



# DON'T GIVE UP THE SHIP(?)

- A research on the introduction of sea-river shipping in Western Europe affecting a Zeeland-based stevedore of North European sawn softwood

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- A research on the introduction of sea-river shipping in Western Europe affecting a Zeeland-based stevedore of North European sawn softwood.

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# Preface

We live in an unique epoch and have an unique position. My generation is witness of an era where new technologies develop at a breathtaking speed. Where, with the introduction of mass media, we can follow every development conscientiously. Sometimes these developments come too fast. It takes a lot to foresee the newest hypes and trends that form the world of tomorrow. Decisions are made more quickly and have more impact. During this 4.5 month period in which I was tasked with writing my final thesis, I met many new, inspiring people who were very dedicated in doing their job.

Stevedores like Verbrugge Terminals see that the market is changing. As a bulk terminal, it faces harsh competition with its everlasting rival: the container. “Once containerized, forever containerized” as the golden rule is. 60-70% Of the Dutch sawn-softwood market is already containerized. Leaving 30-35 % over to be divided by the bulk terminals active in the Netherlands. With sea-river shipping as a possible new development on the run, it might be just a matter of time until this market is lost(?)

Although sea-river shipping is a relatively old form of shipping, it was for centuries not in anyone’s interest. But as the world changes, the market changes, desiring immediate solutions for tomorrow’s problems. During this research I tried to find out whether there is a chance that this new variant of integrated sea-river shipping will claim the left-over space, thus making business for bigger stevedores (such as Verbrugge Terminals) impossible.

In my strive to bring this project to a success, my special thanks goes to Verbrugge Terminals Vlissingen, in person of Mrs. Maria Bahia, for acquainting me in this difficult but also very interesting subject. Furthermore I would like to thank Mr. Bert Noordstar for his much-needed assistance. In addition I would like to thank Mr. Dick Engelhardt, whom helped me in contacting the company of Verbrugge Terminals.

Last but not least I would like to sincerely thank my parents, Tjeerd and Saskia for their unconditional support and backup during all the years of my studies.

Leander Zaaijer

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# Terminology

Berthing	To come to a dock.
Bulk (cargo)	Commodity cargo that is transported unpackaged in large quantities.
Coaster	A Coaster is a shallow-hulled ship used for trade between locations on the same island or continent. Their shallow hulls mean that they can get through reefs where deeper-hulled sea-going ships usually cannot.
Draft	The draft (or draught) of a ship's hull is the vertical distance between the waterline and the bottom of the hull (keel), with the thickness of the hull included.
Handymax generation	Handymax and Supramax are naval architecture terms for a bulk carrier, in a series that is called Handy size class. Handy size class consists of Supramax (50,000 to 60,000 DWT), Handymax (40,000 to 50,000 DWT), and Handy (<40,000 DWT). The ships are used for less voluminous cargos, even allowing for combining different cargos in different holds.
Stevedoring	Term which refers to the loading and unloading of ships, which requires knowledge of the operation of loading equipment, the proper techniques for lifting and stowing cargo, and correct handling of hazardous materials.
CIS	The Commonwealth of Independent States is a regional organization whose participating countries are former Soviet Republics, formed during the breakup of the Soviet Union, which consists out of the countries: Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Turkmenistan, Tajikistan, and Uzbekistan

# Summary

Constant innovation and an increase in competition with other logistic services providers have their influence on the different modes of transport. External influences, such as an increase of strict regulations implemented by governments and the current rise of fuel prices make customers very careful in choosing for a certain mode of transport. These choices are often cost price-based. Stevedores of sawn softwood around Europe are experiencing fierce competition from each other and from other modalities of transport, in particular transport by truck.

Verbrugge Terminals is a stevedore of –among other commodities- sawn softwood from Scandinavia, the Baltic states and Russia. Based in Flushing and Terneuzen it has the advantage of being close connected to sea. Currently it is competitive within a radius of 500 kilometre, servicing mainly the west European hinterland. So far it has not experienced any serious competition from new modalities, but it remains watchful.

As the market triggers innovation, new and old alternatives are getting attention. The most serious tread to the conventional stevedores is posed by the reintroduction of an old form of shipping: sea-river shipping. Its concept is simple, but for many years it was unable to compete with the more established forms of transport (road, rail and short sea shipping). Today low transloading costs, oversupply of river barges, and a lack of good “wet” infrastructure (e.g. Regional Transshipment Centres) delay the reintroduction of these sea-river ships.

It is difficult to predict when sea-river shipping will experience its (re)introduction. As it has a few important advantages, namely its flexibility, speed and its capability to deliver (nearly) door-to-door service, which is unusual within the shipping sector. At this moment there are roughly 400 sea-river ships active on the European market, 80 of them being deployed by Dutch companies. As sea-river shipping gains market share, the radius in which the bigger stevedores can be competitive will be getting smaller.

Fortunately the sawn softwood market is growing. Consumption is growing with at least 0.8% per year (equivalent of 300,000 m<sup>3</sup>/year) and the stricter rules (FLEGT –agreement) imposed to ban illegal tropical hardwood from Europe will certainly give an extra impulse to the alternatives of durable hardwoods, such as modified or engineered softwood.

Although Europe is upgrading its waterways (investing in “wet infrastructure”, bypasses and Regional Transshipment facilities) and to meet future requirements, sea-river shipping experiences difficulties in penetrating the market. It is expected that in the coming 10-15 years at least 15-18 stevedores of sawn softwood in Western Europe can claim/rely on a volume of around 121, 500 m<sup>3</sup> a year, generally enough to keep a stevedore with the size of Verbrugge Terminals in business.

Although this transition phase which will eventually take place is still fairly far away, it might be necessary to find alternatives within the same branch. Verbrugge Terminals enjoys the benefits that come with its experience and its unique location.

# 1. Introduction

‘As the USS Chesapeake left port on 1 June 1813 and immediately engaged the blockading Royal Navy frigate HMS Shannon in a fierce battle, it was disabled with gunfire within the first few minutes. Captain Lawrence, mortally wounded by small arms fire, ordered his officers, "Don't give up the ship. Fight her till she sinks."<sup>2</sup>

Cornered and confronted by the latest developments in the sea shipping sector, should a Dutch-based stevedore Give up the Ship?

Constant innovation and an increase in competition with other logistic services providers have their influence on the different modes of transport. External influences, such as an increase of strict regulations implemented by governments and the current rise of fuel prices make customers very careful in choosing for a certain mode of transport. These choices are often cost price-based. Verbrugge Terminals, a stevedore located in Flushing and Terneuzen positioned itself as a stevedore servicing the European hinterland. Competing with the well-established ports of Rotterdam and Antwerp, it focuses on a customer friendly and high-service based customer-approach.

Different factors influence the European softwood market. Today it is a combination of price, distance, and developments in other sectors (such as the tropical hardwoods sector), tomorrow it could be new and stricter regulations in regard to air pollution caused by ships. Although it is difficult to give a clear prediction about what the future will bring, it is possible to describe the future perspective regarding the trade of softwood within West-Europe transported by a new vessel type within the short sea shipping line, able to transport goods, often bulk materials, via seaways and inland navigation, which is called sea-river shipping.

## Problem definition

At this moment the sea-river fleet is growing steadily. Rough estimates tell that there are at least 400 sea-river ships active on the European waterways, with over 80 vessel owned by Dutch private individuals and companies. With at least 6,900 ships active on the market, the Dutch inland shipping fleet is considered to be the biggest in Europe.

As the wet infrastructure throughout Europe is being upgraded, the competitive strength of sea-river ships is growing. However, competing with other well-established modalities of transport (e.g. truck, ship and train), it has still a long way to go.

The traditional transport per ship today is facing harsh competition from transport by truck.

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<sup>2</sup> <http://www.navalhistory.org/2010/06/01/dont-give-up-the-ship/>

An important trend which made transport by truck or train favourable over transport by ships was the decline of the transported volume.

Currently many importers of softwood prefer keeping inventory at the sawmill abroad, rather than keep it closer to the store, and thus paying for it. Since it is in theory possible to order a lorry two days in advance and have it two days later available for sale. The disadvantage of ordering months ahead, paying directly (which demands a good cash flow) and keeping a huge inventory are past. Stevedoring companies like Verbrugge Terminals are experiencing severe competition with other modes of transport -especially lorry, but also in lesser extend train- and encounter an increase in competition with stevedores in other ports.

Sea-river shipping is a relatively old form of short sea shipping which might be future's key drivers in the transport of softwood in and around Europe, especially from the Scandinavian countries and the Baltic states into West-Europe. Capable of loading around 3,000 – 6,000 cubic meters, these vessels will start their journey in every possible (inland)port and are capable of unloading their goods deep in the European hinterland. This speciality will enable them to compete with the bigger seaworthy ships -which can only load and unload at seaports, and with trucks, which are limited in the volume they can transport.

As the “wet infrastructure” is upgraded, it is expected that smaller ports throughout Europe will start competing with bigger seaports and terminals. Instead of being dependent on bigger, busy seaports, sea-river vessels can visit almost any port in Europe, as long it is connected to a navigable waterway with a certain dept. The competitive strength of the terminals in smaller ports (in regard to the handling of smaller (sea-river) ships is believed to be much bigger than that of the bigger well-established terminals in seaports.

## 2. Scope of research

This chapter will give a general outline of what this research will cover.

### 2.1 Objectives

This research will be carried out the describe the developments that take place within the sea-river shipping business and what influence they could have on Verbrugge Terminals business regarding North and East European softwood transported into West Europe. By determining a radius in which Verbrugge Terminals might be competitive if this new developments go ahead, Verbrugge Terminals might decide on a business plan to attract available volumes to their terminal or to stop investing in this particular area.

The summarize the objectives that will be discussed in this report:

#### **Main-question**

Is there a market for Verbrugge terminals in the coming 10 – 15 years regarding the stevedoring of enough tons/m<sup>3</sup> softwood half-fabricates from Scandinavia, the Baltic States and northwest Russia regarding the further transportation by road to end-consumers in Western Europe (Benelux, Northern France, and the west of Germany)?

## Sub-questions

1. What are the key driving factors that influence the European softwood market?
2. What are the trends in consumption and import of sawn softwood, and what will be responsible for this increase/decrease in the near future?
3. What development(s) is/ are taking place that affect the transport of bulk sawn softwood from Scandinavia, the Baltic states and Russia to Western Europe (within 500 –km. radius)?
4. What triggers the further introduction of sea-river shipping in regard to the transport of sawn softwood from Scandinavia, the Baltic states and Russia to Western Europe?
5. What are the differences between sea-river shipping and other modes of transportation in terms of efficiency, reliability, costs and flexibility?

## Main objective:

Presenting an indication in what way the market will develop in the coming 10 to 15 year regarding the stevedoring of softwood in West Europe, influenced by the introduction of sea-river shipping.

## 2.2 Methodology

### Literature research

Reading various relevant articles, reports and books.

The information regarding sea-river shipment is limited to a few reports describing the use in the United States and France (access of the Rhone via the Mediterranean sea). European reports, reflecting on the development of short sea shipping, show that this form of short sea shipping is developing rapidly.

During this research it was possible to use two main sources.

- EUROSTAT -Luxembourg, the statistics department of the European Union, publishing reports on modal split, production, import and export of forest products
- United Nations Economics Commission for Europe (UNECE) –Geneva, Switzerland, giving prognoses in regard to the future development of the European forest sector.

### Field research

- Food and Agriculture Organization of the United Nations (FAO), used for statistics on import and export of sawn softwood.

Facts, numbers, and overall statistics (2009) regarding the trade of sawn softwood within Europe and the rest of the world.

## External consultation

Short consultation leading to extra and specific information regarding special fields, ports or businesses.  
Sources used in this research:

- Port Authority of Zeeland Seaports, Flushing/Vlissingen
- Port Authority of the Port of Rotterdam, Rotterdam
- Centrum Hout, Almere (the Netherlands)
- UNECE, Geneva (Switzerland)

## 2.3 Range

As a stevedoring company Verbrugge Terminals has a certain radius in which it operates and in which it finds its customers and competitors. This range or radius is assumed to be 500 kilometres, as shown in figure 1. The radius will determine Verbrugge Terminals maximum potential, derived from the number of end-consumers inhabiting the countries, or regions within this radius, and the number of inland harbours/ports, thus competitors (in form of other stevedoring companies) which are able to compete with Verbrugge Terminals.

As a hypothesis could be that this radius will eventually only get smaller since competitors will take over market share as several of the latest development influence the market.

This research will mainly focus on the size of the radius in which Verbrugge Terminals will be competitive when the developments in sea-river shipping continue.



Figure 1: Range of 500 kilometer in which Verbrugge Terminals is operative

## 3. European softwood market

This chapter will give a general overview regarding the European softwood market, in particular the production, trade and consumption of coniferous sawnwood. In order to have a clear view on what is produced, consumed and traded paragraphs 1 and 2 will give a short introduction regarding the material and trends in production and consumption.

### 3.1 Softwood

The term softwood is used as a collective term for wood from trees that are known as gymnosperms. Conifers are a good example, but the term is also used to describe trees that tend to be evergreen, such as bald cypress, and larches. Softwood counts for about 80% of the world’s production of timber, with the traditional centres of production being the Baltic region (including Scandinavia and Russia) and North America.<sup>3</sup> The term softwood is opposed to hardwood, which refers to wood from angiosperm trees.<sup>4</sup>

It is a misunderstanding that softwoods are necessarily softer than hardwoods. In both groups, hardwoods as well softwoods, is a great variation in actual wood hardness; some hardwoods (for example Balsa) are much softer than many softwoods. The woods of Longleaf pine, Douglas fir and *Taxus baccata* (*or European yew*), are much harder –in the mechanical sense- than several hardwoods.<sup>5</sup> For the density of the selected softwood species, common in trade, see table 1 below.

Softwood <sup>6</sup>		Density <sup>12%MC</sup> (Kg/m <sup>3</sup> )	Density <sup>Fresh</sup> (Kg/m <sup>3</sup> )
Spruce		300- <b>460</b> -620	520 – 1100
Pine		350- <b>520</b> -800	450 – 1000
Larch		450- <b>600</b> -850	800 – 900

Table 1: Density; weight per cubic metre softwood

Of the world’s total trade in sawn softwood in 1997 of 99 million m<sup>3</sup>, two-fifths took place within North America, mainly from Canada to the United States, and one quarter within Europe.<sup>7</sup> The rest of the world accounted for only one-third of this total. Of other regions, the former USSR was by far the most important exporter, with at least 69% of its softwood exports going to Europe.<sup>8</sup> The Russian Federation is the largest exporter among the countries of the former USSR, while the Baltic states have seen their export increase considerably in the 1990’s.

Canada was in 1997 the largest exporter of sawn softwood with a volume of 48 million m<sup>3</sup>, of which some 85% went across the border to the United States. The United States is the largest supplier to East Asia after Canada.<sup>9</sup>

Exports from Sweden, Finland and Austria accounted to nearly three-quarters of total European exports, other noteworthy exporters include Germany, the Czech Republic, Portugal and Poland (the three Baltic states are by then still counted as part of the former USSR). Imports, however, are more evenly spread among countries, with the United Kingdom, Germany, Italy, the Netherlands, Denmark and France accounting for three-quarters of the total European imports.

<sup>3</sup> en.wikipedia.org/wiki/Softwood, (2012).

<sup>4</sup> Ibid.

<sup>5</sup> en.wikipedia.org/wiki/Softwood, (2012).

<sup>6</sup> Wiselius, S.I. Houtvademecum (2010)

<sup>7</sup> Peck, *The International Timber Trade*, (2001).

<sup>8</sup> Ibid.

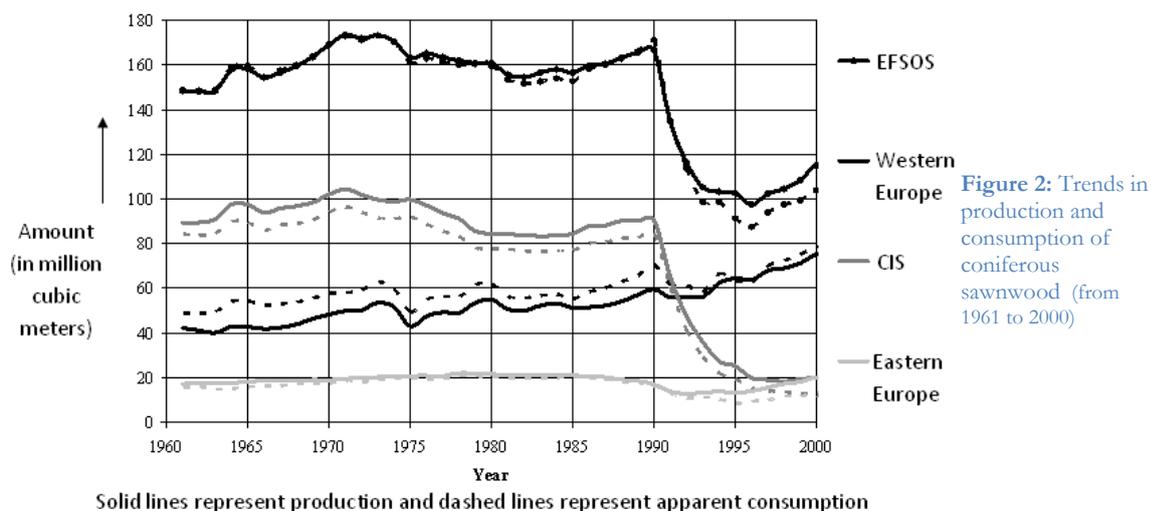
<sup>9</sup> Ibid.

East Asia is the most important importing region of sawn softwood after North America and Europe, and the largest importer from other regions. The largest volume of sawn softwood exported from Europe goes mainly to Africa, especially the North African countries bordering the Mediterranean; Egypt, Libya, Tunisia, Algeria and Morocco.<sup>10</sup>

Up to recently the countries of Indian subcontinent (e.g. India, Pakistan), despite their large populations, housing needs and scarce forest resources, have not been significant importers of softwood. There are signs that this is changing, in India at least.

### 3.2 Trends in production and consumption of coniferous sawnwood

A number of serious and interesting changes have taken place in the markets for coniferous sawnwood in Europe over the last 40 years. The first and probably most remarkable feature of these trends and changes is that Europe has changed from a situation of balance in production and consumption over the period 1960 to 1990 to a situation of net exports from the region to the rest of the world in the last 10 years (figure 2<sup>11</sup>). In 1990 consumption exceeded production slightly (figure 2<sup>12</sup>) and Europe was an importing region. By the year 2000 the situation changed and European production exceeded internal consumption, by just over 10 million cubic meters.<sup>13</sup>



Countries that have contributed to this significant increase in production are the traditionally important producers in Western Europe, such as Austria, Germany, Finland and Sweden. Other notable developments have been the increase in production in some countries (e.g. United Kingdom, Ireland<sup>14</sup>) and the increase of production that exceeds domestic consumption in Eastern Europe (by around 7 million m<sup>3</sup>), where the three Baltic States (Estonia, Latvia, Lithuania) account for much of the growth in this sub-region.<sup>15</sup>

<sup>10</sup> UNECE, *European Forest Sector Outlook Study, 1960-2000-2020*, (2005)

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

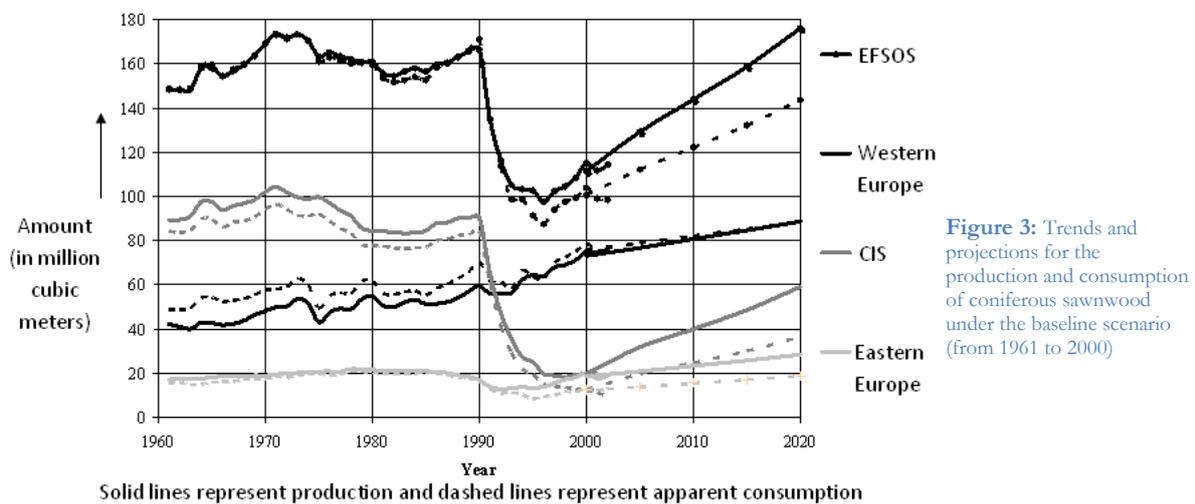
<sup>14</sup> Wood mainly from plantations

<sup>15</sup> UNECE, *European Forest Sector Outlook Study, 1960-2000-2020*, (2005)

The CIS sub-region has always been a net exporter of coniferous sawnwood (at a level just under 10 million m<sup>3</sup>).

In Western Europe, production of coniferous sawnwood has grown quite consistently over the last 40 years at a rate of around 1.3 percent per year (equivalent to around 800,000 m<sup>3</sup> a year), see figure 3, below. The average growth in consumption has been about 0.9 percent per year, which is the equivalent of roughly 700,000 m<sup>3</sup>.<sup>16</sup> Other than a few, rather short-term fluctuations the trend in production and consumption in Europe seems to be relatively stable.

In Eastern Europe, growth in production and consumption was close to negligible until 1990. Since 1995 production has grown by at least 5.3 percent per year ( $\approx$ 600,000 m<sup>3</sup>/year) while consumption has grown by 6.4 percent per year ( $\approx$ 300,000 m<sup>3</sup>/year).<sup>17</sup> It is estimated that these positive trends will continue in this sub-region. In the CIS countries, there was neither a positive or negative trend in production as well consumption before 1990. However, these trends appear to be changing and it looks like that an earlier decline is starting to reverse as well as the trend in consumption.<sup>18</sup>



Source: FAOSTAT –production and trade statistics (<http://faostat.external.fao.org>).

Production and consumption of coniferous sawnwood are expected to grow at an average annual rate of 1.0 percent (production) and 0.8 percent (consumption) respectively. By 2020 it is expected that the produced and consumed volume will reach 89 million m<sup>3</sup> in Western Europe.<sup>19</sup> By that time it is expected that Europe will be self-sustaining regarding the production of softwood, and it will no longer be a net importer of coniferous sawnwood.

The fastest expansion of coniferous sawnwood production and consumption is expected in the CIS –sub-region, where an average annual growth of 5.6<sup>20</sup> percent is expected for both production and consumption.

<sup>16</sup> UNECE, *European Forest Sector Outlook Study, 1960-2000-2020*, (2005).

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

<sup>20</sup> Ibid.

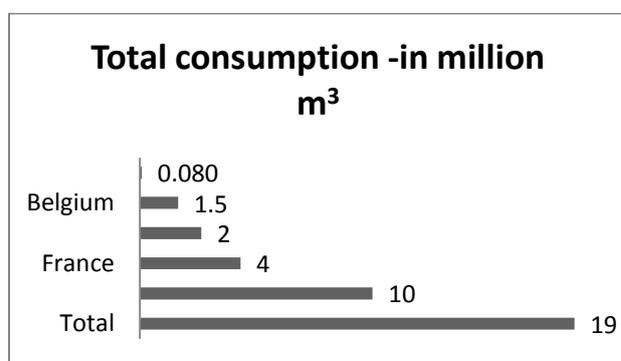
### 3.3 Consumption per capita

To have notion of the consumption capacity per country within in the 500 -kilometre range it was necessary to have information about the consumption of softwood per capita per country.<sup>22</sup> Figure 4, below gives an estimation of the consumed volume in cubic meters per capita (table 2, on the right) of the countries or regions within the radius of 500 kilometre. This gives a total potential demand of around **18,968,922 m<sup>3</sup>**.<sup>23</sup>

This is derived from the wood consumption of softwood per capita times the number of inhabitants. In Germany and France it is respectively the sum of the States (Bundesland) and departments that are laying within the 500-km. radius.

Consumption softwood per Capita <sup>21</sup>	(m <sup>3</sup> /year)
Germany	0.22
France	0.16
The Netherlands	0,16
Belgium	0.16
Luxembourg	0.16
<b>Average</b>	<b>0.17</b>

**Table 2 :** Trends and projections for the production and consumption of coniferous sawnwood under the baseline scenario (from 1961 to 2000)



**Figure 4 :** Total consumption of softwood per country, Western Europe<sup>1</sup>

### 3.4 Import of coniferous sawnwood in Western Europe in 2009

**Table 3 :** Total import of sawn softwood<sup>2</sup>

Nr.	Country	Quantity (m <sup>3</sup> )
1	Germany	5,208,548
2	France	2,959,332
3	Netherlands	2,176,000
4	Belgium	1,688,330
5	Luxembourg	95,747
-	<b>Total</b>	<b>12,127,958</b>

The Food and Agriculture Organization of the United Nations (FAO) provides data relating to food and agriculture for some 200 countries. This paragraph gives an overview of the volume of sawn softwood which was traded between Western Europe<sup>24</sup> and Scandinavia (except Denmark) the Baltic states and Russia.

As for 2009 a total of 12,127,958 m<sup>3</sup> (table 3) sawn softwood reached Western Europe.<sup>25</sup>

<sup>21</sup> Swedish Forest Industries Federation, *Facts and figures 2009, (2010)* / CIA World Factbook

<sup>22</sup> Within radius (except the United Kingdom), as determined on page 9

<sup>23</sup> Swedish Forest Industries Federation, *Facts and figures 2009, (2010)* / CIA World Factbook

<sup>24</sup> Within radius (except the United Kingdom), as determined on page 9

<sup>25</sup> Ibid.

Country	(m <sup>3</sup> ) <sup>27</sup>
Estonia	75,288
Latvia	416,000
Lithuania	60,859
Russia	1,720,000
Finland	1,333,000
Norway	314,772
Sweden	2,491,038
<b>Total</b>	<b>6,410,957</b>

6,410,957 m<sup>3</sup>. As shown in table 4, left, of this volume was originating from Scandinavia, the Baltic states and Russia, which means that at least 53% of what is imported by Western European countries<sup>26</sup>, is originating from Scandinavia, the Baltic states or Russia.

**Table 4 :** Total import of sawn softwood per country, Western Europe<sup>1</sup>

## 4. Modes of transport involved

This chapter will discuss the different modes of transport involved with the transport of sawn softwood; transport by truck, train and ship.

	Rail	Road	Sea
<b>Estonia</b> <sup>28</sup>	47%	37%	16%
<b>Finland</b> <sup>29</sup>	0%	1%	99%
<b>Latvia</b> <sup>30</sup>	0%	6%	94%
<b>Lithuania</b> <sup>31</sup>	0%	40%	60%
<b>Norway</b> <sup>32</sup>	5%	22%	73%
<b>Russia</b> <sup>33</sup>	0%	0%	100%
<b>Sweden</b> <sup>34</sup>	0%	36%	64%

**Table 5 :** Modal split exporting countries<sup>2</sup>

The modes of transport as shown in table 5 (above) are accountable for a certain percentage of transport to Western Europe.<sup>35</sup> The longer the distance, the more freight is transported by ship.

Today it is not only about the direct costs and benefits; efficiency, continuity and reliability are at least even important. Together with the Schengen agreement, which allows the (to a certain degree) unrestricted, unlimited transport of goods and persons, transport by truck is favoured above other forms of transport.

<sup>26</sup> Within radius (except the United Kingdom), as determined on page 9

<sup>27</sup> Food and Agriculture organization of the United Nations (2009)

<sup>28</sup> <http://www.stat.ee/34666> (2011)

<sup>29</sup> AECOM Limited, Rail Baltica *Interim Report: Volume I* (2010)

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Hovi, I. B. and Gronland, S.E., *Intermodal competition in Norwegian freight* (2011)

<sup>33</sup> AECOM Limited, Rail Baltica *Interim Report: Volume I* (2010)

<sup>34</sup> Swedish Forest Industries Federation, Facts and Figures 2010 (2010)

<sup>35</sup> Within radius (except the United Kingdom), as determined on page 9

## 4.1 Road transport

The density of the European motorway network is closely correlated with population density and, thus, with the degree of urbanisation.<sup>36</sup> The densest motorway networks can be found in the Netherlands, Belgium, the western regions of Germany and the United Kingdom. At a country level, it is the Netherlands that has the highest motorway infrastructure density with 77 km/1 000 km<sup>2</sup> and is followed by Belgium (58 km/1 000 km<sup>2</sup>) and Luxembourg (57 km/1 000 km<sup>2</sup>).<sup>37</sup> The total length of the European motorway network is estimated at 4,800,000 kilometre.<sup>38</sup>

### Position in regard to the transport of timber

A growing number of timber trade -related companies based in the Netherlands tend to prefer smaller quantities of softwood delivered by lorry in favour of larger volumes delivered by ship.

The Schengen Agreement (figure 5, left) signed in 1985 foresees in less barriers when travelling through Europe and has a positive effect on the transport by truck.

#### This has a few important advantages:

- Less stock keeping (costs) for the buyer
- Less financial risk; (which is better for the cash flow (no large transactions, goods arrive immediately and can be (in potential) sold directly to the end-consumer, which generates refund for the investments made.
- Quick delivery (in two to three days)
- Delivery up to doorstep without delay due to unloading and transferring and to order in smaller batches



Figure 5 : Schengen members;  
Blue: Schengen area  
Green: Future members

<sup>36</sup> Eurostat, *Transport infrastructure at regional level*. (2010)

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

**Possible disadvantages:**

- Limitations regarding volume
- Limitations regarding size of goods transported

Figure 6 below shows the different types and sizes of lorry, which are permitted on the European roads. The average volume a truck can carry is around **100.84 m<sup>3</sup>**.

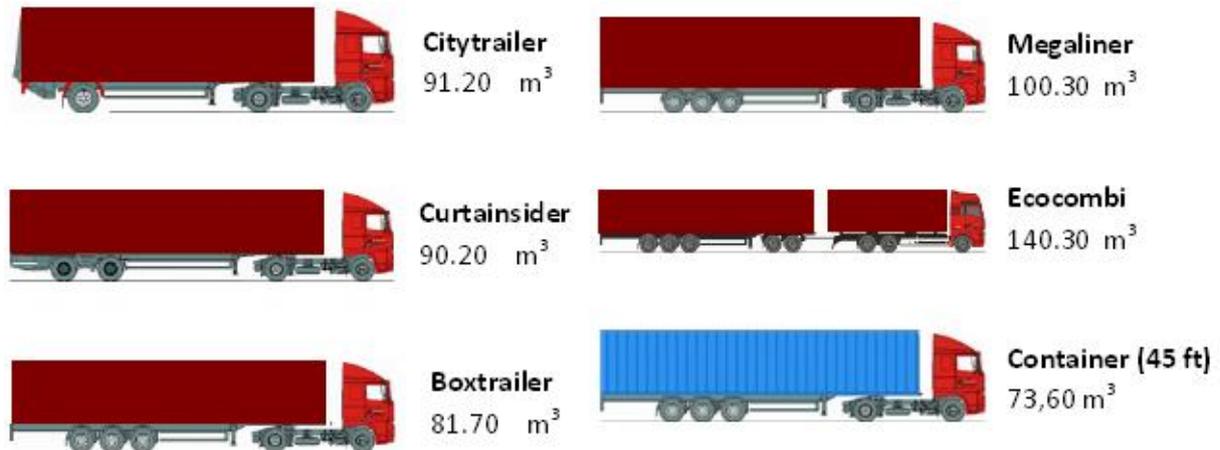


Figure 6 : Types of trucks and sizes

Table 6, below, shows the volume of sawn softwood transported to Western Europe<sup>39</sup> by truck. On the whole, an average of 20%, equivalent to around 1,263,514 cubic metres of the volume softwood transported to Western Europe is done by truck. Sweden and Norway are the only countries that rely for respectively 36% and 22% on road transport when transporting to Western Europe.

**Example:**

If road transport was accountable for 100% of the transport of sawn softwood into Western Europe<sup>3</sup>, this would result in:

$$6,410,957 \text{ m}^3 / 100.84 \text{ m}^3 = 63,576 \text{ truckloads.}$$

	<b>Road transport<sup>40</sup></b>
<b>Netherlands</b>	481,960
<b>Belgium</b>	115,586
<b>Luxembourg</b>	20
<b>Germany</b>	414,170
<b>France</b>	251,777
<b>Total (m<sup>3</sup>)</b>	<b>1,263,514</b>

Table 6 : Volume of sawn softwood transported by truck

<sup>39</sup> Within radius (except the United Kingdom), as determined on page 9

<sup>40</sup> Food and Agriculture organization of the United Nations (2009)

## 4.2 Rail transport

A vast national and international railway network gives a reliable relatively constant source of transport. The regional distribution of railway infrastructure is mainly shaped by economic development and the geographical characteristics of particular region.<sup>41</sup>

The highest network density in the European Union can be found in the Czech Republic, Belgium, Luxembourg and Germany, which is generally above 100 km/1 000 km<sup>2</sup>), followed by the Netherlands, Hungary, Austria, Slovakia, the United Kingdom and Poland generally between 65 to 86 km/1 000 km<sup>2</sup>.<sup>42</sup>

The total length of the European railway network is estimated at a length of 200,000 kilometre.<sup>43</sup>

### Position in regard to the transport of timber

Freight lines play mainly a leading role in regions with traditional coal and steel industries (e.g. Saarland in western Germany). It is difficult to say to what extent the railways play a role in the transport of softwood, but it is assumed to be fairly little in comparison with the other two modes of transport; lorry and ship. Where the railways form a certain middle way solution in freight carrying capacity, it disadvantage remains to the extent that it is an inflexible form of transport; it cannot be diverted from its main track.

However, the advantages of transport by rail are:

- It facilitates long distance travel and the transport of bulk goods, which are often not easily transported through motor vehicles.
- It is a quick and more regular form of transport; helps in the transportation of goods with speed and certainty
- The carrying capacity of the railways is very large.
- The carrying capacity of the railways is elastic

### Disadvantages

- Railway transport is a relatively inflexible form of transport; its routes and timings cannot be adjusted to individual requirements.
- Railway transport cannot provide door to door service
- Time cost of terminal operations
- Railway transport is unsuitable and uneconomical for short distances and small traffic of goods
- Railway transport involves much time and labour in booking and taking delivery of goods

Table 7 on the right shows the volume of sawn softwood transported to Western Europe using the railway network. On average, it does not count for more than 7% of the total volume sawn softwood transported to Western Europe.

	<b>Rail<sup>44</sup></b>
<b>Netherlands</b>	13,941
<b>Belgium</b>	13,374
<b>Luxembourg</b>	0
<b>Germany</b>	15,098
<b>France</b>	8,711
<b>M<sup>3</sup></b>	<b>51,124</b>

**Table 7 :**  
Volume of sawn softwood transported by train

<sup>41</sup> Eurostat, *Transport infrastructure at regional level*. (2010)

<sup>42</sup> Eurostat, *Transport infrastructure at regional level*. (2010)

<sup>43</sup> Ibid.

<sup>44</sup> Food and Agriculture organization of the United Nations (2009)

### 4.3 Ship transport

Latest generation sea-river ships have a maximum capacity of 3,000 DWT, a draught of 5 metres and a height up to 9 metres.<sup>45</sup> Today only a few rivers are deep and wide enough to guarantee a safe passage, please see chapter 6: Navigable Rivers. A few advantages over other forms of transport make it worthwhile choosing for transport by ship rather than relying on other modes of transport. In the enumeration below some of these important advantages and disadvantages

#### Advantages

- Depending on the origin and destination of the cargo, shipping by boat can be much more economically practical than transport by air or ground
- The overhead of operating and maintaining a maritime cargo vessel boasts a more efficient cost to cargo ratio
- Shipping by boat can be far less damaging to the environment than other forms of transport
- Sea faring cargo vessels are incredibly accommodating when it comes to size and nature of freight
- Suitable for products with long lead times

#### Disadvantages

- Longer lead and delivery times
- Bad weather can do considerable damage to goods
- Difficult to monitor exact location of goods in transit
- Traditional sea transport cannot provide door to door service, however the latest development within sea-river shipping makes it possible to deliver the goods closer to the end-consumer
- Goods have to be transferred into trucks in order to reach their final destination

The calculation below is based on an imaginary percentage of 100% market domination by short sea shipping. In theory ships should be capable of transporting 5,400 m<sup>3</sup> softwood, which is the equivalent of roughly 1,190 ships that would be needed to transport the sawn softwood from the Baltic States, Russia and Scandinavia into Western Europe.

Country	M <sup>3</sup> of which is transported over sea <sup>46</sup>
Netherlands	948,134
Belgium	575,364
Luxembourg	35
Germany	2,520,121
France	1.259.666
<b>Total (m<sup>3</sup>)</b>	<b>5,303,319</b>

Table 8 :  
Volume of  
sawn  
softwood  
transported  
by ship

#### Example

5,386 m<sup>3</sup> per ship

100% per ship = 6.410.957 m<sup>3</sup> / 5,386 m<sup>3</sup>  
≈ 1,190 ships

<sup>45</sup> www.shortsea.nl

<sup>46</sup> Food and Agriculture organization of the United Nations, *Statistics*, (2009)

Table 8, on page 18, gives the volume of softwood which is transported by ship into Western Europe from Scandinavia, the Baltic states and Russia.

Verbrugge Terminals assumes that at least 60-70 % is containerized and this percentage will most likely only increase. Once a commodity is containerized, it will be forever containerized.

### Cubic meters

5,303,319 m<sup>3</sup> transported to Western Europe via short sea shipping \* 0.65% = 3,447,157 m<sup>3</sup> is considered to be containerized

5,303,319 m<sup>3</sup> - 3,447,157 m<sup>3</sup>

= **1,856,162 m<sup>3</sup>** available as bulk, which is delivered through (sea)ports in western Europe (Germany, France, The Netherlands, Belgium and Luxembourg)

Table 9 :  
Required  
volume to set  
up a good  
business

Unit	Tonnage	M <sup>3</sup>
<b>7601</b>	17,497.02	27,021.44
	69,988.08	108,085.76 (*4)
	87,485.10	135,107.20 (*5)
<b>*Needed (ideal)</b>	<b>≈ 78,736</b>	<b>≈ 121,597<sup>47</sup></b>

### Availability on the market

As table 9 above suggests, Verbrugge Terminals needs to attract a volume of at least 121,600 m<sup>3</sup> in order to stay profitable in this market. In order to have an idea how much room there is available on the market the following calculation can be made:

1,856,162 m<sup>3</sup> / 121,597 (ideal volume) = **15**

If Verbrugge Terminals can keep up with the bigger terminals capable of stevedoring sawn softwood, 15 stevedores, similar in size, can be operative in this market.

<sup>47</sup> Verbrugge Terminals, *Required volume*, (2011)

## 5. Traditional sea + river versus Sea-river

In Europe, short sea shipping is considered to be the ‘forefront’ of the European Union’s transport policy. At this moment it accounts for roughly 40% of all freight moved in Europe. In the United States of America short sea shipping has yet to be utilized to the extent it is in Europe, but there is an increase in interest towards further development in this area.<sup>48</sup>

Some of the short sea vessels are small enough to travel inland waterways. The typical ship sizes vary between 1,000<sup>dwt</sup> (tonnes deadweight) and 15,000<sup>dwt</sup> with drafts ranging from 3 – 6 metres.<sup>49</sup> Short sea shipping should not be mistaken with inland navigation, which is the transport with ships via inland water.

The main advantages when choosing for this type of shipping instead of transport by truck are alleviation of congestion, decrease of air pollution, and overall cost savings. Shipping goods by ship (one 4000<sup>dwt</sup> vessel resembles 100 – 200 trucks) is far more efficient and cost effective than road transport.

It is important to realize that while roughly 40%<sup>50</sup> of all freight moved in Europe is classified as Short Sea Shipping the greater percentage of this cargo moves through Europe’s heartland on rivers and not oceans. In the last decade the term short sea shipping covers a broader sense including point to point moving on inland waterways as well as inland to ocean ports for transshipment purposes over the ocean.

### 5.1 Inland shipping

The Dutch fleet consists of at least 6,900 inland ships and is considered to be the most modern in the world. In the period between 2000 – 2008, 1,300, of which some 900 under the Dutch flag, new ships were deployed [17]. The greatest share of these ships is operated by family businesses, except for the transport of ore between Rotterdam and Duisburg, which is dominated by larger shipping companies. Since 1998, the complete inland shipping sector is a free market. On a yearly basis, the inland shipping sector transports ca. 320 million ton using Dutch waterways.<sup>51</sup>

### 5.2 Sea-river shipping

Sea-river shipping is a special kind of short sea shipping. Seaworthy ships with such a size that they can sail inland water as well bring their goods closer to their end-consumer. Consequently sea-river vessels should have a draught, height and length suitable for both sea and rivers. These ships usually have a capacity of maximum 3,000<sup>dwt</sup>, a draught of 5 meters and a height of not more than 9 meters. Sea-river vessels predominantly carry general cargo and bulk.<sup>52</sup> The European fleet (Eastern Europe not included) comprises some 400 vessels (5.8% of total inland ships active on the market), with at this moment 80 (20% of the total sea-river ships active on the European market) vessels being deployed by Dutch companies.<sup>53</sup>

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<sup>48</sup> Koliouis, I., Katsoulakos, Y., Papadimitriou, S., Katsoulakos, T. and McLaughlin, H. *Short Sea Shipping developments* (2011)

<sup>49</sup> Ibid.

<sup>50</sup> Koliouis, I., Katsoulakos, Y., Papadimitriou, S., Katsoulakos, T. and McLaughlin, H. *Short Sea Shipping developments* (2011)

<sup>51</sup> <http://www.informatie.binnenvaart.nl/algemeen/nederlandsebinnenvaart.html> (2012)

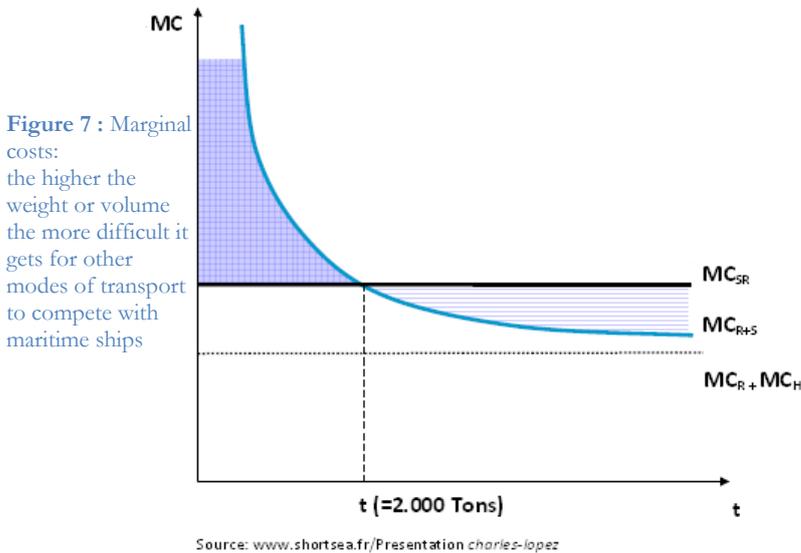
<sup>52</sup> <http://www.shortsea.nl/index.php?language=2> :Sea-river shipping (2012)

<sup>53</sup> Ibid.

### 5.3 Competiveness strength of sea-river shipping

Different organizations spread over Europe (e.g. Belgium, France, The Netherlands) are responsible for the provision of information regarding short sea shipping, and in extend the sea-river shipping branch.

Recent, but also older studies concerning sea-river shipping focus on one particular waterway rather than presenting a general overview regarding sea-river shipping and its worldwide usage. It might be necessary to conduct extra (more general) research in this specific, relatively undeveloped field within short-sea shipping.



The French ‘Laboratoire d’Economie des Transports’ (LET) issued a report and presentation which focuses on the Rhone-Saone corridor, located in the southeast of France. In order to have a basic understanding of the competitive strength of sea-river shipping compared with the more traditional forms of short sea shipping or *coastal shipping* the results of this research will be portrayed in this chapter.

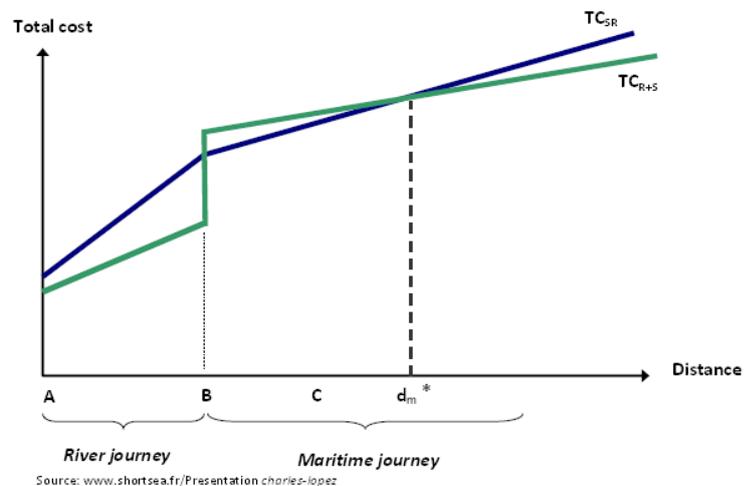
Besides harsh competition with the other two important modes of transport (train, truck) sea-river shipping finds a fearsome competitor in the more traditional form of short sea shipping. Since these short sea

shipping vessels are bound to sea and thus have lesser limitations regarding the dimensions and weight of the ship and its freight, they have usually a lower cost price per unit of freight. This important advantage is slightly compensated by the fact that these ships have to count on costly transshipment procedures at least once per turn, often far away from their eventual end-consumer.

The intersection of the marginal costs curves in figure 7 above determines the ‘tipping point’ between sea-river and “river + sea” transports. As figure 7 above shows; the higher the weight or volume the more difficult it will get for other modes of transport to compete with larger maritime ships. Today sea-river ships can only be competitive with a freight less than 2,000 tons in weight.<sup>54</sup>

Figure 8 on the right shows a similar outcome, but now it is the distance. Before transshipment it is a ‘normal’ river barge which will successfully compete with a sea-river vessel. During the transshipment procedures which involves the combination of

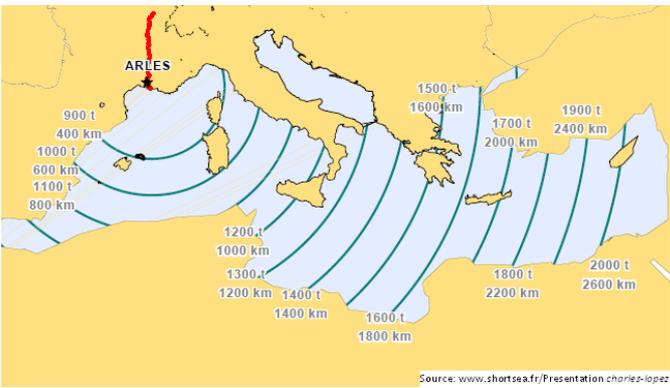
Figure 8 : Competitive strength of sea-river vessels  $TC_{SR}$  compared with river + sea shipping  $TC_{R+S}$  including transshipment



<sup>54</sup> Lopez, C., Sea-river shipping competitiveness and its geographical market area for the Rhone-Saone corridor

river + sea shipping (on two separate barges), the sea-river vessel has a slight advantage in time. During the journey at sea this difference will disappear, in favour of the sea ship, thus the river + sea ship combination.

To have an idea about the difference in size, it might be worth to mention the difference in size which involves the transport of containers. It is calculated that sea-river ships are optimal at a smaller scale of operations; about 2,000 – 2,500 dwt, which is the equivalent of 90 or 100 Teu.<sup>55</sup> The latest generation of seaworthy container ships can carry up to 14,000 Teu. Today, the maritime fleet, which is in competition with sea-river vessels, enjoys the benefit of economies of scale.<sup>56</sup>



**Figure 9 :** Range in which sea-river ship can be competitive: 900 ton can be transported over a distance of 400 kilometres

Figure 9, above shows the competitive strength of an average sea-river vessel operating the Rhone-Saone corridor. As it shows the range of a sea-river vessel in relation to its freight (in tonnes), there is a certain limit in radius in which it can be competitive.

For example:

If the sea-river vessel transports 900 tons, the maximum sea journey it can undertake, under the constraint of saving 10% in comparison with the “river + sea” services, is 400 kilometres<sup>57</sup>



**Figure 10 :** Transshipment of large freights is more cost efficient than shipping smaller volumes directly using sea-river vessels

As figure 10 shows, today the extra costs for sea-river shipping in comparison with ‘normal’ costs for the traditional river shipping together are negligible in relation to the costs involved for transshipment procedures. As the definition of Rissoan (1987) underlines: ‘The quality-price ratio of the transshipment defines the sea-river shipping’s competitiveness’.<sup>58</sup> As long as this ratio favours transshipment above sea-river shipping without conventional transshipment in the seaports, customer will tend to choose for ‘traditional’ short sea shipping with transshipment rather than sea-river shipping.

<sup>55</sup> The twenty-foot equivalent unit (often TEU or teu) is an inexact unit of cargo capacity often used to describe the capacity of container ships and container terminals.  
<sup>56</sup> Lopez, C., Sea-river shipping competitiveness and its geographical market area for the Rhone-Saone corridor  
<sup>57</sup> Ibid.  
<sup>58</sup> Ibid.

Bottom line is that three major advantages determine the competitive strength within the sea-river business compared with other modes within short sea shipping:

- Sea-river shipping has a market niche for the smaller cargoes/volumes.<sup>59</sup>

Instead of being –as a customer- committed to a rather small volume (truckload) or large volume (coaster) sea-river vessels can form a middle-way solution. One sea-river vessel should be able to carry the freight of around 50 lorry's (5000 m<sup>3</sup> (average ship) / 100 m<sup>3</sup> (average lorry)). This has a few important advantages over the traditional form of shipping where it is only possible to work with larger volumes. Companies that import softwood from Scandinavia, the Baltic states and Russia changed their more conventional way of 'purchase and delivery' in a new and more flexible way where products are purchased and delivered throughout the year. These volumes are generally relatively small, which has a positive effect on the eventual transaction (cash flow) and (low) stock keeping costs for the buyer.

- The two transport chains (sea river and "river + sea" services) are complementary.<sup>60</sup>

This could have a positive effect on the travel time, although this also depends on barriers such as transshipment, custom clearance and other specific regulations involving environmental law (for instance excise on fuel).

- Sea-river shipping is very interesting for feeder services and can provide intermodal door to door transport.<sup>61</sup>

This is probably the biggest advantage of sea-river shipping over other maritime transport. Currently there are by far not enough Regional Transshipment Centres (RTC's) that can provide the transshipment close to end-consumers throughout Europe. As mentioned, sea-river vessels can transport much more than one single lorry (up to the volume of at least 50 lorry's) and deliver it theoretically from doorstep to doorstep.

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<sup>59</sup> Lopez, C., Sea-river shipping competitiveness and its geographical market area for the Rhone-Saone corridor

<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

### 5.3 Future perspective

As figure 11 on the right shows, there are enough possibilities for sea-river shipping in the near future. Especially around the “economic heart” of Europe, Ruhr district or Ruhr valley, the transport sector in the Netherlands relies for at least 80% on inland navigation when it comes to the export of bulk goods to other parts in Europe, predominantly Germany. Bottleneck is considered to be the poor distribution of Regional Transshipment Centres (RTC), which can provide all necessary services.

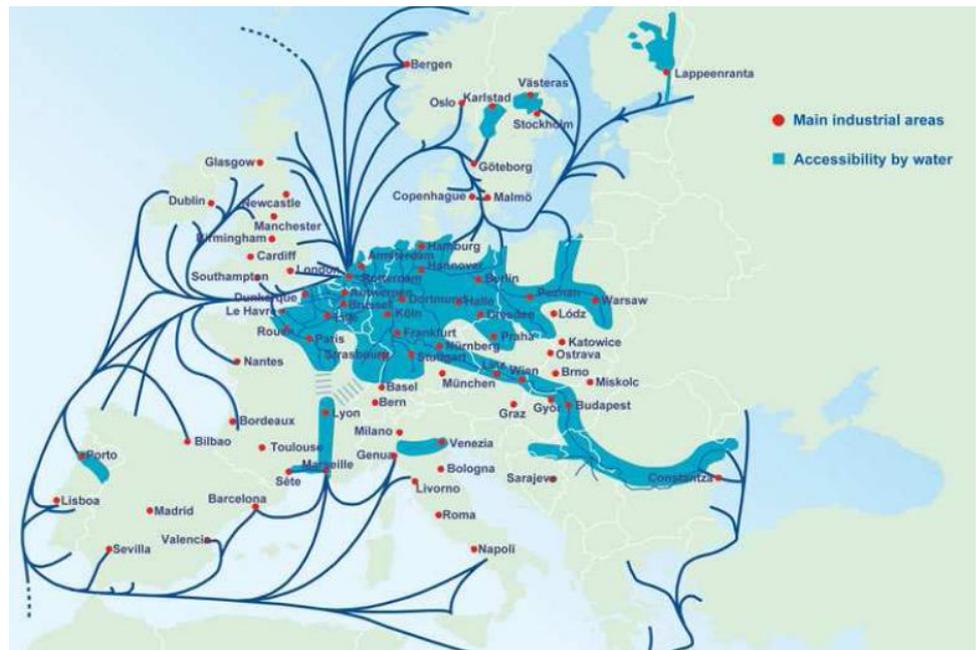


Figure 11 : Accessibility of main industrial areas of Europe by navigable water

Besides having Regional Transshipment Centres providing constant service, it is also expected that private terminals will extend their business in this particular field. This development will likely effect the bigger stevedores in seaports, which will find many difficulties to compete with these smaller (completely paid for) enterprises close to the final end-consumer. The Netherlands has some 398 inland ports (Figure 12, on the right), of which currently 150 are used extensively, and linked to at least 96 (inland) terminals.<sup>62</sup>

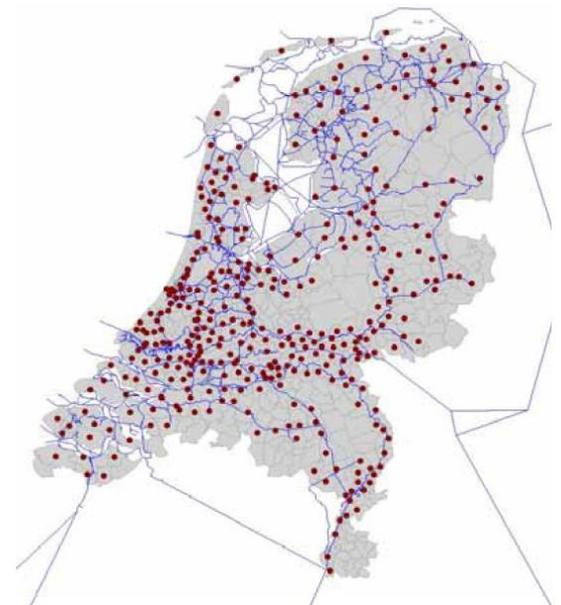


Figure 12 : The 398 Dutch (inland) ports,

-Source: Eindrapport BluePorts, TNO-

Besides the accessibility of different regions within Europe via a vast network of waterways, there are also other important aspects that might speed up or slow down that large-scale introduction of sea-river vessels in Europe.

- Stricter regulations concerning emissions (such as NO<sub>x</sub>, PM, SO<sub>2</sub> and CO<sub>2</sub>) discharged by river barges, which could have a positive effect on the acquisition of new ships (sea-river ships included)
- High fuel prices, which makes it more profitable to transport goods by ship rather than lorry; with a possible special preference for sea-river ships, since they are able to transport the goods as close as possible to the end-customer, as the door-to-door principle prescribes.
- As the Dutch government indicates that it is willing to invest in the infrastructure of waterways, smaller terminals throughout the country will expand their business to attract more volumes to

<sup>62</sup> Bureau voorlichting binnenvaart (2012)

their terminal. Sea-river shipping could be ideal for the smaller terminals which might –on their turn- give a positive boost to the sea-river shipping branch.

- Construction and further development of better facilities, such as the Regional Transshipment Centres (RTC's), which can load and unload the goods fast and cheap. Without these Regional Transshipment Centres, sea-river shipping finds a certain handicap in the (successful) competition with other modes of transport; especially truck and inland navigation.
- Development of new, more durable ships, as part a campaign to renew the fleet.

The recent strive for a more durable fleet certainly benefits the further development of the sea-river fleet in particular, which has a few major advantages in the field of durability and environmental friendliness over other modes of transport.

Chapter 8 will present a few scenarios which could applicable in the near future when it comes to the introduction of sea-river shipping on broader sphere.

## 6. Navigable rivers

The main advantage of sea-river shipping is its unique market range. Sea-river vessels can easily connect the hinterland with overseas destinations (theoretically) in one single move, without a need for intermediate transshipment, which results in lower transport costs and a reduced risk due to limited handling.

Table 10, on page 26, shows the rivers in Western Europe that are suitable for sea-river shipping and their bottlenecks. Although there are more shipping options apart from the rivers and canals as indicated, these rivers are only navigable by a small number of smaller vessels.<sup>63</sup>

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<sup>63</sup> Bureau voorlichting binnenvaart (2012)

		Length	Width	Draught	Airdraught	Tonnage*
Netherlands	Juliana Canal: Maasbracht - Stein	137 m	14.0 m	3.0 m	6.15 m	1.000/1.500
	Juliana Canal: Stein - Maastricht	110 m	12.0 m	3.0 m	6.15 m	1.000/1.500
	Meuse	137 m	14.0 m	3.0 m	6.8 m	1.000/1.500
Belgium	Albert Canal	134 m	12.5 m	3.4 m	6.7 m	1.000/2.000
	Sea canal: Locks Wintam to Ruisbroek	180 m	23.5 m	8.5 m	48.0 m	10.000
	Sea canal: Ruisbroek - Puurs to Brussels	140 m	16.5 m	5.8 m	32.0 m	4.500
	Ghent - Terneuzen Canal					
France	Seine to Gennevilliers	120 m	15.5 m	3.9 m	7.5 m	1.800/1.901
Germany	Upper Rhine: Basel - Bingen	135 m	22.8 m	2.1/3.0 m	7.0 m	1.500/3.000
	Central Rhine: Bingen - Bonn	135 m	22.8 m	1.9/2.1/2.5 m	9.0 m	1.500/3.000
	Lower Rhine: Bonn - Millingen	135 m	22.8 m	2.5/2.8 m	9.0 m	1.500/3.000

**Table 10 :** Bottlenecks that determine the limits in regard to vessel size, thus the possible limitations in regard to the introduction of sea-river shipping

www.bureauvoorlichtingbinnenvaart.nl

With the abundance of many waterways throughout Europe, there are many possibilities for sea-river shipping in the near future. But only the existence of waterways is not enough in itself: special loading and unloading terminals are also required.

The development of so-called Regional Transshipment Centres is important for the further development of the sea-river market. Currently RTC's can be found in Kampen, Heijen, Stein and Oss.

### Current important sea-river shipping rivers and canals

Figure 13<sup>64</sup>, on the right, shows the main navigable waterways of Western Europe.

The **Rhine**, with a length of 1,320 kilometres<sup>65</sup> is the longest of the Western European rivers and passes through or borders parts of six countries. Navigable upstream as far as Basel (Switzerland) it is considered to be one of the world's busiest waterways and an "invaluable economic asset".

**Figure 13 :** The Rhine, one of the world's busiest waterways



<sup>64</sup> <http://geography.howstuffworks.com/europe/the-rhine.htm>

<sup>65</sup> <http://www.britannica.com> (2012)

The **Meuse** depends mainly on rainfall, in contrast with the Rhine, which depends both on melt water as precipitation, rises in France and flows through Belgium and the Netherlands before draining in the North Sea. It has a total length of 950 kilometres.<sup>66</sup> Recent study shows that the difference between summer and winter flow volumes has increased significantly in the last 100 – 200 years. It predicts that winter flooding of the Meuse may cause recurring problems in the coming decades. Dry and warm weather during the summer can have a serious influence on the Meuse's water level, which will on its effect the possibilities of inland navigation.

The **Juliana Canal** provides a 36 kilometres long bypass of an unnavigable part of the river the Meuse between the cities of Maastricht and Maasbracht. It is a important (transport) connection between the ports of the Rhine delta and the industrial areas of southern Limburg and southern Belgium.

The **Albert Canal** is about 130 kilometres long and connects the major Belgian cities Antwerp and Liège.<sup>67</sup> Between these two cities there is a height difference of 56 meters and a total of six canal locks, which are needed to overcome the difference in elevation. Since the completion Rhine-Main-Danube Canal in 1992, a barge can travel from Antwerp all the way across Europe to the Black Sea.

The **Ghent-Terneuzen Canal** is about 31 kilometres long<sup>68</sup> and links Ghent (Belgium) with the port of Terneuzen (The Netherlands). Today it is 200 meters wide and 32 kilometres long and capable of accommodating ships of at least 125,000 gross tonnage.<sup>69</sup>

The **Seine** is a 780 kilometre long<sup>70</sup> river and an important commercial waterway within what is called the Paris Basin, in the north of France. The river is navigable by ocean-going vessels as far as the city of Rouen, some 120 kilometre from sea.

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<sup>66</sup> <http://www.britannica.com> (2012)

<sup>67</sup> Ibid.

<sup>68</sup> <http://www.encyclo.co.uk>

<sup>69</sup> <http://www.britannica.com> (2012)

<sup>70</sup> Ibid.

# 7. Port capacity in the Netherlands

Apart from the important seaports of Rotterdam, Amsterdam, Zeeland and Groningen, there are many more inland ports that can provide stevedoring services.

Traditionally it were the seaports referred as the main gateway to the European hinterland. Today many ports can rely on a vast network of good navigable rivers, suitable for bigger, even seaworthy ships.

The volume of transported bulk cargo is the last years quite stable, with around 380 million tons in 2006.<sup>71</sup> Except for the recession which tempers economies worldwide, it is expected that the shipping and transshipping of bulk will grow only further. Thanks to adequate measures that will be taken in the coming years regarding the upgrade of regional and provincial ports, there will be enough capacity for the transshipment of bulk cargo in the near future.<sup>72</sup> The government, launched initiated a series of projects called “quick wins”. These “Quick Wins” focus on better access of these smaller inland ports, and on the development of so-called public quays.<sup>73</sup>

To summarize the (main) objectives of the “quick win” projects:

- Keeping waterways navigable and ports accessible
- Upgrading and construction of public quays infrastructure
- Reconstruction of ports and terrains.

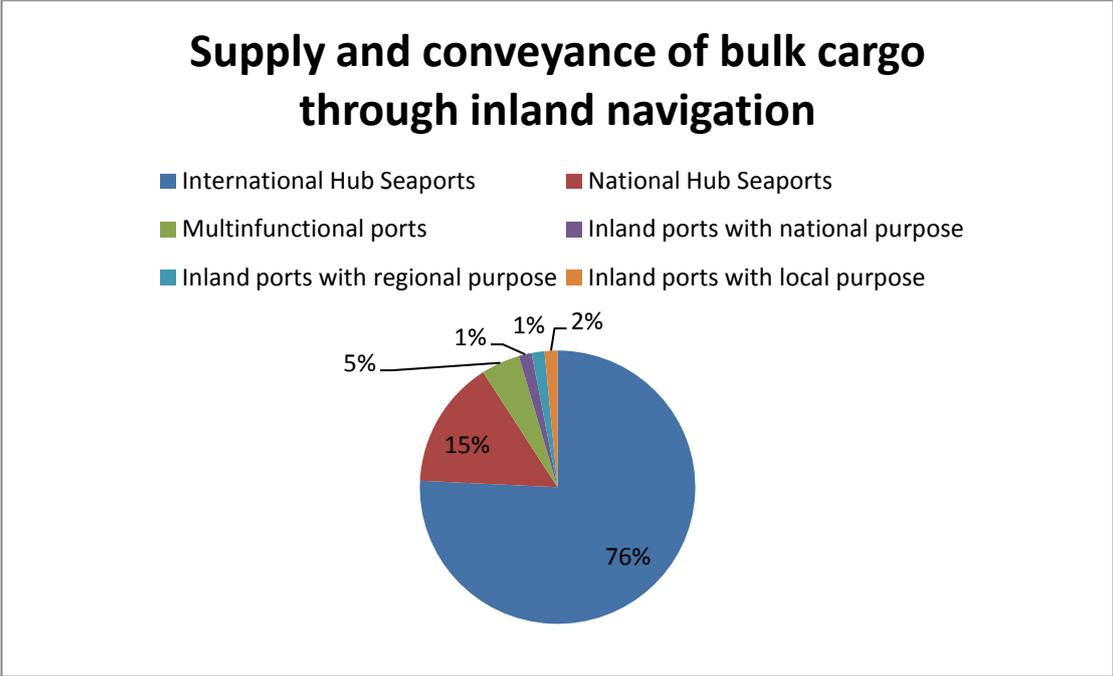


Figure 14 : Composition of the supply and conveyance of bulk cargo in the Netherlands

<sup>71</sup> Bückmann, E., Korteweg, A., Tillema, H. and van der Gun, M. Landelijke Capaciteitsanalyse Binnenhavens (2010)

<sup>72</sup> Ibid.

<sup>73</sup> Ibid.

As part of the “quick win” project, the Dutch government invested around 200 million euro in upgrading the infrastructure and overall improvement of the wet infrastructure. Initiated in 2011, the “quick win” projects will be ready in 2013.<sup>74</sup>

Figure 14 on page 28, and table 11 on the right show that at this moment only a few bigger bulk cargo ports are involved in the distribution of bulk cargo through Western Europe. Although there are around 359<sup>75</sup> smaller inland ports which can provide the same services, these ports have the disadvantage of not being connected to a busy waterway or servicing a densely populated area (such as the Randstad)

Type	Ports
<b>International Hub Seaports</b>	Rotterdam, Amsterdam
<b>National Hub Seaports</b>	Vlissingen, Terneuzen, Moerdijk, Velsen
<b>Multifunctional ports</b>	Dordrecht, Delfzijl, Utrecht, Nijmegen, 's-Hertogenbosch
<b>Inland ports with national purpose</b>	Meppel, Oss, Bergen op Zoom, Oosterhout, Hengelo, Almelo, Zaanstad, Stein, Roermond, Maastricht, Groningen, Zwolle, Kampen, Veghel, Zwijndrecht, Vlaardingen, Wageningen, Tiel, Harlingen
<b>Inland ports with regional purpose</b>	N/a
<b>Inland ports with local purpose</b>	N/a

Table 11 : Type of ports

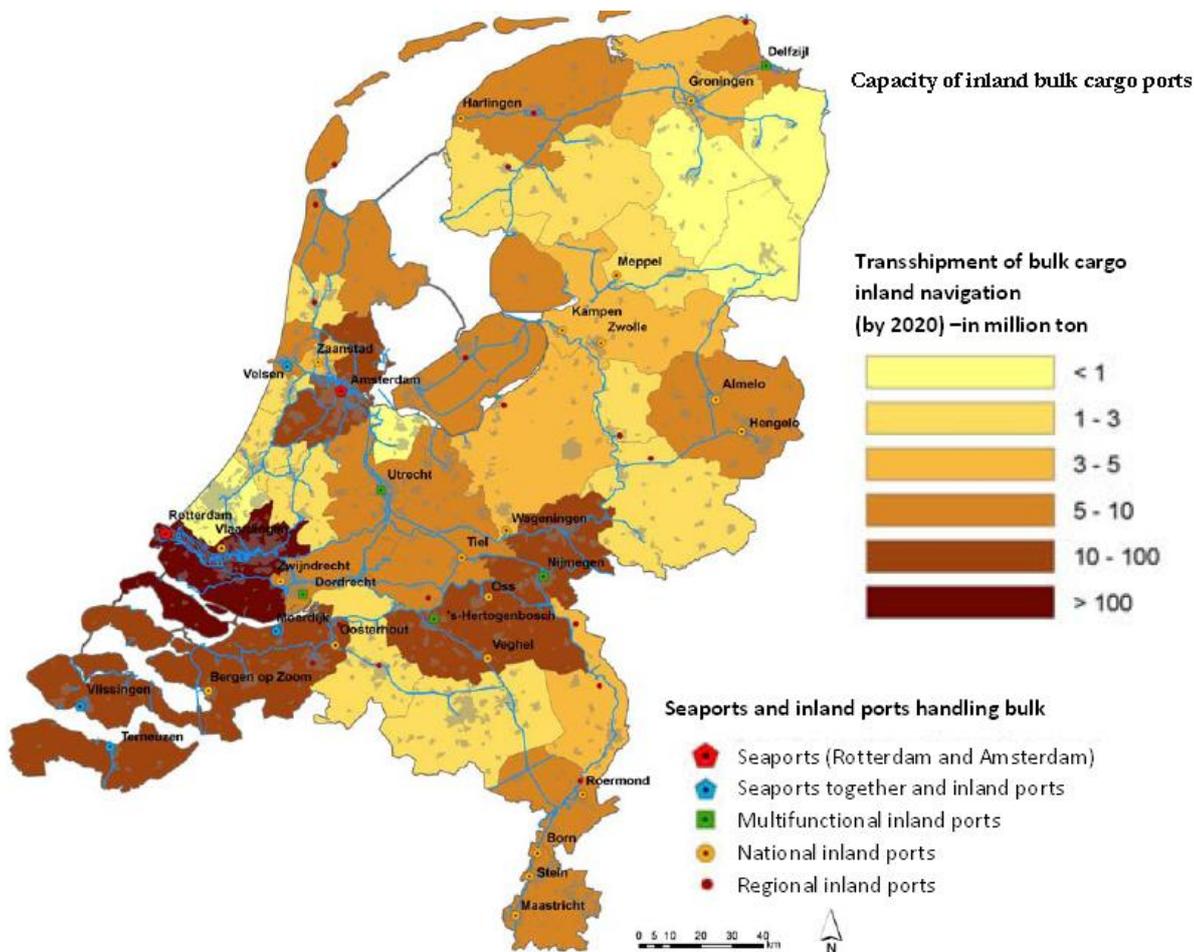


Figure 15 : Capacity of inland bulk cargo ports

Source: Landelijke capaciteitsanalyse binnenvaart, Ecorys Nederland B.V.

<sup>74</sup> Bückmann, E., Korteweg, A., Tillem, H. and van der Gun, M. Landelijke Capaciteitsanalyse Binnenhavens (2010)

<sup>75</sup> Ibid.

Figure 15, page 29, shows the different regions and their share in transshipment of bulk. Four provinces dominate this market: Seaports Rotterdam and Amsterdam, Flushing and Terneuzen and 's-Hertogenbosch-Veghel-Oss.

Thanks to adequate measures that will be taken in the coming years, there will be enough capacity for the transshipment of bulk cargo in the near future.<sup>76</sup> After 2020 it is expected that the market for bulk cargo will grow slightly. However, this development also depends on the speed in which the market is containerized.

For the other West-European ports, it is rather difficult to give a good indication of their capacity, especially in the field of the processing of bulk cargo. However, a few rough figures exist, which give an idea about volumes recently transported by river barges.

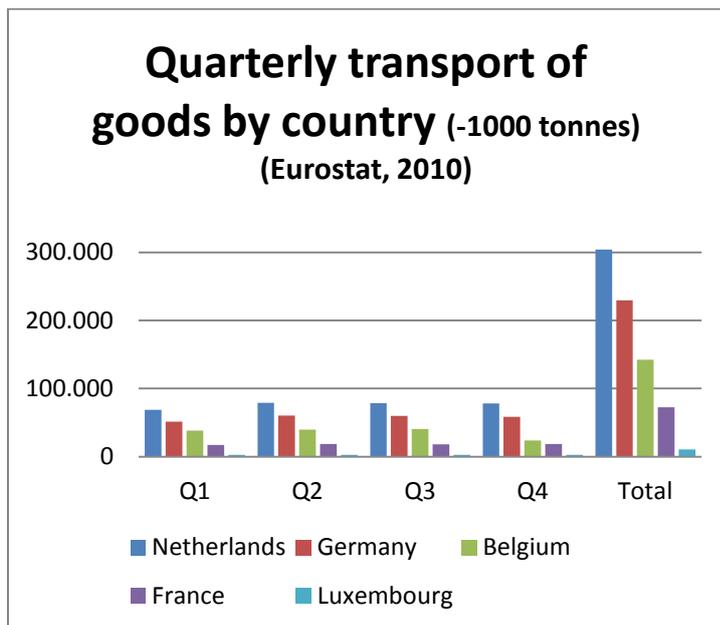


Figure 16 : Quarterly and total transport of freight in 2010 by country.

Figure 16 (above) shows that the Dutch inland shipping sector is by far ‘market-leader’ with a yearly total of around 304 million tons (2010) transported using the Dutch waterways.<sup>77</sup>

In 2010 there was a recovery of the total European Union inland waterways transport, followed by a new decline in the first quarter of 2011, which almost reached the level of the economic crisis. This decrease was accompanied by a further growth of container transport with an average 10% in the first quarter of that same year (2011).

<sup>76</sup> Bückmann, E., Korteweg, A., Tillema, H. and van der Gun, M. Landelijke Capaciteitsanalyse Binnenhavens (2010)

<sup>77</sup> Justen, F. Quarterly and total transport of freight in 2010 by country (2011)

## 8. Drivers that might influence the (re-)introduction of sea-river shipping

This chapter will give an outline of a few scenarios that might influence the market of sawn-softwood and the reintroduction of sea-river shipping in the coming years. Different factors influence the market, and it is difficult to predict in which direction these new developments will take place.

### 8.1 Scenario 1 Overcapacity river barges

A combination of different factors might cause an overcapacity in the number of river barges active on the market. Since 2008, Europe is struggling with the effects of a recession caused by the financial crisis, which started in 2007 in the United States, immediately also affecting the rest of the financial world. Traditionally, the Netherlands heavily depends on its transport sectors and trade. With a few important seaports (Rotterdam, Amsterdam, Vlissingen) connected to a vast network of navigable waterways, it exploits its unique advantage and forms one of the most important gateways of the European hinterland, in particular Germany.

The Dutch fleet is the biggest in Europe, as well in number of vessels as in diversity. Apart from the recession, which is expected to be provisional, other factors such as the water level of rivers –when too low, it is difficult to navigate- determine the supply and demand of these river barges. For a couple of years there is a certain oversupply of these river barges. Owners of river barges do not get the necessary orders, or have to work with extremely low prices in order to stay in competition with the rest of the fleet, which often leads to bankruptcy.

As described in chapter 4.2, sea-river vessels experience in a normal situation a lot of competition of the common river barges, there they are in many cases still too expensive, even when the costs for transshipment are not included. If the market is saturated, like it is today, it is questionable whether these sea-river vessels can compete with the traditional combination of sea ship – river barge or sea ship – lorry.

As long as river barges compete each other as fiercely as today, it will be extremely difficult for sea-river vessels to interfere in this market. History has shown that consumers tend to choose for the cheapest, most reliable option, which is why this relatively old form of transport, as sea-river shipping is, was out of favour for many years up till now.

Although sea-river vessels claim the unique selling point of door-to-door supply within the sea – river transport branch, it has –in many cases- to undergo a certain transshipment phase in which the goods will finally reach their end-destination when transported for the last several kilometres by lorry. Thereby this relatively unique doorstep –advantage is counteracted.

In brief:

- A certain degree of overcapacity within the inland navigation branch (assumed to be temporary).
- Fierce competition between river barges mutual, resulting in a lower cost price, and as a result of this lower cost price it is difficult for sea-river vessels to start/expand business and over the whole to penetrate the market.
- Sea-river shipping can only be cheaper when goods are transported over shorter distances.

Various Dutch shipping lines had new sea-river vessels built in the past few years. Also in other parts of Europe, France and in lesser extend also Germany, private enterprises and individuals are consequently investing in this new form of shipping.

## 8.2 Scenario 2 Change in regulations enforced by national and international authorities

Relatively unknown is the fact that ships burn extremely dirty fuel which on average contain almost three thousand times as much sulphur as road fuel, resulting in high emissions of air pollutants that are particularly very harmful to both human health as the environment. In February 2012 the environment committee of European Union voted in support of a proposal of July 2011 to implement the international sulphur standards agreed by the International Maritime Organization (IMO).<sup>78</sup>

As of January 2007, new, stricter rules were introduced to battle the harmful effects of emissions in The Netherlands. The following was agreed:

- Reduction of the proportion of sulphur in fuel; which will have a positive effect on the outburst of sulphur dioxide and atmospheric particulate matter.<sup>79</sup>
- Reduction of nitrogen oxide produced by diesel motors.<sup>80</sup>
- Fuel cannot contain any harmful substances, such as chemical waste (plastics).<sup>81</sup>

Mixing fuel oil with other chemicals has a huge negative impact on the environment, and it is likely that these new rules will be enforced on a stricter bases. It is possible that these new rules have an effect on the replacement of the older, traditional barges into newer models such as sea-river vessels.

New and stricter rules will certainly trigger new investments that could affect the competitive strength of inland shipping in different ways:

- A percentage of the fleet will not be able to meet these latest requirements. The number of ships available will decline, and the market is not as saturated as it is today. Different other modes of transport will profit from this development and gain market share. It would also trigger the introduction of a new generation vessels, other types included (e.g. sea-river vessels).
- A positive (green) image thanks to the introduction of new, strict rules, will promote the use of ships in favour of other forms of transport (transport by road, rail). Especially sea-river shipping will profit from this situation.

In brief:

New regulations regarding emissions will probably have a positive effect on the development of new vessels, replacing the old fleet. Making it possible to introduce sea-river shipping on a broader sphere.

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<sup>78</sup> <http://www.airclim.org/acidnews/2012/AN1-12/eu-moving-towards-stricter-ship-sulphur-standards> (2012)

<sup>79</sup> Ibid.

<sup>80</sup> Ibid.

<sup>81</sup> Ibid.

### 8.3 Scenario 3 Rising fuel prices

Topical are the rising fuel prices that confront the world today. Many factors, besides intensive speculation, influence the price for a barrel crude-oil. It is not clear how far the world's resources in fossil fuels stretch, but it is clear that the world wide consumption with the two Asian giants China and India, will grow significantly. Governments but certainly also many companies are trying to develop their logistical chain in such a way that it can outlive a dramatic change in fuel prices. As figure 17 below shows, it is reasonable to suggest that the price for a barrel of crude oil will rise in the coming decennia.

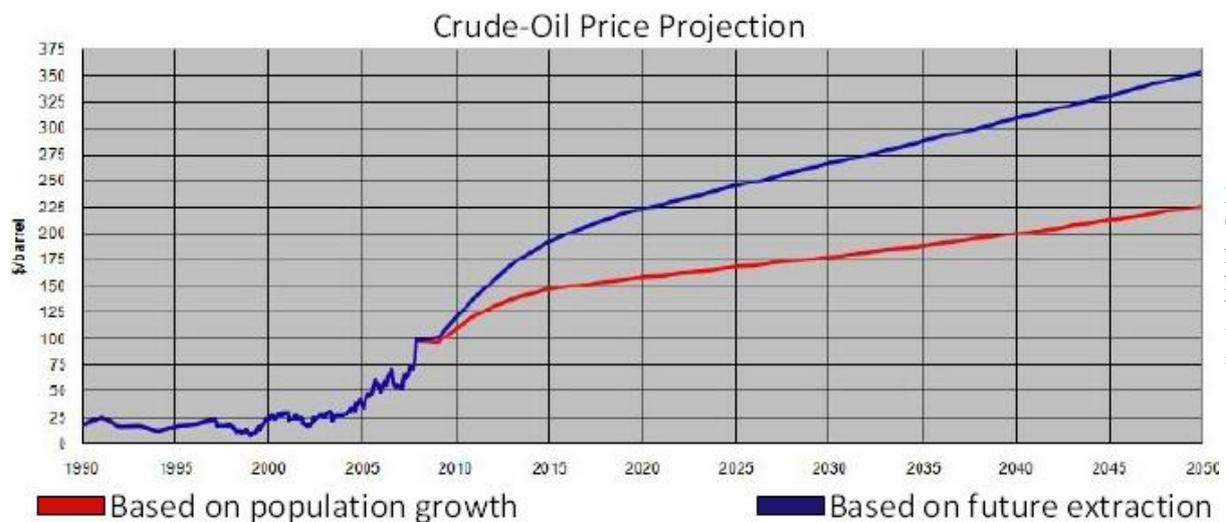


Figure 17: Crude-Oil price projection which affects the transport sector

<http://www.roperld.com/science/minerals/fossilfuels.htm>

Higher fuel prices will certainly affect the transport sector, in particular the transport of lower volumes per truck. As mentioned in chapter 7, short(er) distance transport (<900 kilometres) is often done with trucks, especially the smaller volumes of sawn softwood imported into Western Europe. At this moment companies give preference to order in small volumes constantly, rather than larger volumes 1 to 5 times a year. The question is whether higher fuel prices could have an effect on this latest trend. If fuel prices rise, transport costs will get generally higher, which could make it more interesting to order and transport larger quantities and keep the inventory in own hands at the company's own premise. Figure 17 shows a possible scenario which is created when the future extraction of crude oil comes under pressure combined with a increase in population, as we experience today; which will make it difficult to meet the future demand.

However, sea-river vessels could fill the gap between the advantages of shipping and transport by truck thanks to their specific qualities:

- At this moment average sea-river ships are capable of transporting volumes representing the equivalent of at least 50 conventional truckloads.
- It has the important advantage that it can almost (to a certain extend) deliver according to the doorstep-to-doorstep service, which is unique within the shipping branch.
- Ships are considered to be very economical when it comes to the consumption of fuel; a very good kilometre-ton/fuel consumption ratio.

With the further development of what is called wet infrastructure, the increase of fuel prices could be a very important trigger in the introduction of more sea-river ships. The ongoing recession that affects the industrialized world, has a positive effect on the fuel prices, but it is likely that this will come to an end

when the economies start to grow again. Other aspects, such as instability in the oil-producing regions, for example the middle east (recently the possible closure of the strait of Hormuz -approximately 20% of the world's petroleum passes the strait of Hormuz- will have an immediate effect on the oil prices around the world. It is expected that when other world powers (China and India) will show their presence on the market (more than they already do) the oil prices will reach unprecedented heights, which could stimulate other more durable types of transport, such as sea-river shipping.

## 8.4 Scenario 4 Further development of “wet infrastructure”

As the Dutch government proclaims that it will invest in what is called “wet infrastructure” (quays, ports, RTC’s, and infrastructure to give an existing terrain a better connection to the existing road network). Many (local) governments see the advantages of having river barges taking over the freight normally transported by trucks, there it reduces traffic jams and it has a positive effect on environmental issues. In France it is the Rhône-Saone corridor (which discharges in the Mediterranean sea) which is brought under attention. German (inland) ports are expanding their business. A lack of enough terminals who can process sea-river vessels quick, inexpensive, and safely has an effect on the employability of sea-river ships.

This new form of shipping demands a certain degree of extra service in order to compete with other (well-established) modes of transport (transport by truck, inland navigation, and rail), which is provided by a quick delivery, prices that can compete with prices suitable for transporting cargo with the more conventional modes of transport.

In brief:

Development of “wet infrastructure” has the following advantages regarding the introduction of sea-river shipping on a broader scale:

- More terminals (private enterprises) are involved in the market; resulting in an increase in competition.
- Regional Transshipment Centres have enough facilities to do the loading or/and unloading procedures as quick, cheap and safe possible.
- Infrastructure around these Regional Transshipment Centres (RTC’s) is adjusted to service these particular sea-river vessels.
- Could help the sea-river shipping branch exploit the advantage of less transshipment procedures, which consumes time and money.

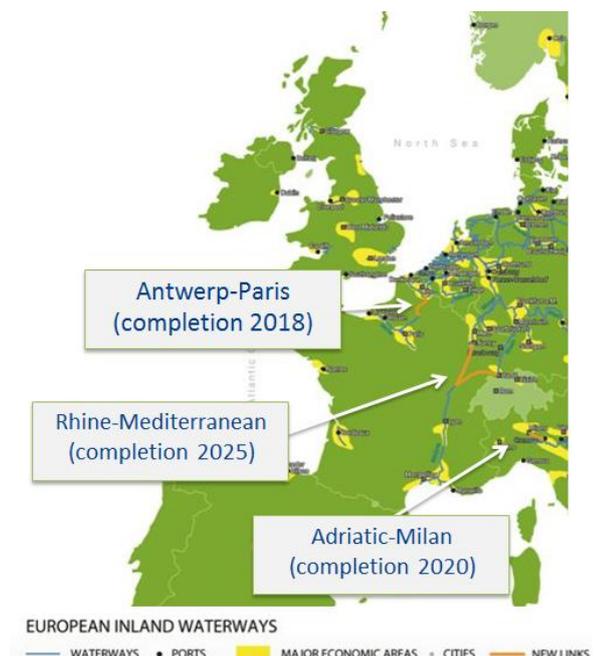


Figure 18: Upgrade of the European inland waterways

A few projects initiated by the European Union and its member states, emphasize on joining different separate waterways together to form a vast network of navigable rivers that cover all the important industrial areas in Europe. Figure 18<sup>82</sup>, above, shows three different projects that connect the busy waterway the Rhine and the river Rhône, which discharges in the Mediterranean sea.

<sup>82</sup> www.inlandnavigation.org (2002)

Another project that will hopefully be finished 2018, connects the Belgian river Schelde with the French river Seine. This new river system will eventually form the backbone of the West European inland waterway structure.

The construction of new waterways, which allow the latest generation of river barges and sea-river ships to travel deep in to the West European hinterland from almost any direction, will possibly give an positive impulse to further introduction of sea-river vessels.

## 8.5 Scenario 5 Effect of stricter regulations regarding the import of tropical hardwoods

Illegal logging has a devastating effect on some of the world's most valuable remaining forests. Its environmental effects include deforestation and the loss of biodiversity and its direct impacts on people include 'conflicts with indigenous and local populations, violence and human rights abuses and the fuelling of corruption'. The scale of illegal logging is difficult to assess. The world Bank estimates that governments worldwide lose between 10-15 billion dollar as a result of illegal logging.<sup>83</sup>

Confronted with the serious environmental, economic and social consequences of illegal logging, the European Union launched the so-called EU-FLEGT Action Plan. This Action Plan recognises the European Union as an important export market for countries where the levels of illegal logging and poor governance in the forest sector are most urgent.

As a single market, the European Union is considered to be one of the largest consumers of timber products in the world. As the behaviour of European companies and governments purchasing wood in other parts of the world has a significant impact on illegal logging, it is important to act in a responsible way.

The European Union's FLEGT Action Plan tries to prevent the import of illegal wood into the European Union by improving and support the supply of legal timber and increasing the demand for wood coming from so-called responsibly managed forests.

One of the seven measures of the Action Plan aims at the use of 'existing legislative instruments or adaption of new legislation'<sup>84</sup> in order to support the EU Illegal Timber Regulation.

A comprehensive research carried out by Chatham House, about the impacts that are coupled with the introduction of FLEGT regulations, mentions the following:

*"The global market trends described in Section 4 show that there is a growing shift towards processed and engineered products. In addition, buyers are moving away from tropical products towards alternative softwood and plantation-sourced wood-based products. Increasing amounts of timber are being sourced from the EU and North America, representing a switch from tropical to temperate sources."*<sup>85</sup>

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<sup>83</sup> [http://www.euflegt.efi.int/portal/home/flegt\\_intro/illegal\\_logging/](http://www.euflegt.efi.int/portal/home/flegt_intro/illegal_logging/) (2012)

<sup>84</sup> Ibid.

<sup>85</sup> Fripp, E., *FLEGT AND TRADE –What will the impacts be?* (2004), Paragraph 11

And: *“There is also the possibility of switching to alternative materials such as synthetics, e.g. UPVC doors. Alternative products such as OSB, which are produced from FSC sources, can be used instead of tropical plywood in some situations.”*<sup>86</sup> Treatment of softwoods with chemicals to gain the characteristics of hardwoods is increasingly used, but currently at high cost.

It further notices: *“Product substitution is already occurring and may increase. It is already evident that product substitution away from tropical hardwood to either treated softwood or engineered products is occurring.”*<sup>87</sup> And sees a certain *“shifting away from tropical timber to softwood and plantation-sourced timber.”*<sup>88</sup>

In other words, it is plausible that FLEGT regulations as imposed, will have an influence on other substitutes, such as softwood. With the latest technology it is possible to transform softwood into a product which carries the same characteristics as the more durable tropical hardwoods.

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<sup>86</sup> Fripp, E., *FLEGT AND TRADE –What will the impacts be?* (2004), Paragraph 113

<sup>87</sup> *Ibid*, Page 4

<sup>88</sup> *Ibid*, Page 67

## 9. Conclusions and recommendations

This report aims at describing the impact of the recent (and future) introduction of sea-river shipping on stevedores of sawn softwood based in Western Europe.

Following chapters give an overview of the conclusions and recommendations in regard to this research.

### 9.1 Conclusions

A variety of factors could be responsible for the (re)introduction of sea-river shipping and also determine the speed in which this will take place. Sawn softwood, once predominantly transported as bulk, is today for at least 65-70% containerized, and it is expected that this percentage will only get higher. This is not the only threat to terminals specialized in processing of bulk material face today.

Terminals in Europe form the essential link between sea shipping and inland shipping; it is their duty to transload freight from one modality into another. However, with the (re)introduction of sea-river shipping these terminals might face harsh competition. Sea-river vessels are generally cheaper, faster and more flexible, and can deliver their freight closer to the final end-consumer. At this moment there is not enough infrastructure to facilitate these sea-river ships properly.

However, based on the outcome of this research, it is not very likely that sea-river shipping will develop itself drastically in the coming 10 – 15 years, thus forming a concrete threat to the more “traditional” short sea shipping.

**In regard to the outcome of this research the following is concluded:**

*Key driving factors that influence the European softwood market*

- The relationship between production and consumption; which is constantly trying to find a certain degree of balance.
- The import of sawn softwood from other regions (North America, Oceania)
- The manner in which European countries can be self-sustaining
- The trade in tropical hardwoods

*Trends in consumption and import of sawn softwood:*

- At this moment 53% of the sawn softwood imported by Western European countries is originating from Scandinavia, the Baltic states and Russia
- The consumption of sawn softwood in Europe will grow with 0.8% per year, which is the equivalent of 300,000 m<sup>3</sup>/year in Europe (entirely).
- It is estimated that 19,120,678 m<sup>3</sup> sawn softwood will reach Western Europe by 2020
- By the year 2020, 2,188,935 m<sup>3</sup> sawn softwood will be available as bulk and be delivered by ships, supplying the market (within the 500 –kilometre radius)
- By the year 2020, at least 18 middle/large scale terminals comparable with Verbrugge Terminals can compete for a volume referred as ideal by Verbrugge Terminals, which is around 121, 597 m<sup>3</sup> a year

*Developments that will affect the transport of bulk sawn softwood:*

- Further containerization of the market
- An increase in the transport of lower quantities and volumes, which are often delivered by trucks.

*Drivers of the further introduction of sea-river shipping in regard to the transport of sawn softwood from Scandinavia, the Baltic states and Russia to Western Europe:*

- Readiness of “quick win” projects and the further improvement of the European waterway network.  
Some vital bypasses and corridors are being upgraded by the European Union, but it will take years for them to be ready; 2018 (Antwerp-Paris) and 2025 (Rhine-Mediterranean). These investments will certainly boost the introduction of sea-river shipping on a broader whole.
- Overcapacity river barges caused by the global economic recession (2008-2012).  
Many operators of river barges already went bankrupt in the last two years. In order to stay in business, operators of river barges are willing to work under the cost price. This makes it difficult for sea-river ships to penetrate the market.
- Increase in consumption of softwood caused by the (further) introduction of FLEGT  
The trade in “legal” products will grow, and this will certainly effect the supply of tropical hardwoods. Specially engineered softwood products can form a suitable alternative, by replacing the -in general more durable- tropical hardwood species.
- The recent and upcoming introduction of new and, (in particular) stricter, environmental laws  
New regulations will ban the use of contaminated (mixing plastics and fuels together) fuel by river barges and sea ships. The latest generation of ships (including sea-river ships) that will be introduced in the coming years, will be able to comply with these latest requirements.

*Differences between sea-river shipping and other modes of transportation in terms of efficiency, reliability, costs and flexibility:*

- At this moment sea-river shipping can only compete with short sea + river shipping over shorter distances
- The efficiency of sea-river ships at this moment is rather small; there are not enough special regional terminals (transshipment centres) close to the end-destination which can provide the necessary extra (special) service in loading and unloading this type of ships.

Basis above, it is expected that it will take at least another 10 to 15 years before sea-river it will be operative on a larger scale –meaning that it will be able to successfully compete with the other modes of transport (in special sea + river shipping) in Western Europe.

Verbrugge Terminals radius of competitiveness will depend on the ‘readiness’ of the terminals in the inland ports within the Netherlands and Western Europe. The size of this radius will eventually be small (25 – 30 kilometre), since other (398 in total) ports/terminals will have enough capacity to handle these ships, by than having the advantage of being connected to navigable waterways, in size large enough to allow bigger sea-worthy ships.

## 9.2 Recommendations

Various elements have an effect on the consumption of sawn softwood in Europe. The latest technology makes it possible to upgrade softwood and copy the much desired characteristics (hardness, density, durability) of tropical hardwoods. As new regulations regarding the import and trade of tropical hardwood (e.g. FLEGT) are imposed, there will be a growing need for suitable substitutes. Softwood from Scandinavia, the Baltic states or Russia, could be an useful substitute.

It is very possible that the consumption of sawn softwood will increase in the coming years. Verbrugge Terminals can still play an import role as hub port, and should not be too afraid of a -on short-term notice- introduction of sea-river shipping. Sea-river shipping will eventually change round, and reshape the traditional stevedoring market regarding sawn softwood.

Following the outcome of this research it is recommended that:

- Verbrugge should maintain its strategic position within the stevedoring market of sawn softwood.

At least for the coming 10-15 years (it is needless to say that this depends on several prospective developments) there is enough volume to obtain in order to run a good business, and this volume (following the future figures on consumption) is expected to grow every year with at least 0.8%. It is rather difficult to say what will happen after this 10-15 years term, but even when there is a dramatic change in available volume –for example caused by the introduction of sea-river shipping- there are enough possibilities to find alternatives within in the softwood sector:

- Import of larger quantities of softwood from North America (United States and Canada) which cannot be done by sea-river shipping
- Change in focus from sawn softwood to the import and stevedoring of softwood pallets used for generating energy.
- (Closer) collaboration with exporters of sawn softwood products from (among others) Scandinavia, the Baltic states and Russia, who are generally interested in finding a reliable partner in their strive to set up business in the European mainland's market.
- Emphasizing on gaining market share in the Dutch market, rather than the West European market. The Randstad with a population of 7.1 million people (Randstadmonitor, 2010), is a unique market with a high potential, close by.
- Change in focus from traditional sawn softwood to engineered softwood. As probably turns out, there will be a growing demand for a suitable substitute replacing expensive tropical hardwoods.

Even though it may feel cornered by the latest developments in the sea shipping sector, Verbrugge Terminals should never give up the ship!

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