especially the connection of chemical enterprises to the Highway and road network is good.

7.4 PARTICIPATION IN SHAPING REGULATORY FRAMEWORK

In the harmonisation and standardisation process the chemical enterprises have the opportunity to actively participate in the definition of joint standards and the transfer of knowledge. In a joint dialogue process joint efforts for the coordination of transport routes can be implemented.
8 **EXTERNAL THREATS, PROBLEMS AND BARRIERS FOR CHEMICAL LOGISTICS IN CENTRAL AND EASTERN EUROPE**

8.1 **INADEQUATE ACCESS TO WATERWAYS**

The central German chemical industry has a location disadvantage due to the inadequate access to waterways and the oversee ports. Therefore the connection to the international commodity flows is more complicated and expensive. Hence, the inland transport via railway and road play a more important role.

8.2 **RAIL SYSTEMS IN WEST- AND EAST-EUROPE ARE NOT COMPATIBLE**

The incompatibility of railway networks and the different track with in Western and Eastern Europe are a special problem for chemical enterprises. An additional reloading causes higher costs, a big loss and higher safety risks.

8.3 **LACK OF PIPELINE CONNECTIONS FOR OLEFINS BETWEEN THE CHEMICAL COMPLEXES**

The inadequate pipeline network for Olefins is a big competitive disadvantage for the central German chemical industry in comparison to the Western European competitors. The enterprises are forced to transport a large share of their products on the road and the railway, which leads to higher costs and longer transport times.

8.4 **INADEQUATE RAIL- AND ROAD INFRASTRUCTURE**

The inadequate railway and road infrastructure in Central and Eastern Europe is a big barrier for chemical transport in this region. A large share of the chemical goods are transported on the roads, because the railway can only be use to a limited extend. But the capacity limits of the roads are already exceeded. A special weakness of the railway transport is the reloading at the border stations.

8.5 **LONG DURATION OF REALISATION OF PLANNED INFRASTRUCTURE**

The closing of identified railway infrastructure gaps in Central Germany is delayed due to time consuming procedures for planning and realisation. An inadequate coordination between the neighbouring states leads to further delays and discontinuity in the transport routes.

8.6 **INADEQUATE STRUCTURE OF TERMINAL STRUCTURE FOR INTER-MODAL TRANSPORT**

At the moment there is no well developed structure for intermodal terminals in Eastern Europe. This circumstance leads to loss of efficiency in chemical logistics for the combined transport of railway and road.
8.7 **Congested ports in the Baltic and the Black Sea**

Due to the congestion of ports in the Baltic and Black Sea, these ports can only be used for chemical transports in a limited way. Furthermore a capable port in the Mediterranean See is missing. Therefore chemical goods have to be transported via the cost intensive inland routes.

8.8 **Insufficient harmonization of administrative and technical standards, safety and security standards and social standards**

An insufficient harmonisation of technical and administrative standards for the transport of chemicals causes increased costs and time for the handling of cross-boarder transports. Different safety and security standards for the transport of chemical goods lead to double red tape and further delays. Different social standards distort the equal level playing fields to the disadvantage of the Central German chemical industry.

8.9 **Burocracy in customs clearance (RID SGMS)**

Complex custom clearance and partially different interpretation of regulations by the custom authorities are a handicap for cross-boarder chemical transports. Under these conditions, contract logistics is almost not possible and interferences have a negative impact on the customer satisfaction.

8.10 **Absence of emergency response and crisis mgmt systems (i.e. TUIS)**

There is no common Emergency Response and Crisis Management System in the Eastern European States outside the European Union (especially Russia and Ukraine). This is a big threat to the safety of chemical transports.

8.11 **Hard to find people with excellent logistics background**

A general problem is the availability of qualified employees for chemical logistics.

8.12 **Diesel price / toll fees**

The development of the diesel price and toll fees is an important cost factor for chemical logistics. Increasing prices cause additional cost burden. National and European regulations, which lead to higher prices and fees compared to the global market, are a specific competitive disadvantage for European chemical enterprises. The discrimination and missing equal treatment of foreigners for the collection of toll fees is a special problem in Russia.

8.13 **Behaviour of former state-owned railway companies (blocking, intransparency and freight costs) - Liberalisation**

The behaviour of former state-owned railway companies is being considered as a barrier for the chemical industry. An intransparent method of operation, an attitude of blockade and high freight charges as well as an arbitrarily price policy are among the biggest problems.
8.14 **Lack of Parity of West-East Transport**

The comparison of transport flows shows an imbalance for the East West transport. Today a large amount of chemical goods is transported from West to East.

8.15 **Lack of Awareness for Chemical Transports**

Especially in Russia there is an inadequate awareness for the specific characteristics and needs of chemical transports. There are especially deficits in the mentality and consciousness.
9 NEEDS FOR FUTURE ACTIONS AND IMPROVEMENTS - CONCLUSIONS

9.1 BETTER COORDINATION OF PAN-EUROPEAN INFRASTRUCTURE PROJECTS

A better coordination of the pan-European infrastructure plans in West-East and East-West direction is necessary to agree on common priorities for the development of transport routes and to speed up the respective extension of infrastructure. The relevant stakeholders from policy, industry and administration have to be actively integrated in this coordination process in order to ensure high chances for implementation and the focus of planning according to the expected needs. The different political levels regional, national and European have to be involved according to their specific regulatory and decision making competencies. The ChemLog project wants to deliver a special contribution for the area of chemical logistics in this respect. At the same time the project aims to develop close cooperation with similar initiatives such as the programme of the Chamber Union Elbe Oder for the development of infrastructure, ensuring mobility and access, strengthening of economic development.

9.2 MORE EFFECTIVE DISTRIBUTION OF EU FUNDS

The development of cross-boarder infrastructure projects in Central and Eastern Europe should be supported by a more efficient use of EU Structural Funds in interaction with other regional and national funding sources. This should contribute to the integration of the new Member States in the European Union and to strengthen competitiveness of the Central and Eastern European industry. The EU funding has due to its leverage effects for the mobilisation of further public and private investments a special importance. In the framework of the use of EU funds a prioritisation on especially important infrastructure projects is necessary.

9.3 DEVELOP VISION OF A PAN-EUROPEAN OLEFIN PIPELINE NETWORK

The development of a vision for a pan European Olefin pipeline network in Central and Eastern Europe is an important contribution for the strengthening of competitiveness of this region especially in comparison with the highly integrated Western European chemical locations. The pipeline network can only be implemented under consideration of the interest of private enterprises in close cooperation with the political level. The pipelines can contribute to avoidance of transport especially on the congested roads and railway, to improve safety of chemical transports and to reduce costs for chemical logistics.

9.4 INVESTMENTS IN RAIL- AND ROAD INFRASTRUCTURE IN CE & EE

Extensive investments in the railway and road infrastructure in Central and Eastern Europe are necessary for an improvement of chemical logistics. Especially the barriers at the boarder crossing and at identified bottlenecks should be overcome. Important transport corridors for the chemical industry are starting from Central Germany to the economic centres and growth markets in St. Petersburg, Moscow, Vladimir, Kiev or Odessa and furthermore to China.
9.5 Investments in Terminals for Inter-Modal Transport

Investments in Terminals for intermodal transport have a special importance for the chemical industry. The combined use of different transport modes especially railway and road are especially important for an efficient inland chemical logistics in Central and Eastern Europe. Intermodal Terminals have to be developed, extended and connected especially close to the economic centres alongside the important transport corridors.

9.6 Build Alternative Ports for Short Sea Transport

The extension of alternative ports for the short sees transport is important for the chemical industry, to improve the access to the international transport flows and to bypass congested existing ports.

9.7 Harmonization of Standards

The harmonisation of standards in the technical administrative area as well as in the safety, security and social dimension are necessary to improve efficiency of chemical logistics for cross-boarder transports, to reduce costs, to reduce delivery times, to minimise safety risks and to ensure an equal level playing field.

9.8 Implement ER and Crisis Mgmt Systems for the Chemical Industry

In the area of safety standards, best practice solutions from Western Europe can be transferred to Central and Eastern Europe.

9.9 Know-how Transfer

The know-how transfer to Central and Eastern Europe can contribute to an improvement of chemical logistics. The experiences of the constant optimisation process of logistics can be used in closed cooperation between the relevant stakeholders in mutual advantage.

9.10 Coordination and Bundling of Transport

The coordination and bundling of chemical transports from one region to a selected target destination can produce synergies and cost advantages. This approach requires a high level of cooperation between the relevant chemical enterprises and logistic providers across the boarders.

Solutions can only be developed and implemented in close cooperation between Enterprises / Logistic Providers and Politics and Administration at regional, national and European Level
10 LITERATURE

List of relevant literature, studies, surveys, policy documents
List of experts in RSM