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The Road to Holland

The Belt and Road Initiative: implications and opportunities of rail freight transport between China and the Netherlands

Study at the request of the Netherlands ministry of Infrastructure and Water Management

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Management summary

The Chinese Belt and Road Initiative (BRI), also referred to as the 'New Silk Road', comprises two key elements. On the one hand, development of the 'Maritime Silk Road' is aimed at maritime connectivity between coastal regions and their hinterlands in Southeast Asia and the Middle East. The 'Silk Road Economic Belt', on the other hand, is to bring about economic integration and remove infrastructure bottlenecks in Central Asia and Southeast Asia. This includes expansion of rail freight connections between China and Europe. From 2015 onwards, a substantial increase in rail freight flows between China and Europe has been witnessed.

The potential of intercontinental rail freight lies in its middle position between ocean and air. Other important factors are large-scale Chinese government subsidies, occasional capacity shortages in the other modalities, ongoing economic development in the Chinese hinterland, a global trend of curbing costs for capital use, and the availability of an alternative and flexible modality. However, important challenges remain. These include infrastructure shortfalls, inefficient customs and transshipment procedures at border crossings and brake-of-gauge, delays and congestion at arrival terminals in the EU, and the accompanying uncertainties and planning issues. Also, impediments for the use of temperature-controlled containers, import sanctions in place between the EU and Russia, free-trade limitations vis-à-vis China, and a lack of control over the transport process are seen as obstacles for European shippers.

The most important railway corridor between China and Western Europe, now and in the foreseeable future, runs through Poland, Belarus, Russia and Kazakhstan. Under normal circumstances, lead times from inland China to Western Europe stand at 15 to 16 days, which would allow for a time saving of some 14 days compared to ocean. However, currently experienced delays are seen to increase lead times to 18 to 19 days or even more. Brake of gauge takes place on the Polish-Belarusian border (typically Malaszewicze/Brest) and on the Kazakh-Chinese border (typically Dostyk/Alashankou; Khorgos). Customs procedures also take place on these border crossings, with Russia, Belarus and Kazakhstan being members of the Eurasian Economic Union (EAEU) customs area. The Malaszewicze/Brest border crossing is identified by all stakeholders as the most pressing bottleneck, notably for westbound transport.

The organisation and planning of rail freight transport between China and Europe is carried out by Chinese intermodal operators, who act by order of city or regional authorities. Competition for subsidies and freight between Chinese cities and regions from which the trains depart is intense. Although economic rationality is certainly the foremost guide in establishing new services, other factors such as networking contacts (government to government, business to government), city bonds and operational circumstances also come into play. Chinese decision makers are well aware of the practicalities of rail freight transport to and from Europe and the positioning of end terminals in the European hinterland. However, specific knowledge of the Netherlands and its leading position in infrastructure and transport, including the extensive distribution centres in the country's southeast and the high-capacity dedicated rail freight infrastructure between the ports of Rotterdam and Amsterdam and the German hinterland (*Betuweroute*), is less apparent.

Essential points of departure and arrival for containers from and to the Netherlands are Duisburg and Tilburg. Duisburg has myriad connections with Chinese destinations, such as Chongqing, Beijing, Dalian, Harbin, Qingdao, Shenyang, Shilong, Tianjin, Wuhan, Yingkou and Yiwu. Tilburg currently offers triweekly services to and from Chengdu, with expansion of the rail terminal creating capacity for greater numbers of trains and destinations. A Nunner Logistics run shuttle linking the port of Amsterdam to Yiwu (via Duisburg) is being started, aiming for several services per week.



Rail freight volumes between China and the Netherlands have strongly increased over the past years and are estimated at some 25.000 TEU for import and export in 2018, with the inland provinces of Jiangsu, Chongqing and Yunnan being the top 3 Chinese origins and Sichuan province (Chengdu) the vital destination. Towards 2030, rail freight potential for import from China to the Netherlands stands at some 297.000 TEU per annum (making up for 10 to 15 trains per day). Potential for export equals some 28.000 TEU per annum (roughly 7 trains per week). Impact on the Dutch transport economy is mild but significant. Distribution centres in the southeast of the country will become modestly more competitive, whereas the port of Rotterdam will likely see a limited share of its future growth in container turnover curbed.

So far, European countries have reacted to BRI in different ways. Generally, Central, Eastern and Southeast European countries, some of them struggling with high unemployment and limited financial means for infrastructure development, appear to have embraced the initiative. To be sure, Chinese infrastructure investments in European countries generally appear to process slow, with some countries only moderately interested in attracting financing. Also, EU internal market rules as well as rules and funds associated with European TEN-T policy seem to put a brake on Chinese investments. Western and Northern European countries, on the other hand, have been more reticent although not dismissive.

At the European level a discussion is taking place concerning BRI's wider strategic implications and Chinese infrastructure investments in the EU and its neighbourhood. A communication from the European Commission detailing infrastructure investment options in the EU and Eastern Partnership countries, with the aim of improving transport connections between TEN-T and countries to the East, is expected in summer 2018. Stakeholders indicate that actively taking stock in BRI is in the interest of the Netherlands and other European countries. Being involved in upgraded and new infrastructure and services in the EU and beyond, including on government level, brings a measure of shared control, whereas the opposite leaves the risk of loss of influence.

An active role for the Dutch Ministry of Infrastructure and Water Management brings a number of important advantages. The Netherlands has a clear interest in furthering the quality and efficiency of rail freight connections to the EU-EAEU border and beyond, whilst simultaneously addressing strategic challenges in a European context – both matters requiring ministerial involvement. In addition, coordinating and consolidating promotional actions towards Chinese stakeholders with regard to the Dutch leading position in transport would allow for an effective approach, both in terms of concrete actions and in terms of attaining access to the appropriate levels of decision making. As mentioned already, on the Chinese side BRI is ultimately managed at the governmental level, thus requiring involvement from the Dutch government as counterpart.

- Improve corridor quality
- Emphasise the importance of the continuing development of unified railway law for intercontinental rail freight transport at EU and CIT level
- Include BRI connectivity as one of the Dutch priorities with regard to TEN-T Rail Freight Corridors, particularly RFC North Sea-Baltic
- Establish platform with the BRI states
- Ensure that the Netherlands is represented in multilateral meetings where BRI is discussed
- Establish contacts with respective Chinese counterparts in the Ministry of Transport, important cities and regions, and intermodal operators
- Address strategic challenges coming from BRI in a European context.
- Promote the Netherlands as integral part of BRI, including its leading position in transport
- Support Dutch companies and regions that are interested in BRI
- The ministry should be represented when Chinese delegations visit the Netherlands, in order to support the relevant Dutch companies and regions and to ensure that the Chinese visitors meet with the right counterpart and recognise the government supports the sector



1 Introduction

The Chinese 'Belt and Road Initiative' (BRI) is seen as an important driver to foster economic and trade growth by improving the transport and logistics network between China and the larger Eurasian hemisphere. Among other implications, the large-scale initiative is expected to affect freight transport to and from Europe.

Announced in 2013 by Chinese president Xi Jinping, the BRI initiative – also referred to as the 'New Silk Road' – comprises two key elements. On the one hand, development of the 'Maritime Silk Road' is aimed at maritime connectivity between coastal regions and their hinterlands in Southeast Asia and the Middle East. The 'Silk Road Economic Belt', on the other hand, is to bring about economic integration and remove infrastructural bottlenecks in Central and Southeast Asia. This includes expansion of rail freight connections between China and Europe.

From 2015 onwards, a substantial increase in rail freight flows between China and Europe has been witnessed. Most trains from China to Europe, some 50 per week at the moment, are block trains with a single customer. However, recently added services offer smaller transports as well, including full container (FCL) and less-than-container (LCL) loads. The predominant departure point is the city of Chongqing (some 10-15 trains per week), whereas the most important destination in Europe is Duisburg (around 25 trains per week). Often regarded as key drivers are the demand for time-sensitive transport, with rail being considerably faster than ocean freight and less expensive than air freight, and the relocation of certain manufacturing industries into the Chinese hinterland.



Figure 1-1. The main land and ocean corridors advanced by the Belt and Road Initiative. ©Province of Gelderland

The BRI initiative and the recent increase of intercontinental rail freight transport give rise to a number of questions for the Ministry of Infrastructure and Water Management, especially regarding if specific steps should be taken. What is the current market situation and how will it develop over the next years? What business opportunities arise from the initiative and which barriers could they face? Which are the vital destinations and regions of origin in China and Europe? Are distribution centres being shifted eastward? What opportunities and/or threats present themselves to Dutch mainports? And in what way should the Ministry of Infrastructure



and Water Management anticipate on these developments? This study answers these questions by examining rail freight transport from China to the Netherlands and vice versa, by analysing the implications for the Netherlands and, based on its findings, by making recommendations.

1.1 Reader's guide

This study starts with an assessment of the railway corridor in terms of infrastructure, legal frameworks, organisation, and rail freight services (Chapter 3), followed by an analysis of current and future rail freight flows between China and the Netherlands (Chapter 4). The implications for the Netherlands are identified and assessed, focusing on the Dutch transport economy (freight distribution centres and seaports – Chapter 5) as well as on wider strategic considerations (Chapter 6). Finally, a grounded set of practicable policy options for the Ministry of Infrastructure and Water Management is developed (Chapter 7).

2 Why rail?

As already hinted on, intercontinental rail freight's potential first of all seems to lie in its middle position between ocean and air freight in terms of cost and lead time. Being faster but more expensive than ocean, and less expensive but slower than air, rail is thought capable of offering competitive transport for time-sensitive and/or high-value goods (estimated to account for some 65% of the total rail value between China and the EU), especially for Chinese imports into the EU. The modality has thus been coined 'fast ocean' but might as well be labelled 'cheap air.'

However, with rail between Europe and China being a relatively new modality, other factors are seen to contribute to an altering playing field, too. Ocean freight's capacity has occasionally fallen short over the previous years and is not without congestions and delays either. Indeed, 2017 not only brought the insolvency of one of the major container lines, causing significant damage to shippers, but also saw the formation of new alliances in the branch. Air freight, usually regarded an expensive modality used for time-sensitive transport and as an alternative for ocean in cases of delay, has at times also been struggling to meet demand. Seen from this perspective, the alternative offered by rail seems to have seized the right moment.

Doubtless, large Chinese government subsidies on intercontinental rail freight services, have been a vital driver behind the uptake of the China-Europe connection. Indeed, multiple sources with different backgrounds lead us to a cost indication ranging from \$300.000 to \$450.000 and a subsidy indication ranging from \$100.000 to \$200.000 per roundtrip, with differences between Chinese cities in terms of amount and way of disbursement. Chinese decision-makers hint on an intention to cut subsidies from 2020 on, but without being specific. However, given the levels of subsidies it seems questionable that rail freight services between China and Europe will become economically self-supporting in the short to medium term.

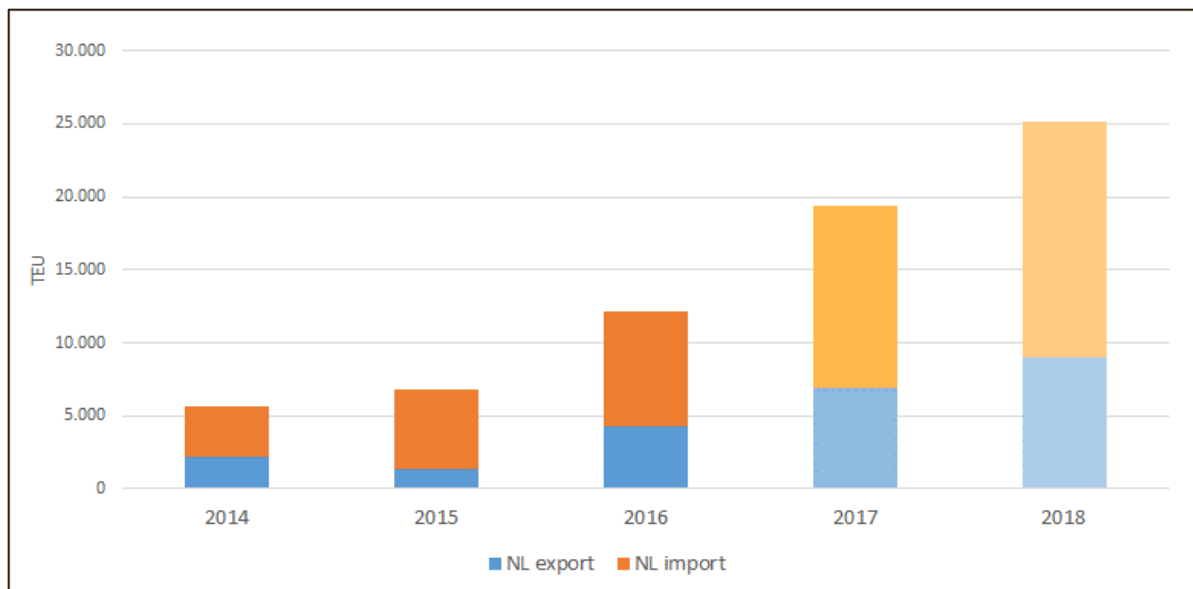


Figure 2-1. Rail freight volumes (TEUs) between China and the Netherlands 2014-2018. Volumes for 2017 and 2018 derived from growth estimations by Belarusian Railways. ©Panteia



Other factors are the ongoing economic and industrial development in landlocked regions in both China and Central and Eastern Europe (CEE) and a global trend of curbing costs of capital use. Increasing freight flows from and between inland regions, at distance from deep-sea ports, can be expected to enhance the case for rail freight links. Indeed, stakeholders expect that further growth of intercontinental rail freight services will involve multiple origins and destinations in the European and Asian hinterland rather than a limited number of departure and arrival points. The new modality allows for savings on capital costs, as it limits the transport time – in which capital is ‘frozen’ – for greater numbers of commodities and for greater volumes. Shippers depending on external funding can thus reduce costs of credit, whereas capital-rich companies are able to use greater parts of their financial capital for other purposes. A value proposition is shown in Table 2-1.

The value of goods in the container	US\$ 1,000,000	
Mode of transportation from China to Europe	By rail	By sea
Loan interest rate	6%	6%
Duration of transportation (days)	20	50
Carriage price (US\$)	5,000	2,000
Cost of capital use 6% (US\$)	3,288	8,219
Price of carriage and capital use (US\$) 6%	8,288	10,219
Cost of capital use 8% (US\$)	4,384	10,591
Price of carriage and capital use (US\$) 8%	9,384	12,591

Table 2-1. Value proposition of intercontinental rail freight versus ocean for high-value goods, taking into account capital costs. ©OSW/Centre for Eastern Studies

Most stakeholders experience the rail connection as a relatively flexible modality, albeit with significant differences between westbound and eastbound services. Contrary to eastbound trains, westbound trains usually have load factors of 90% or higher and therefore offer less flexibility. A commodity for which flexibility is of particular importance is E-commerce, a fast-growing trade between Europe and China and expected by many to play a role in further growth. As we will see, E-commerce could greatly benefit from improved customs procedures.

A potential future factor, anticipated by some, are possible cost increases in air and ocean freight due to internalisation of external costs (emission of greenhouse gases, SO_x, NO_x, particulate matter as well as noise) and perhaps rising fuel prices, from which rail could surface as a winner. Northwestern European deep-sea ports, on the other hand, could attract certain additional freight flows through transfer to and from shortsea connections, rather than seeing their overall turnover decrease. On balance, the majority of stakeholders expect intercontinental rail freight to constitute mild competition for both ocean and air freight.



Seen from the above perspective, the stage might appear to be set for significant growth of rail freight transport between Europe and China over the coming years. Nevertheless, important challenges remain, some of which interact. Infrastructure shortfalls, combined with inefficient customs procedures, are seen to considerably increase lead times, whilst accompanying uncertainties could thwart rail's credentials as a flexible, alternative modality. A significant number of stakeholders indicate not to recognise flexibility of booking, nor reliability of the services, especially for temperature-conditioned (refrigerated or heated) cargo.



Figure 2-2. The main Eurasian East-West rail corridors. ©Panteia

A somewhat related issue concerns the trade sanctions set by the Russian authorities and free-trade limitations vis-à-vis China with regard to a number of commodities (particularly agrofood). Both factors are experienced as impediments. Also, most chemical products are not transported by intercontinental rail due to safety restrictions, particularly in China. Finally, both near-exclusive control over the transport process by Chinese operators and the dependency of price setting on Chinese government subsidies are regarded by stakeholders as causes for uncertainty. The next paragraphs will outline the aforementioned bottlenecks in more detail.



3 The intercontinental rail freight corridor

3.1 Routes, capacity, bottlenecks and investments

As set forth already, by far the most important railway corridor between Western Europe and China, now and in the foreseeable future, runs through Poland, Belarus, Russia and Kazakhstan. Trains typically carry up to 41 high-cube containers of 40 ft., making up for trains of approximately 565 m. As a rule, the trains do not exceed the total number of 41 *containers*, of any type or size, due to Chinese government subsidy regulations in conjunction with infrastructure capacity in the EU. However, for the long haul through the Eurasian Economic Union (EAEU) countries – in effect Belarus, Russia and Kazakhstan – where freight trains often exceed 1.000 m, combining trains is common use.

Under normal circumstances, lead times from terminals in inland China to Duisburg stand at 15 to 16 days or slightly less, which would allow for a time saving of some 14 days compared to ocean for the overall transport. However, currently experienced delays are seen to increase lead times to 18 to 19 days or even more. These partially capacity-related issues are a driver towards considering and testing possibilities for using alternative stretches. In the next sections, this is examined in more detail.

3.1.1 The main corridor

From the Polish-Belarusian border, two routes are available. The first proceeds to Moscow and from there to Yekaterinburg, where the corridor is split up with the most important leg transiting Kazakhstan towards the Chinese border, and an alternative leg transiting Siberia and reaching China either via Mongolia or via the Russo-Chinese border. The second route diverts at Minsk, transits Southern Russia and then crosses into Western Kazakhstan, from where it also proceeds to the Chinese border. Over two thirds of rail freight between China and Europe is shipped via the Russia-Kazakhstan route, with only small portions via alternative routes.



Figure 3-1. The main Europe-China railway corridor. ©Panteia



Brake of gauge takes place on the Polish-Belarusian border (Malaszewicze/Brest or alternative EU-EAEU border crossings) and on the Kazakh-Chinese border (Dostyk/Alashankou; Khorgos) or, for the Trans-Siberian route, the Russo-Chinese (Zabaykalsk/Manzhouli) or Mongolian-Chinese border (Erenhot). Customs procedures also take place on these border crossings, with Russia, Belarus and Kazakhstan being members of the Eurasian Economic Union (EAEU) customs area and Mongolia being aligned to it.

The essential milestones are thus:

- Assembly/arrival of the transports at European rail terminals, such as Duisburg, Hamburg or Tilburg
- Brake of gauge, transshipment and customs procedures at Malaszewicze/Brest
- Brake of gauge, transshipment and customs procedures at Dostyk/Alashankou or Khorgos
- Arrival/assembly of the transports at Chinese rail terminals, such as Chongqing, Chengdu, Wuhan, Xi'an or Yiwu.

The Eurasian Economic Union

The Eurasian Economic Union (EAEU) is an economic union in the Northern Eurasian hemisphere, which entered into force in 2015. It currently consists of Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan, with possible prospects for deeper cooperation or accession for others. Notably, this may concern Tajikistan, Azerbaijan, Mongolia, Moldova and Turkmenistan.

The EAEU has an integrated market of some 183 million people, with considerable combined economic output. It features free movement of goods and people and envisages gradual integration of markets, although the process seems to have slowed down. Common policies are in place in a number of fields – including customs, transport and foreign trade and investment. Free trade agreements exist with a number of countries, including Moldova, Uzbekistan and Vietnam.

As the Chinese BRI initiative is expected to bring considerable investments to the Central Asian region, the EAEU is regarded by some observers as an unfortunate – or even inferior – competitor. However, from a transport perspective, the Eurasian customs union removes a number of technical and customs obstacles for the Silk Road Economic Belt, and can thus be regarded complementary to Chinese aims. In May 2018, a Free Trade Agreement (FTA) was signed between the EAEU and China.

thediplomat.com/2018/01/remember-the-urasian-economic-union/
www.cer.eu/sites/default/files/pb_eurasian_IB_16.3.17_0.pdf

European sections, terminals and transshipment points

The most important start and end point for trains to and from China is the inland port of Duisburg, which now handles some 120 trains per month in either direction, and in the same area the inland port of Neuss. Other important departure and arrival points include the port of Hamburg, Railport Brabant (Tilburg) and, in Central Europe, Łódź (Łódź Special Economic Zone) and Budapest. Apart from the logistic rationale, not all European rail terminals are able to handle trains to and from China due to the requirement to be capable of communicating with information control systems used by the Chinese intermodal operators who organise the transport process (see paragraph



3.3). A number of Western European destinations, including the port of Amsterdam as of March 2018, are serviced through Duisburg rather than directly.

The trains reach the Polish-Belarus border at Malaszewicze/Brest, where brake-of-gauge transshipment and customs procedures take place. Traditionally, westbound trains were transhipped in Malascewicze, whereas eastbound trains were transhipped at Brest. However, nowadays operators can decide on which side of the border the transshipment takes place.

The Malaszewicze/Brest border crossing is identified by all stakeholders as the first and foremost bottleneck, notably for westbound transport. Ideally, transshipment and customs procedures would take some 18 hours for an entire train (this is the official aim of the Belarus Railways), but in practice this may last for 2 to 3 days or even longer. This, combined with the notorious difficulties of the busy European railway network, causes many trains to arrive with serious delay at their Western European destinations and leads to rescheduling issues and congestion at the most important arrival terminals.

Estimations of current infrastructure capacity at the border crossing (e.g. availability of cranes and tracks at the terminals) stand at some 10 trains per day (loaded with 80 TEU). Also, current regulations between Poland and Belarus allow for a maximum of 12 border crossings per day. Thus, in terms of infrastructure, the border crossing may already be operating at its maximum capacity¹.

The Malaszewicze/Brest border crossing: essential logistic procedures

For westbound trains, handling procedures typically resemble the following path:

1. Belarusian railways run the train to a Belarusian railway terminal
2. Belarusian customs control
- ~~3.~~ 3. Border control on two sides of the border
4. Shunting across the border to Polish customs – typically carried out by Belarusian railways
5. Shunting to Polish terminal for transshipment – carried out by one of two Polish shunting operators
6. Operator picks up train

For eastbound trains, procedures are slightly different:

1. Rail operator runs the train to a Polish terminal
2. Shunting to Polish customs station
3. Border control on two sides of the border
4. Shunting by Polish operator across the border to Belarusian terminal
5. Transshipment and customs at Belarusian terminal
6. Taking over by Belarusian railways

As will be detailed in the next paragraph, border procedures are generally very time-consuming. Also, the time needed for border procedures can deviate due to logistics processes of operators (choice of terminal, trucking operations between terminals, loading and unloading in addition to transshipment, storages, train composition) or incorrect documents. It therefore seems fair to conclude that infrastructure limitations coincide with suboptimal administrative procedures and organisation.

¹ www.belint.de/material/belintpresentation.pdf



Poland intends to invest some 55 million euros in the facilities on the Polish side of the border over the coming years, aiming to increase capacity and enable the use of 750m trains and higher axle loads. Another 40 million of investment is depending on the construction of a third railway bridge (broad gauge only) and additional tracks across the border jointly with Belarus. Terminals on the Polish side are privately owned, whereas Belarusian facilities belong to Belarusian Railway. Ideally, infrastructure investments would be accompanied by optimisation of procedural management and communication between parties on both sides of the border, initiatives for which are being started as well. Options for improvement are being considered by multiple stakeholders, but, as we will see, partially depend on customs regulations. One possible option could be a limitation of loading and unloading operations at the border terminals, in order to focus on essential border handling (transshipment and legal procedures). Also, optimising shunting procedures of empty wagons in the border area is considered.

Obviously, another option might be bypassing Malaszewicze/Brest altogether, possibilities for which are being examined by a number of market parties. One such possible option would run from Poland through Lithuania, entering the broad-gauge system at Šeštokai, and rejoin the main corridor at Minsk. Infrastructure capacity on this route is relatively limited, however, thus rendering it unsuitable for large numbers of trains in the foreseeable future. Currently the Polish and Belarus governments are also considering a second border crossing north of Malaszewicze (Czeremcha/Vysokolitovsk) for border crossing. Another potential bypass transits Ukraine, possibly departing from Budapest or Bratislava and changing to broad gauge at Dobrá/Chop. Recently a plan was conceived by the Austrian, Slovak and Russian railways to construct a broad-gauge freight railway line from nearby Košice to Vienna. According to the plan, construction would start in 2024 with operational status to be reached in 2033².

Brest-Dostyk sections, terminals and transshipment points

The route from Poland, via Belarus and to Moscow has well-developed (electrified) infrastructure, albeit with different systems and the aforementioned brake of gauge. Belarus and the Russian Federation are parts of the EAEU customs union and apply the same standards for rail operations. Therefore, border procedures at the Russian-Belarusian border are driven by technical and staff management matters rather than by cargo clearance.

An upcoming cargo hub is Minsk, where considerable investments are seen to take place in i.a. the China-Belarus Industrial Park, which is expected to increase and diversify the country's production output. The hub's connection to the intercontinental corridor will be improved simultaneously, with among others Duisport investing in rail freight facilities³. As such, Minsk could become an example of creating added value along the corridor.

Moscow, next to being a central hinge for intercontinental rail freight, is of increasing importance as a destination – and to a lesser extent point of departure – for rail freight from China. For certain commodities this may cause a slight loss for Northwest European deep-sea ports, as cargo to and from the Russian market may otherwise be transhipped there, onto and from shortsea services connecting with Baltic ports. The number of rail freight services from China to Moscow now stands at over 10 trains per week and is seen growing, with tariffs at around \$4.000 per forty feet unit.

Trains from Western China into Kazakhstan can use two border crossings. First, the traditional border and transshipment facility at Dostyk/Alashankou is handling the vast bulk of intercontinental trains, with procedures being led by Chinese operators. Second, the new facilities at Khorgos are

² www.railjournal.com/index.php/freight/austria-backs-broad-gauge-extension-to-vienna.html?channel=527&utm_source=Email_marketing&utm_campaign=IRJ_Rail_Brief_Feb_28_2018&cmp=1&utm_medium=HTMLEmail

www.wiwo.de/unternehmen/handel/neue-seidenstrasse-duisburger-hafen-will-china-geschaefte-ausbauen/21125382.html



projected to handle increasing volumes, especially for trade to and from Central Asia, the Caucasus and Turkey. From the Chinese-Kazakh border, lead times to Brest/Malaszewicze are stable at 8 to 10 days, covering between 1.000 and 1.100 kilometers per day. The busiest station of departure in China is Chongqing, with over 10 trains per week, followed by Chengdu, Wuhan, Yiwu and others.

Freight trains destined for the EU typically carry 41 forty feet units, making up for trains of approximately 565 m. Although in both the EAEU countries and China longer trains of over 1.000 m are operated, the European railway system, including the Malaszewicze/Brest border crossing are equipped for trains <750 m. According to stakeholders, both lead time and border handling might be improved by bundling all shipments on shuttle trains between Dostyk and Brest, rather than handling all trains from Chinese and European points of departure on an ad-hoc basis. This, however, would have to be administrated by the Chinese intermodal operators.

Between Moscow and China, parts of the route are single-track. Although the use of very long trains is common, and two parallel routes are available, future bottlenecks on these stretches cannot be excluded. The Russian and Kazakh railway authorities have indicated to the researchers that upgrades are being considered, but no decisions have been taken yet. According to the stakeholders, however, particularly Kazakhstan is keen to play an active role in further implementation of BRI.

3.1.2 *Alternative corridors*

Routes that are complementary to the one described above are still being used primarily for domestic and intra-continental transport between China, Russia, Central Asia and the Middle East. As already noted, for the main corridor an alternative for traversing Kazakhstan is the Trans-Siberian route, starting at Yekaterinburg and reaching Northeast China over Russian territory at the Manzhouli/Zabaykalsk border facilities, or via Mongolia at Erenhot. A parallel route to the Trans-Siberian railway is the Baikal-Amur line, which is primarily used for domestic freight transport. In 2017 it was announced that the Russian Federation plans to invest \$43 billion over the next five years to upgrade its railway infrastructure. This includes the Baikal-Amur and Trans-Siberian routes, and connectivity projects to the Baltic and Black seas⁴. Apart from improving domestic rail freight and passenger transport, it is unclear what the effects on intercontinental rail freight will be.

A completely different corridor is seen running through Kazakhstan and other Central Asian countries and connecting Western China to the Caucasus region, Turkey, and ultimately Central Europe. A central connecting hub is the port of Baku (Azerbaijan), from where rail ferries reach the ports of Aktau (Kazakhstan) and Turkmenbashi (Turkmenistan). Considerable infrastructure investment takes place on either side of the Caspian Sea. On the Caucasus side, the newly constructed Kars (Turkey)-Tiflis (Georgia)-Baku (Azerbaijan) Railway extends the corridor into Turkey. The line then connects to the Trans-Anatolian railway, running from Eastern Turkey to Istanbul, where the double track Marmaray rail tunnel links Asia to Europe. However, the ferry connection over the Caspian Sea and the relatively poor rail infrastructure in Southeast Europe continue to constitute a bottleneck.

Potential advantages of the southern route are the availability of an alternative corridor in conjunction with bypassing Russia. The latter is considered beneficial from a perspective of international interdependency, and avoids the trade sanctions in place between the European Union and the Russian government. However, a considerable number of stakeholders believe both the longer lead time compared to the northern route and the additional costs of the aforementioned rail ferries will forbid economic feasibility of the route in the foreseeable future. Also, political stability along the southern route has been questioned (see 6.4). According to a

⁴ www.rbth.com/business/2017/03/02/russia-europe-asia-transport-corridor-712173



number of stakeholders, disadvantages of the southern corridor add to the case for using ocean freight between this part of the world and China. Notwithstanding these considerations, Chinese decision-makers have indicated to the researchers that the southern route is primarily regarded in strategic rather than commercial terms and has their attention.



Figure 3-2. The southern corridor (Kazakhstan route). ©Trans-Caspian International Transport Route

Daily services exist between Western Europe (i.a. Duisburg, Rotterdam) and Istanbul, some of which call at Budapest⁵, with lead times of around 5 days. Alternatively, part of the route from Western Europe to Istanbul may be covered by road. Services to Teheran are offered, too. A first service to China via Turkey and the Caspian is under consideration, and might grow to 3 services per week. However, large-scale uptake of the southern route has not been witnessed so far.

3.2 The legal framework: customs procedures

The legal procedures for rail freight transport between China and the EU are set by the frameworks applied in Western Europe on the one hand, and the Eurasian countries on the other. The Europe-based International Rail Transport Committee (CIT), based on the Convention concerning International Carriage by Rail (COTIF), uses the Uniform Rules concerning the Contract of International Carriage of Goods by Rail (CIM) consignment note. The Eurasian Organisation for Cooperation on Railways (OSJD) uses the SMGS consignment note.

Ideally, for freight transport crossing the EU-EAEU border, the common CIM-SMGS consignment note is used. However, in many cases CIM and SMGS appear to be used separately as the common CIM-SMGS document may entail complicated contractual relationships. Legally, CIM-SMGS applies as transit document for the EAEU, as well as Mongolia, in the same way as CIM applies for transport through the EU. CIM-SMGS can also be used without official status for the rail leg between the Chinese border and the Chinese points of arrival and departure, where official clearance is carried out. The official formats are often accompanied by attached documents in different formats, including World Customs Organisation (WCO) notices.

⁵ www.railcargo.nl/railscout



The EU-EAEU border is recognised by all stakeholders as a bottleneck in terms of customs procedures. As noted, a number of operators do not use the joint CIM-SMGS customs document, but have to clear goods from one customs system to the other (CIM to SMGS or vice versa). This is a time-consuming process, as details might be missing or have to be translated into the appropriate format, and trains may arrive in a different order.

A significant discrepancy between theory and operational practicalities seems to exist. For import flows from China to the EU, information exchange between China and the Polish customs authorities is an inefficient process, regardless the ample time between departure from Dostyk/Alashankou and arrival at Brest/Malaszewicze. Translation between the electronic EDI format used in the EU and the paper format used elsewhere is not fine-tuned in terms of information required. Also, language difficulties persist, including for WCO and other attachments (at Dostyk/Alashankou the language issue is tackled by Chinese Railways translation staff). In case of freight for which non-fiscal obligations apply (veterinary and phytosanitary control), formalities are often unclear, thus making up for much administration. Another problem experienced is that information for rail freight differs from information for other modes, whereas customs formats tend to be harmonised for all modes. As a consequence, and also hampering a level playing field, most operators try to maintain their own exceptional *modus operandi* with customs authorities.

For less-than-container loads (LCLs), all parcels and pallets are required to be registered and checked at the customs station separately. This causes serious delays, even for trains with only a small number of LCL containers. For E-commerce, specifically, the procedure implies that all such containers are offloaded at Malaszewicze and hauled by road to a dedicated facility at Lublin. For this part of the transport a level playing field is lacking: both the road haulage and customs handling station fall under Polish jurisdiction and are run by Polish (state) companies. Moreover, as reloading the cargo on the trains after clearance is inefficient, road transport is also used for dispersal to the end destinations. A possible improvement would be to keep the sealed LCL containers on the trains and carry out clearance at dedicated customs stations close to the end terminals (proposed amongst others by CER). However, this would require a change in EU customs law as well as the cooperation of the Polish customs authorities.

Another impediment, especially for westbound transport, are the high customs guarantees for transit through the EU (between Malaszewicze and the end destinations), which may run into hundreds of thousands of euros per container, depending on the type of cargo and the destination country. This implies that large amounts of capital are being frozen during the transport time between the EU border and the end stations, thus increasing the cost for using the rail connection. Also, containers are seen to pile up at Malaszewicze as the shipments can proceed only when sufficient capital is freed through clearance of earlier shipments. Possible improvements could be the setting of uniform tariffs for customs guarantees throughout the EU, and the standard involvement of specialised customs brokers with Authorised Economic Operator (AEO) status who are subject to lower tariffs.

Improving customs procedures would involve close cooperation between regulators (the EU, EAEU and the Chinese government), as well as between national customs authorities. Procedures could be addressed by creating a rail-dedicated, electronic format with harmonised information between CIM and SMGS, including fiscal and non-fiscal requirements (unified railway law). Clearance would ideally take place at the end destinations, and information shared in advance, thus strongly simplifying procedures at the border crossings. For the EU, implementation of customs regulations by the member states should be carried out in a uniform way, so as to coordinate procedures for all EU-EAEU border crossings.



3.3 Running the trains: Chinese decision makers

The organisation and planning of rail freight transport between China and Europe involves the active cooperation of multiple states, railway and terminal operators and market parties. As we have seen, different customs regimes and technical systems are in use along the route, with the EU-EAEU and EAEU-China borders implying customs clearance and transshipment between different rolling stock (wagons and locomotives).

Figure 3-3 shows the relations between the main parties involved in organising and carrying out the rail freight services. Chinese intermodal operators are the central players, closing contractual relations with clients (shippers and forwarders) and operators along the rail corridor (state railway operators, terminal and shunting operators, customs brokers). The intermodal operators are usually seen to act by order of the city and/or regional authorities, who are permitted to run the services by the Central Authorities in Beijing. Government subsidies are usually disbursed by the city and/or regional authorities to the respective intermodal operators. A joint working group between the German, Polish, Belarusian, Russian, Kazakh, Ulaanbaatar and Chinese (state) railways was instated in 2017, aiming to deepen cooperation and increasing the market share of intercontinental rail freight⁶.

Competition for subsidies and freight between Chinese cities and regions from which the trains depart is intense. After the announcement of BRI, some 60 services were started between 2013 and 2017, linking inland as well as coastal provinces of China to the EU. The different points of departure are seen to further their own interest wherever they can, and may even hinder each other. Thus, although economic rationality is certainly the foremost guide in establishing services, other factors such as networking contacts (government to government, business to government), city bonds and operational circumstances also come into play. Overall, from the Chinese perspective, catchment areas of terminals of origin and destination are regarded to be far more extensive than their immediate vicinity, with medium-distance (up to 1.000 km) pre and end haulage by other modalities being a natural part of the transport process.

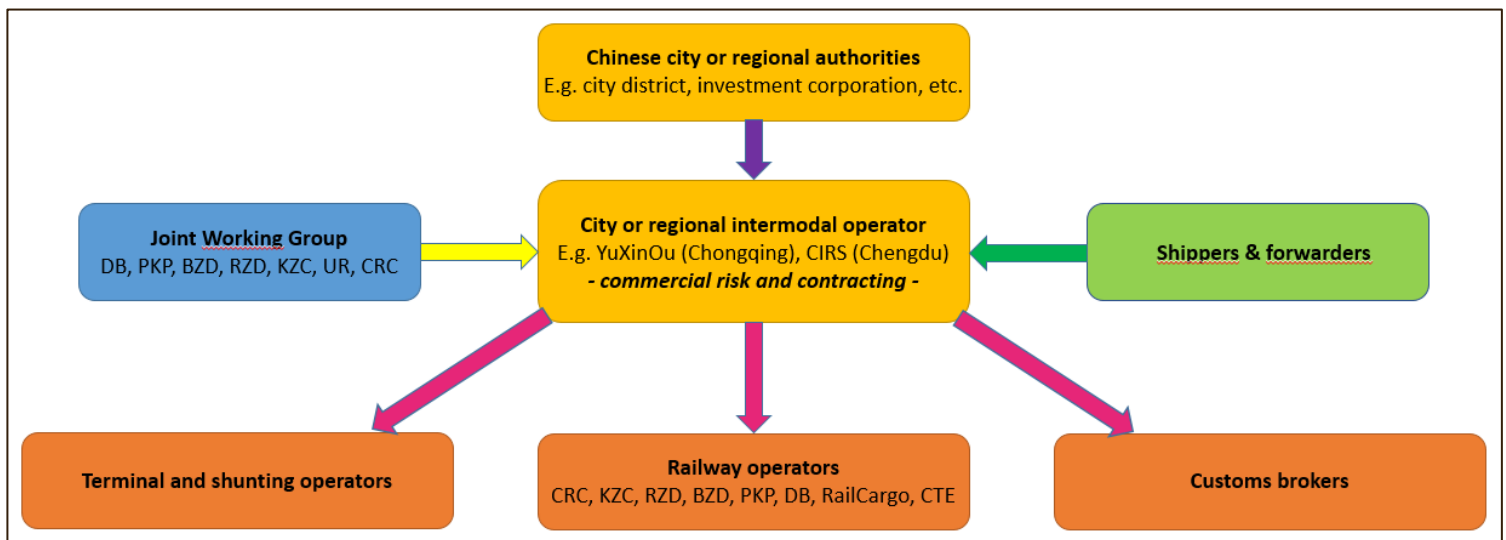


Figure 3-3. The organisational chart for rail freight services between China and Europe ©Panteia

Chinese decision-makers generally seem well aware of the practicalities and challenges of rail freight transport to and from Europe, and the positioning of end terminals in the European hinterland. However, specific knowledge of the Netherlands and its leading position in

⁶ <http://www.railwaygazette.com/news/freight/single-view/view/seven-railways-sign-china-europe-container-agreement.html>

infrastructure and transport, including the extensive distribution centres in the country's southeast and the high-capacity, dedicated rail freight infrastructure between the seaports of Rotterdam and Amsterdam and the German hinterland (the so-called *Betuweroute*), is less apparent.

In order to increase the efficiency of the transport process, and therefore to be able to curb government subsidies (estimated at \$100.000-\$200.000 per roundtrip), the Central Authorities intend to strengthen internal coordination and possibly limit the number of departure points. Bringing the locations of the terminals more into line with those of the main production centres, thereby potentially cutting out inefficient long-distance pre and end haulage, may significantly reduce the cost of using the rail connection.

3.4 Rail freight services between China and the Netherlands

Essential points of departure and arrival for containers from and to the Netherlands are Duisburg and Tilburg. Duisburg has myriad connections with Chinese destinations, such as Chongqing, Beijing, Dalian, Harbin, Qingdao, Shenyang, Shilong, Tianjin, Wuhan, Yingkou and Yiwu⁷. Tilburg currently offers triweekly services to and from Chengdu⁸, while the expansion of the rail terminal creates capacity for greater numbers of trains and destinations in the future.

Both New Silkway Logistics (a combination of KLG, Essers and Wagenborg) and Nunner Logistics are using Duisburg as their starting point, whereas GVT Logistics uses Tilburg. Also, a number of smaller service providers either directly or indirectly book slots on the trains. Both Tilburg and Duisburg have highly frequent connections to the ports of Rotterdam and Antwerp. Rail freight from China proceeding to the European seaports is still limited, however, now standing at some 20 TEU per week for the Tilburg-Rotterdam leg. A Nunner Logistics run shuttle linking the port of Amsterdam to Yiwu (via Duisburg) is being started, with an aim for several services per week.

The vast bulk of containers used are 40 ft. high cube (HC), typically loaded in pairs on 80 ft. wagons. The use of 20 ft. units is far less common, whereas the use of 45 ft. containers is limited, in part due to irregular availability of 90 and 60 ft. wagons in the EU. Stakeholders, including Chinese decision makers, indicate that 20 ft. containers are commonly used for urgent shipments, whereas 45 ft. could help facilitate larger volumes.

Moreover, 45 ft. is the standard for temperature conditioned (reefer) containers. Temperature-controlled containers are not only used for typical refrigerated cargo such as agrofood and medicines, but also for all products that cannot withstand the extreme temperatures (-40/+40°C) that may occur in Russia and Central Asia. Next to difficulties in fitting the reefers onto the trains, stakeholders emphasize reliability is an obstacle. Although it is generally possible to monitor the climate inside the reefer along the route, organising timely emergency repairs is an uncertain affair and entails high additional costs. Also, the required facilities at the transshipment terminals are limited. These issues concerning the 'cold chain' appear to withhold considerable numbers of shippers from using the rail connection.

As mentioned already, official tariffs generally range from \$2.500-3.000 to \$4.000-5.000 per standard 40 ft. container for westbound shipments, and from \$2.500 to \$3.500 per 40 ft. container for eastbound shipments. Exact prices depend on the points of departure and destinations as well as on the type of container and cargo. In most cases, pre and/or end haulage need to be taken into account too, such as in so-called 'free on rail' or 'door to port' arrangements in which end haulage is not included in the tariff. Prices may decrease with a further uptake in volumes, especially considering the relatively low load factors of eastbound trains (only gradually increasing over the past years and now standing at some 60% – as opposed to >90% for westbound trains).

⁷ www.duisport.de/en/port-information/services/ship-rail-destinations.html

⁸ www.gvtintermodal.com/verbinding/chengdu-tilburg-rotterdam



Flexibility of booking, as a competitive advantage combined with short lead time, is generally recognised by stakeholders, but not by all. Closure of the booking may be as short as two days before departure, although capacity on the trains is destination-specific. On balance, most services can be booked within one week before departure or shorter, particularly eastbound. A question outside the scope of this study, however, is how well-spread this knowledge is in the sector. Indeed, some stakeholders indicate a perceived lack of flexibility of the rail services is a reason for shippers to rely on air freight in cases of time pressure.

Finally, time-sensitive and relatively expensive transport may require high levels of reliability and visibility of the process, which seems to be sometimes lacking in intercontinental rail freight. Fast and efficient delivery of shipments, as well as accurate status information towards the client, are prerequisites for justifying the relatively high transport costs. The aforementioned lack of reliable lead times and status visibility appear to distort the logic of using rail services instead of ocean or air for a substantial part of the market.

4 Current and future freight flows

4.1 Overview

Rail freight volumes between China and the Netherlands have strongly increased over the past years. Year-on-year growth amounted to 20% and 78% in 2015 and 2016, and is estimated at 60% and 30% for 2017 and 2018. Rail freight *values* demonstrated a somewhat lighter increase of 11% and 63% for 2015 and 2016. As already noted, intercontinental rail freight may well constitute competition, to an extent, for air freight as well as for ocean freight. A comparison between rail freight tonnage and air freight tonnage seems to support this expectation. Rail freight tonnage between China and the Netherlands stood at some 120.000 tonnes in 2016, whereas air freight tonnage in the same year was 150.000 tonnes (import)⁹.

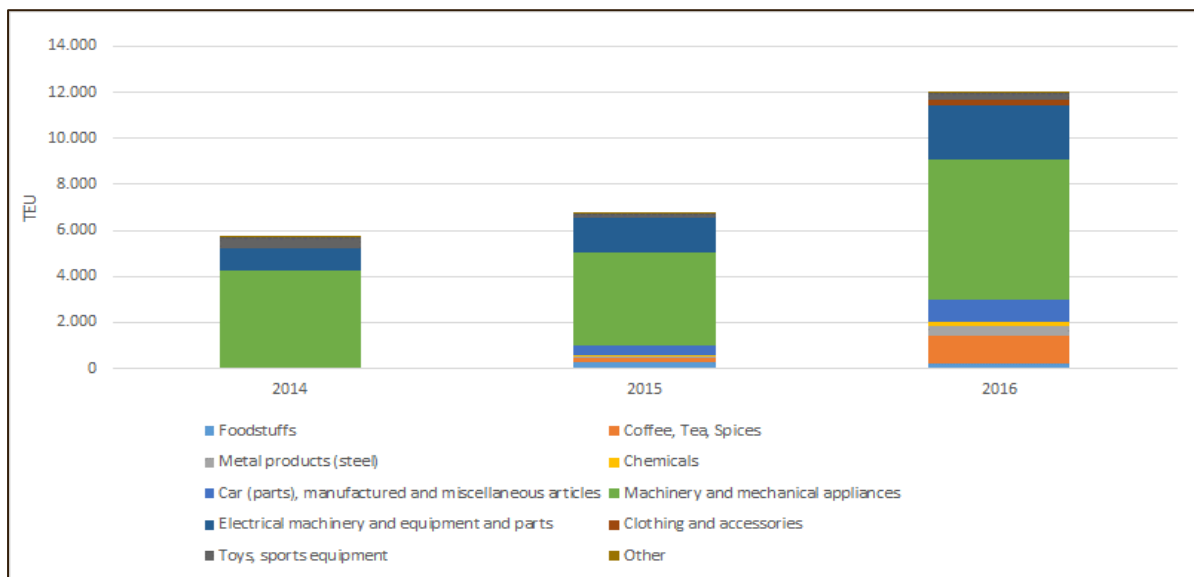


Figure 4-1. Rail freight volumes between China and the Netherlands 2014-2016, TEU. ©Panteia

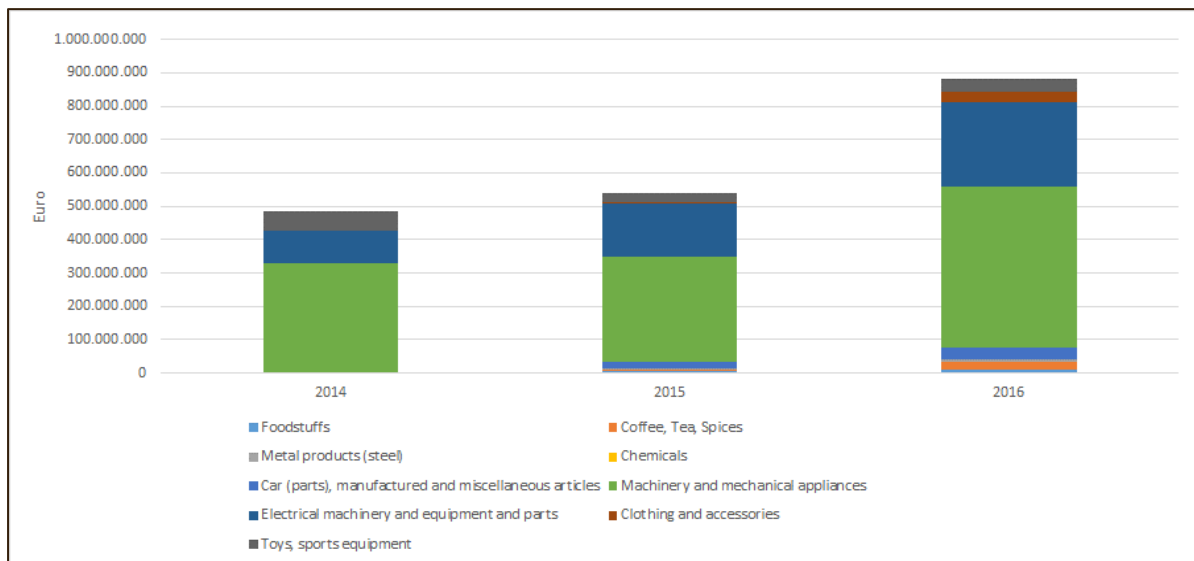


Figure 4-2. Rail freight values between China and the Netherlands 2014-2016, euro. ©Panteia

⁹ Centraal Bureau voor de Statistiek (2016)



The most prominent commodity type is *machinery and mechanical appliances*, with *electrical machinery and parts* and *car (parts), manufactures and miscellaneous articles* coming second and third. Apart from *coffee, tea and spices* these are also the commodities showing the fastest growth.

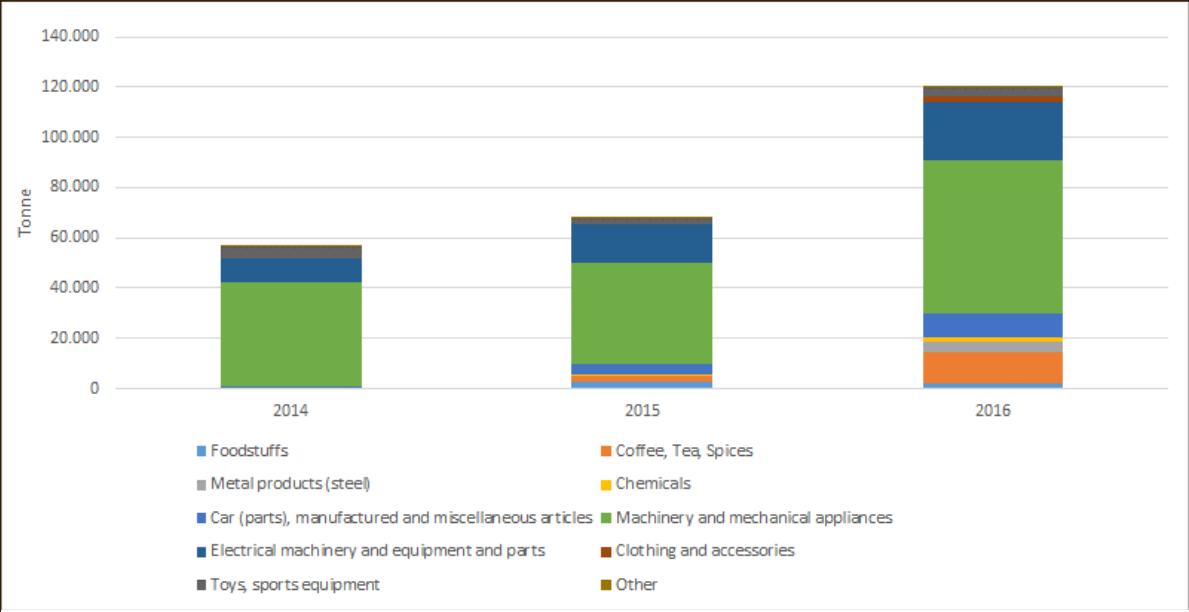


Figure 4-3. Rail freight tonnage between China and the Netherlands 2014-2016, tonnes. ©Panteia

4.2 Import from China to the Netherlands

Our analysis, seen in Figure 4-4, shows the inland provinces of Jiangsu, Chongqing and Yunnan as the top 3 Chinese origins for rail freight from China to the Netherlands. Consistent with information received from stakeholders, significant volumes come from coastal areas as well, with Guangdong and Shanghai provinces taking the fourth and fifth positions.

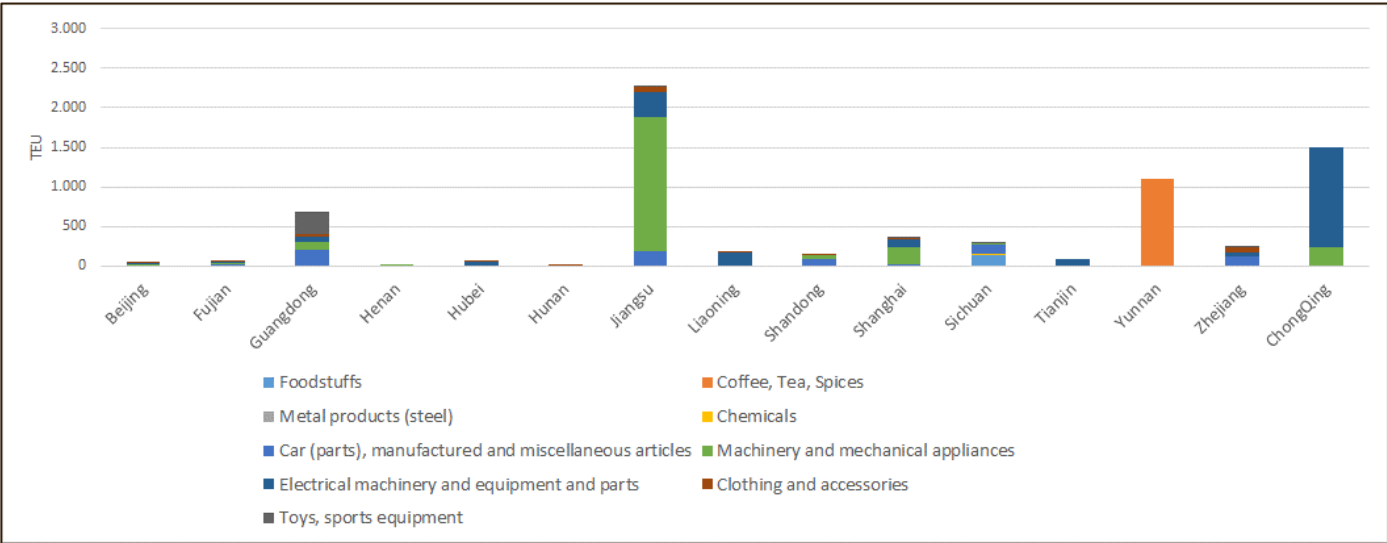


Figure 4-4. Import commodities from Chinese provinces to the Netherlands 2016, TEU. ©Panteia





Figure 4-5. The provinces of the People's Republic of China ©GettyImages

4.3 Export from the Netherlands to China

Our analysis, as depicted in Figure 4-5, shows that the first and foremost Chinese destination for Dutch railborne exports to China is Sichuan province, with flows to other destinations still very limited. The only other significant destinations are Shandong, albeit with relatively low-value goods, and Chongqing. Especially with regard to export, it would be useful to study the development of volumes, destinations and commodities for the years after 2016 when more recent data becomes available.

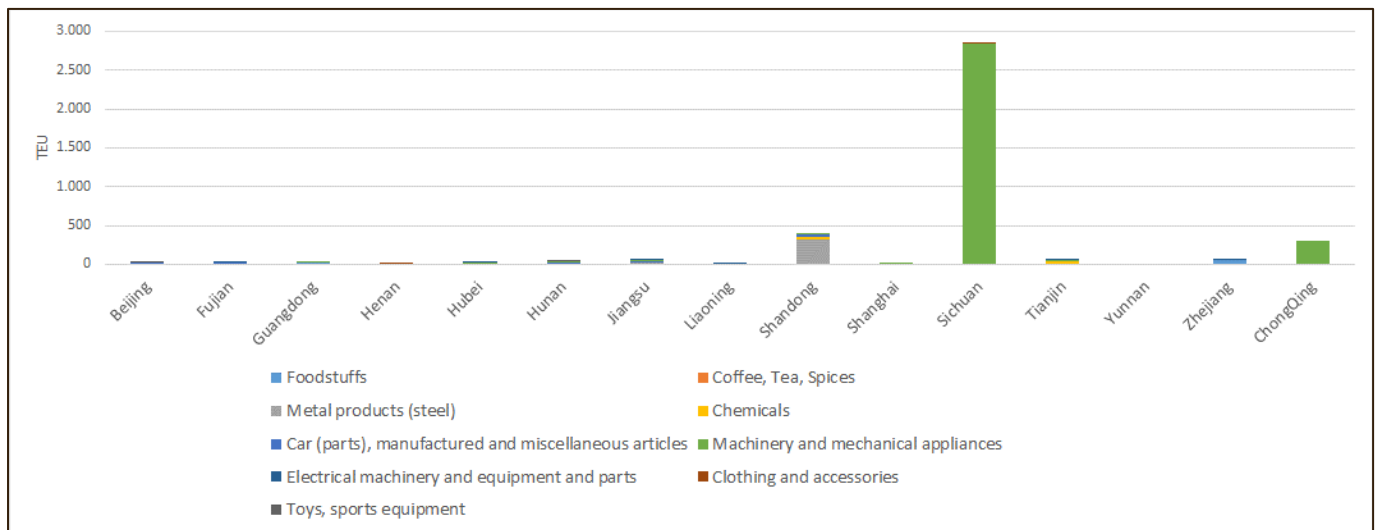


Figure 4-6. Export commodities to Chinese provinces from the Netherlands 2016, TEU. ©Panteia



4.4 2030 Forecast: import from China to the Netherlands

For import from China to the Netherlands, the total volume with the potential to shift from current modalities (ocean and air freight) to rail equals some 297.000 TEU towards 2030 – making up for between 10 and 15 trains per day to different terminals in the Netherlands and Germany from where pre and end haulage is carried out. This is demonstrated in Figure 4-6, with a +/- margin of 10% (low, average, high scenarios).

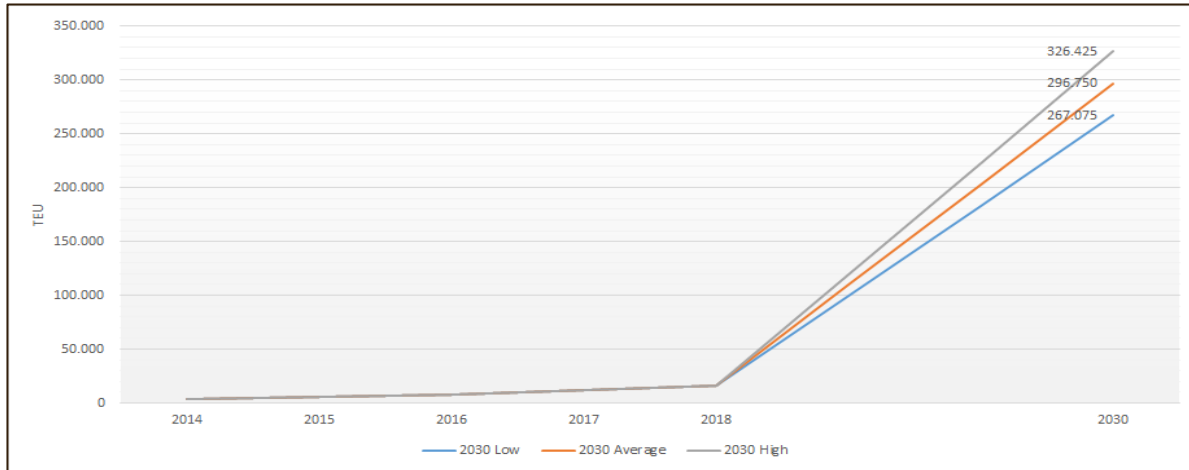


Figure 4-7. High, average and low scenarios for railborne import from China to the Netherlands towards 2030. ©Panteia

Figure 4-8 shows an overview of the expected transport flows by rail from the 28 provinces of China to the Netherlands by 2030. Volumes are expected to originate from coastal as well as inland provinces, with the former served either by direct (or connecting) rail services or by pre and end haulage to and from inland rail terminals by other modalities (road or inland waterway).

4.5 2030 Forecast: export from the Netherlands to China

For export from the Netherlands to China, the total volume with the potential to shift from current modalities to rail equals some 28.000 TEU towards 2030 – making up for some 7 trains per week. This is demonstrated in Figure 4-7, with a +/- margin of 10% (low, average and high scenarios). Figure 4-9 shows an overview of the expected rail freight flows from the Netherlands to the 28 provinces of China by 2030.

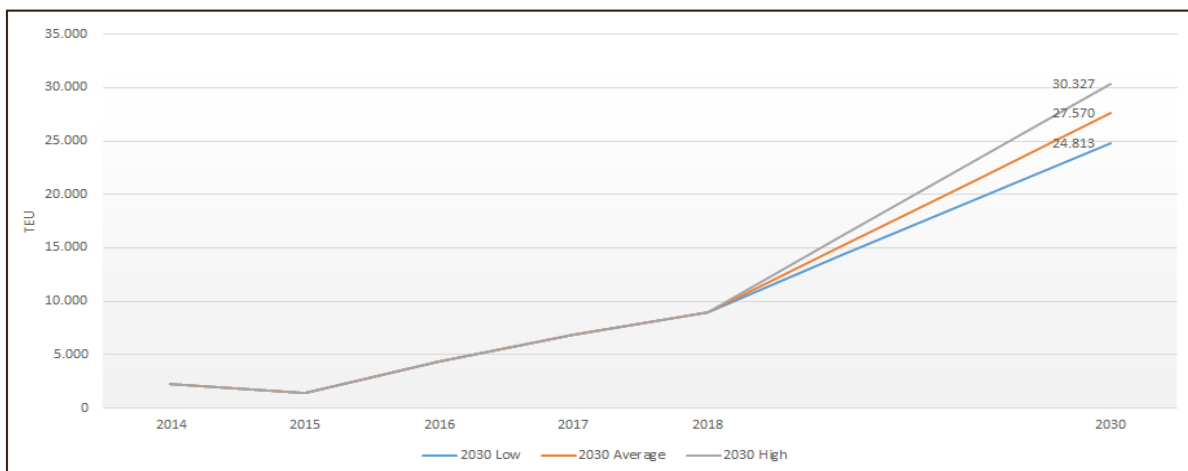


Figure 4-8. High, average and low scenarios for railborne export from the Netherlands to China towards 2030. ©Panteia



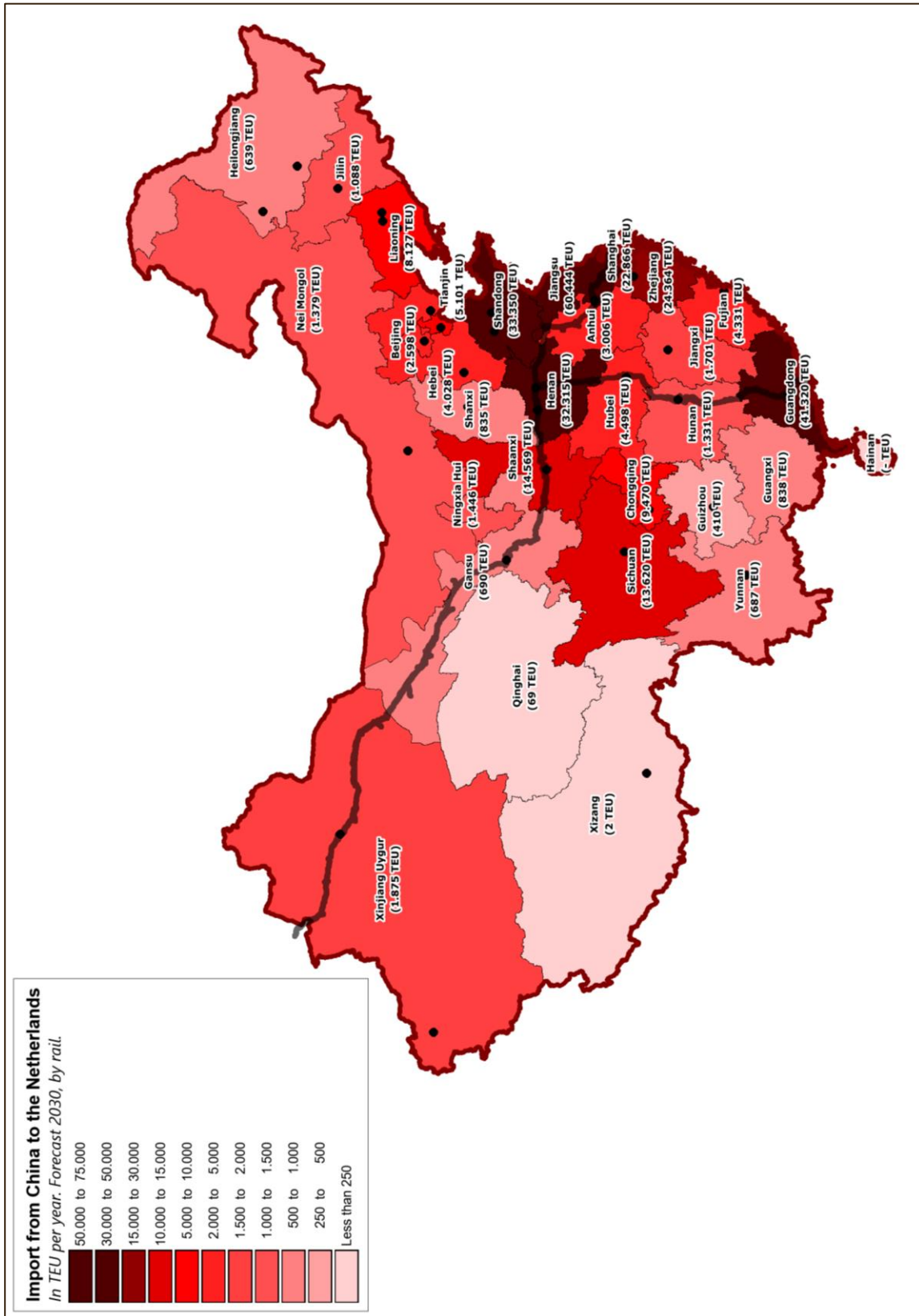


Figure 4-9. Regions of origin for rail freight from China to the Netherlands, 2030. ©Panteia



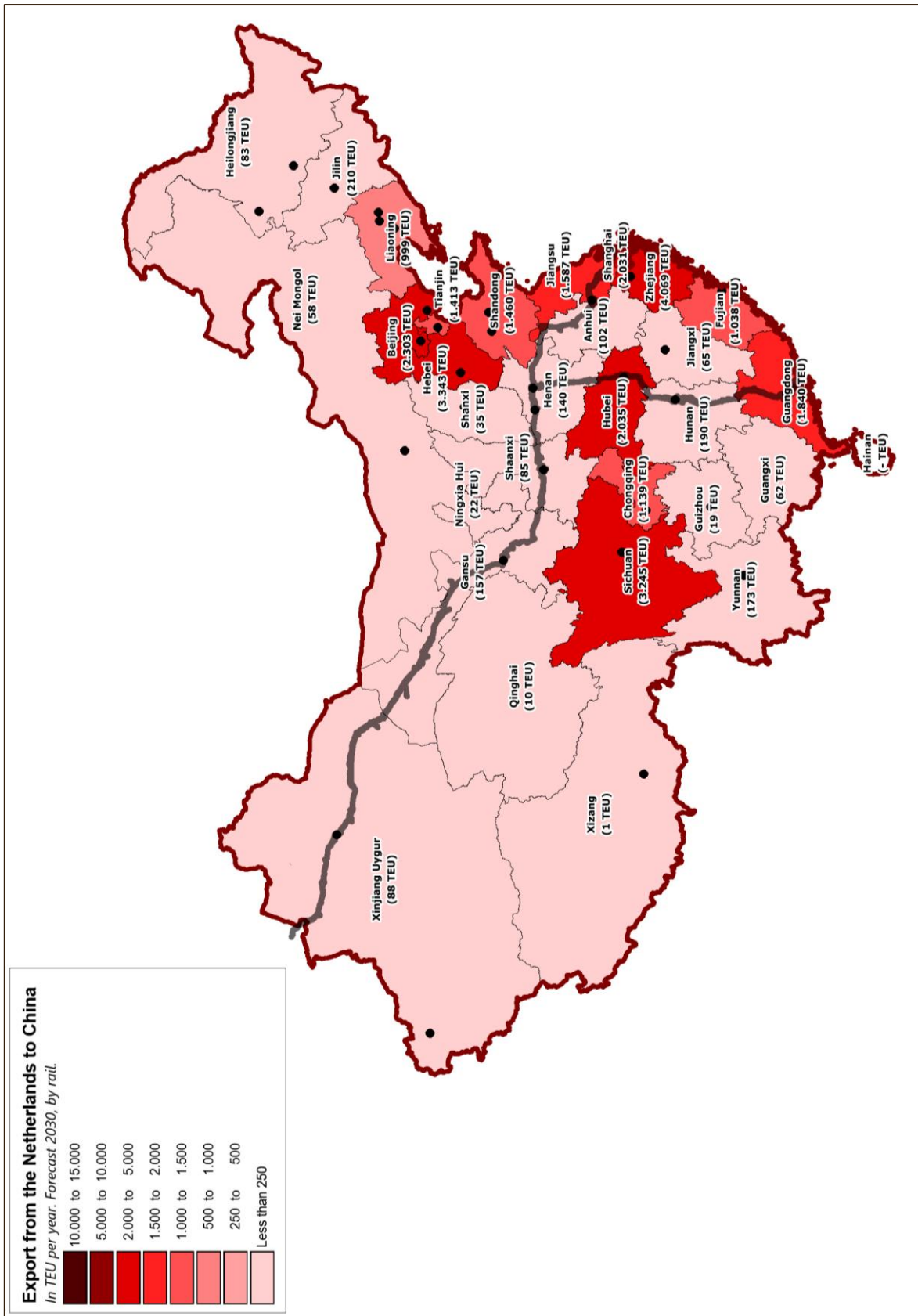


Figure 4-10. Regions of destination for rail freight from the Netherlands to China, 2030. ©Panteia

5 Impact on the Netherlands

5.1 Impact on the Netherlands: distribution centres

Another key research question concerns the effects on the Dutch transport economy, in particular the port of Rotterdam. In order to answer this question, we have started with establishing the optimal locations of European distribution centres in the Netherlands for containerised import. Figure 5-1 shows the optimal locations in the base scenario (without availability of the China-Netherlands rail connection) are in the middle and southeast of the country, with centres such as Tilburg and Venlo already being competitive.

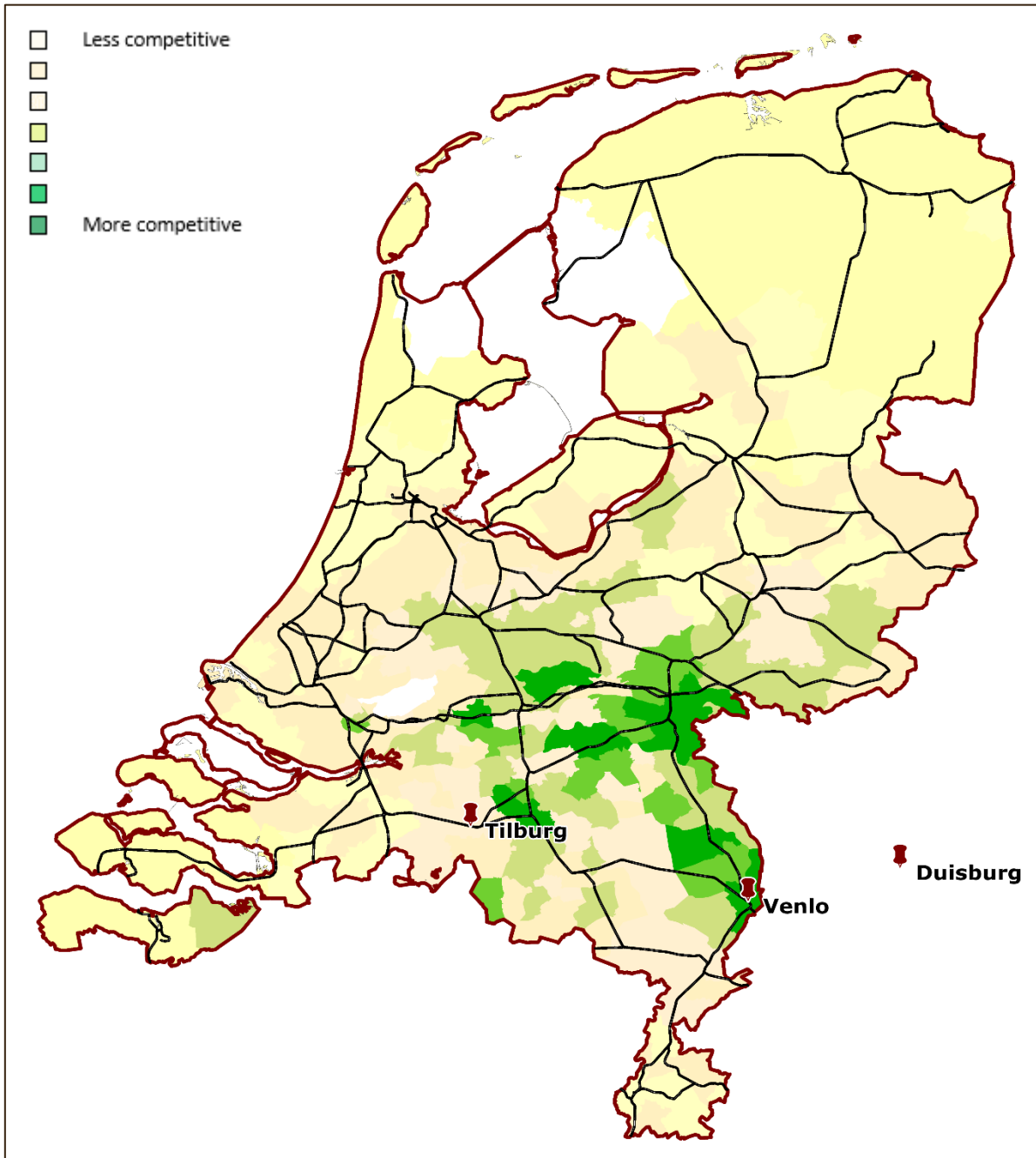


Figure 5-1. Optimal locations for European distribution centres in the Netherlands for containerised import, base scenario. ©Panteia

Next, the potential for modal shift to the rail connection for China-Europe trade is included in the equation. In Figure 5-2 the competitive distribution centres are depicted for railbourne import from China. The optimal European distribution centres for intercontinental rail freight are in the south and southeast of the country. We can therefore expect the new modality to bring about a shift of optimal locations towards the south-east of the country. However, it is important to emphasise that the effect is relevant for specific commodities only, and will be small when expressed in absolute numbers. Therefore, it is fair to conclude that as far as the location of distribution centres is concerned, noticeable effects will remain limited to mild regional advantages, even when the full modal-shift potential materialises.

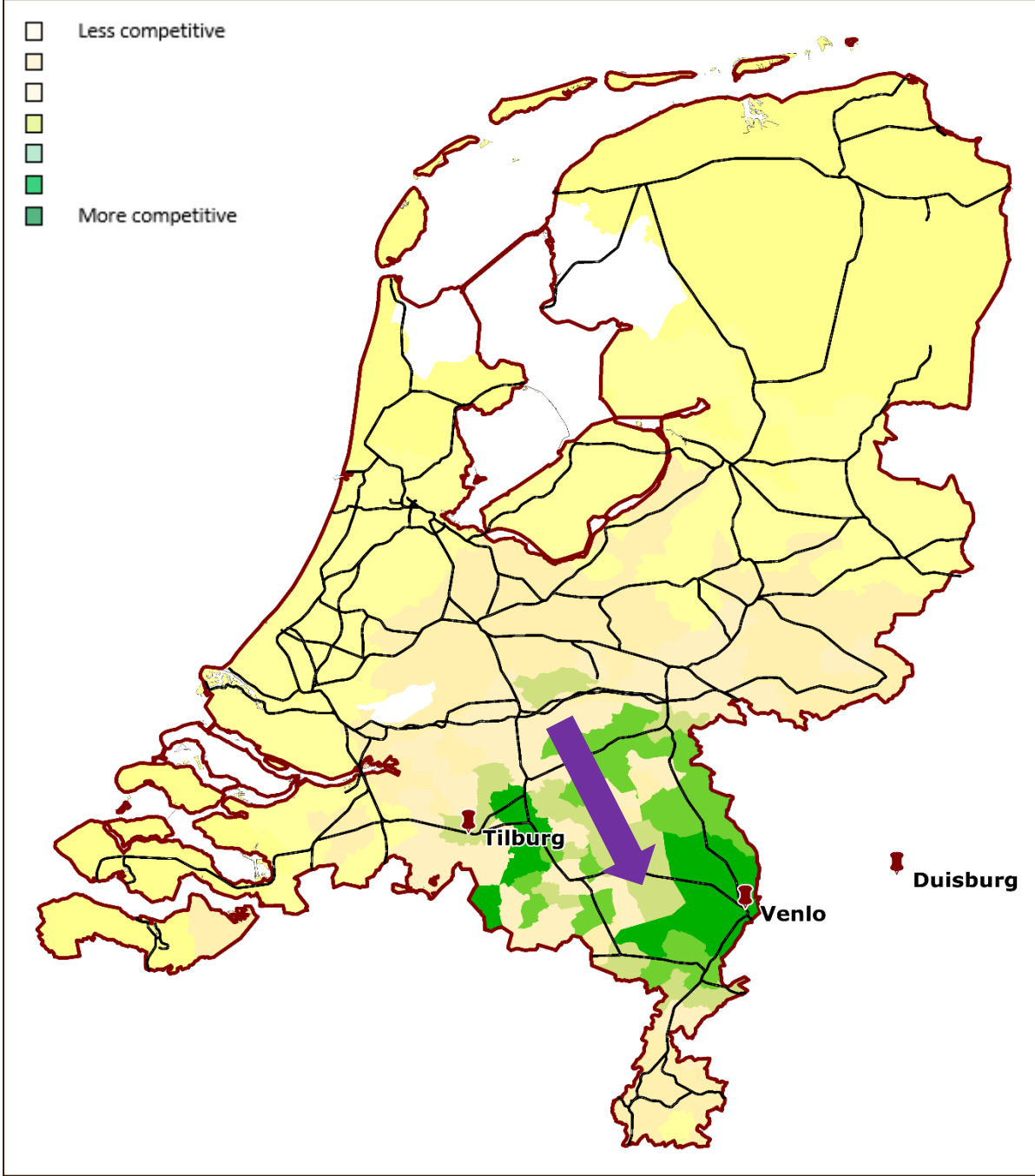


Figure 5-2. Optimal locations for European distribution centres in the Netherlands for containerised import by intercontinental rail freight. ©Panteia

5.2 Impact on the Netherlands: mainports

Port of Rotterdam

For the port of Rotterdam, a noticeable but mild competition is to be expected. For the most relevant European deep-sea ports, the modal-shift potential for ocean freight to intercontinental rail was established, based on transport costs including a value/time function. The modal-shift potential is shown in Figures 5-3 and 5-4, together with 2015 turnover figures. The list is topped by the port of Rotterdam, but with comparable modal-shift potential as a share of total turnover demonstrated by Antwerp and the German ports. Interestingly, the Polish port of Gdańsk, geographically relatively close to the Eurasian land route, is seen to experience relatively fierce competition.

The modal-shift potential for the port of Rotterdam of 368.000 TEU (import and export) is limited when compared to total container throughput, standing at well over 12 million TEU in 2015 and seen increasing since. Compared to the port's container turnover originating from and destined for China, surpassing 3 million TEU or roughly a quarter of total turnover, the modal-shift potential of some 10% is more significant¹⁰. The cargo value per container is not expected to specifically affect the seaport's competitive position.

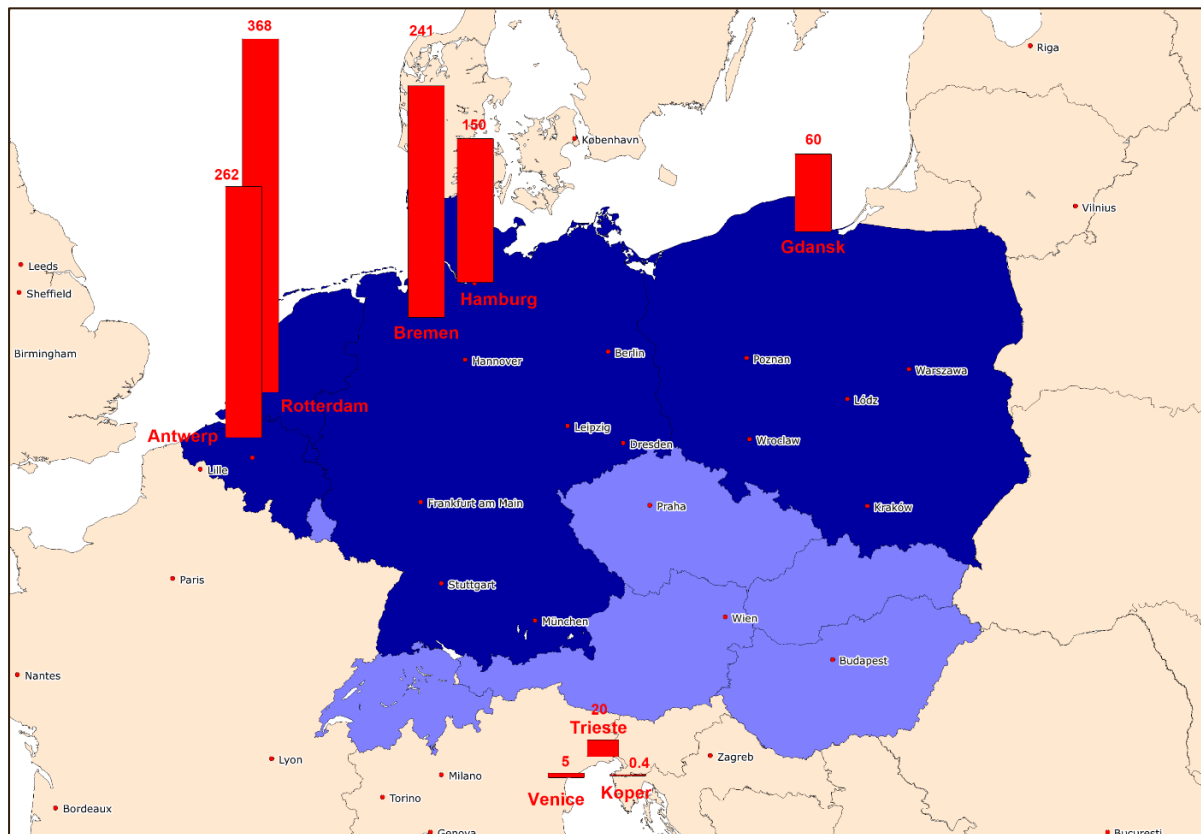


Figure 5-3. Potential for modal shift from ocean to rail per sea port (1.000s TEU). ©Panteia

With regard to Southern European seaports, the almost negligible impact corresponds to findings from Panteia's earlier studies¹¹, in which it was demonstrated that catchment areas of the

¹⁰ www.portofrotterdam.com/en/news-and-press-releases/rotterdam-remains-the-largest-european-port-serving-china

¹¹ www.portofrotterdam.com/en/news-and-press-releases/china-accounts-for-25-of-all-discharged-containers
E.g. Sustainable Logistics for Europe: The Role of Ports (2016); Natuurlijk Achterland Rotterdam: Input voor Bepaling Relevante Geografische Markt en Productmarkt voor Overslag van Containers (2015).



Sea port	TEU shift potential 2030	TEU turnover 2015
Rotterdam	- 368.000	12.235.000
Antwerp	- 262.000	9.370.000
Bremerhaven	- 241.000	5.467.000
Hamburg	- 150.000	8.848.000
Gdansk	- 60.000	1.041.000
Trieste	- 20.000	501.268
Venice	- 4.800	560.301
Koper	- 200	790.736

Table 5-1. Potential for modal shift from ocean to rail, per seaport. Turnover 2015 from Eurostat/ESPO. ©Panteia

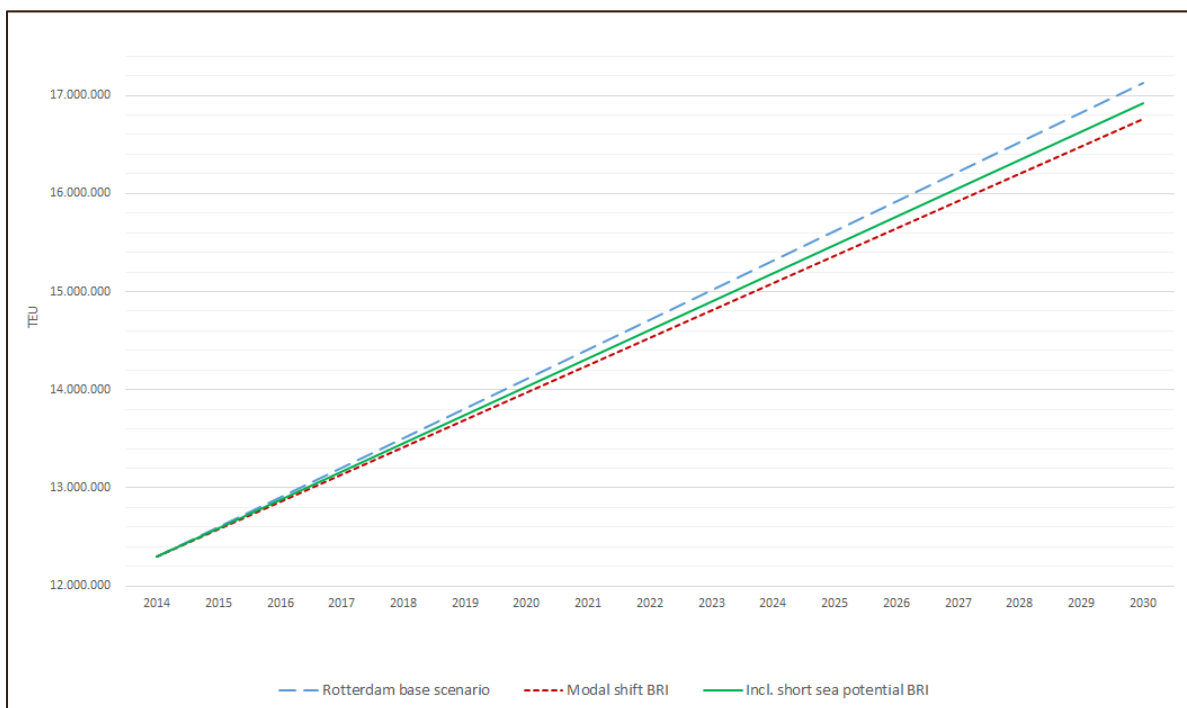


Figure 5-4. Port of Rotterdam modal shift 2030 scenario including additional shortsea potential. ©Panteia

respective Northern and Southern European seaports only marginally overlap, with a 'battleground' extending to parts of the German southeast, Austrian north and Czech south. The intercontinental rail freight corridor is arguably out of range for destinations in the Southern European port areas, which is unlikely to change in the foreseeable future. This is elaborated in paragraph 6.3.

For the port of Rotterdam, we have plotted the modal shift potential set off against ocean freight baseline scenarios. Also, we included the aforementioned additional shortsea potential stemming from the intercontinental rail freight connection. The results for the port of Rotterdam are shown in Figure 5-5. In the base scenario, turnover is projected to increase to over 17 million TEU. Taking

into account modal shift potential from ocean to intercontinental rail freight, turnover growth may be curbed to just under 16,8 million TEU. When intercontinental rail related shortsea potential is added to the equation, turnover growth is somewhat higher: although the relative effect on throughput is expected to be limited, added shortsea potential is unlikely to compensate for loss of cargo entirely.

Schiphol Airport

As we have seen, both intercontinental rail freight and air freight are primarily used by shippers for high-value and time sensitive transport. Rail freight tonnage between China and the Netherlands stood at some 120.000 tonnes in 2016, whereas air freight tonnage in the same year was 150.000 tonnes (import), the vast bulk of which is handled through Schiphol Airport. Although air freight volumes are relatively small and impact from intercontinental rail experienced by the air freight market is therefore difficult to assess, the two modalities can therefore be expected to increasingly compete.

However, with air freight demand predicted to roughly double over the next 20 years¹², and capacity shortage on Schiphol Airport looming, it must be considered unlikely that future growth of rail freight transport between China and Europe will significantly affect the airport.

¹² <http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/cargo-market-detail-wacf/download-report/assets/pdfs/wacf.pdf>



6 Strategic considerations

6.1 Long-term implications

Although much can and should be said about the China-Europe rail freight connection in terms of logistics, the BRI initiative is a strategic drive and therefore more encompassing. This is not the occasion for an extensive assessment of the wider strategic implications of BRI; however, some transport and infrastructure-related considerations cannot be absent in this report. The next paragraphs will elaborate on possible implications of (Chinese) infrastructure investments in the intercontinental rail corridor as well as in Europe, international interdependency, and the case for a common European strategy.

The BRI initiative, and the recent uptake of rail freight transport between China and Europe, is seen being driven by multiple developments and economic and political forces. From a Chinese perspective, increasing freight flows over land augments economic development in the country's landlocked western regions, as well as economic diversification. It also coincides with geopolitical goals, such as expanding spheres of influence, furthering security in adjacent territories and helping safeguard access to raw materials.

It has been asserted that Chinese infrastructure investments in the EU appear primarily aimed at the EU member states in Central and Southeastern Europe, which are economically weaker than other member states. Specifically, talks in the so-called '16+1' format¹³ have been promoted by the Chinese government and accompanied by significant investments as well as an increase in trade between these countries and China. Some stakeholders point to the size difference between China and the 16 European countries involved, especially when one questions the political coherence among them. This might entail a risk of uneven control over future infrastructure, even as added value may not always come to the benefit of the countries concerned. Another point of concern expressed by stakeholders is the relatively closed Chinese domestic infrastructure market, implying an uneven playing field for European market parties.

BRI investment mechanisms

With Asia's infrastructure investment needs - mostly through debt instruments - estimated at thousands of billions US Dollars, the Belt and Road Initiative is spearheaded by the Chinese-led Asian Infrastructure Investment Bank (AIIB). Some sixty countries in the planned BRI zone, including the major European economies, have acceded to the bank. AIIB's capital stands at 100 billion US Dollars, approximately half of the World Bank's.

Other investment facilities include the \$40 billion Silk Road Fund primarily aimed at business investment, a \$38 billion scheme at the China Development Bank, and some \$20 billion dedicated to the Export-Import Bank of China. In all, BRI comprises over \$900 billion of projected investments, with the private sector expected to make large investments too.

www.ft.com/content/e83ced94-0bd8-11e6-9456-444ab5211a2f

www.wsj.com/articles/china-to-contribute-40-billion-to-silk-road-fund-1415454995

¹³ Consisting of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, and China.



So far, European countries have anticipated to BRI in different ways, with a number of EU governments assuming a relatively passive role. Generally, Central, Eastern and Southeast European countries, some of them struggling with high unemployment and limited financial means for infrastructure development, appear to have embraced the initiative. To be sure, Chinese infrastructure investments in European countries generally appear to process slow, with some countries only moderately interested in attracting financing. Also, EU internal market rules as well as rules and funds associated with the European TEN-T infrastructure policy seem to put a brake on Chinese investments. Indeed, these activities have so far been particularly apparent in the Western Balkans, countries that are not part of the EU and therefore less bound to EU rules, while having less access to EU funds. A Chinese-financed project that stands out is the projected upgrade of the Belgrade-Budapest railway, which would enable fast transport into Central Europe¹⁴.

Western and Northern European countries, on the other hand, have been more reticent although not dismissive. Thus, Germany has shown interest in BRI in various ways, including at high political level. As already set forth, some of its actors, such as Duisport, the Hamburg Port Authority (HPA) and Deutsche Bahn (DB Cargo), are actively taking stock through logistics processes as well as infrastructure investments on the intercontinental corridor. This also applies to Belgium, although to a lesser extent, with the Antwerp Port Authority having assumed a bystander role so far. Other Western European countries expressing an ambition to participate in rail freight connections between China and Europe include Austria and Italy.

At the same time, a discussion at the European level is taking place concerning BRI's wider strategic implications and Chinese infrastructure investments in the EU and its neighbourhood¹⁵. An EU-China 'Connectivity Platform' was established in 2015, with biannual meetings between the European Commission (DG MOVE, DG TAXUD) and the Chinese government. Guiding principles for the Commission are inclusiveness (all countries involved are to benefit), respecting trade rules, sustainability, localisation of infrastructure construction (i.e. use of local companies), and fiscal sustainability for countries involved. The mutual aim is to create synergies between both sides, with possible mutual funding of infrastructure projects in Europe as well as China. However, reported progress has been limited so far. A communication from the European Commission detailing infrastructure investment options in the EU and Eastern Partnership countries, with the aim of improving transport connections between TEN-T and its eastern neighbourhood, is expected over the summer.

Stakeholders also express the need for an intensified discussion of BRI between themselves, among European governments, and at the European level. According to them, defining a common strategy could include monitoring compliance with and functioning of the internal market rules with regard to Chinese investments, as well as a consolidated set of infrastructure funding guidelines that, where appropriate, helps to look beyond TEN-T. Stakeholders indicate that actively taking stock in BRI is in the interest of the Netherlands and other European countries, too. Being involved in upgraded and new infrastructure and services in the EU and beyond, including on government level, brings a measure of shared control, whereas the opposite leaves the risk of a relative loss of influence. In the next paragraphs, possible future implications of (Chinese) infrastructure investments are further detailed.

¹⁴ www.politico.eu/article/china-hits-roadblocks-in-central-europe/

¹⁵ <https://thediplomat.com/2017/10/belt-and-road-initiative-eu-strategic-interests-in-asia/>

<https://fd.nl/opinie/1248410/handelsmissie-china-moet-stevig-aan-de-bak>

www.ft.com/content/3e79ae14-0681-11e8-9650-9c0ad2d7c5b5



6.2 Scenario 1 – Corridor investments

As we have seen, the intercontinental rail corridor is now seen to be operating close to its maximum capacity within existing infrastructure and organisational boundaries. The border crossing at Malaszewicze/Brest may already be operating at its maximum capacity, whereas other bottlenecks, such as on the crowded European railway system or Eurasian single-track sections, can be expected to present themselves when the number of trains crossing the border between the EU and the EAEU is further increased. This leads to an **infrastructure gap** between current capacity and future demand, as seen in the chart below.

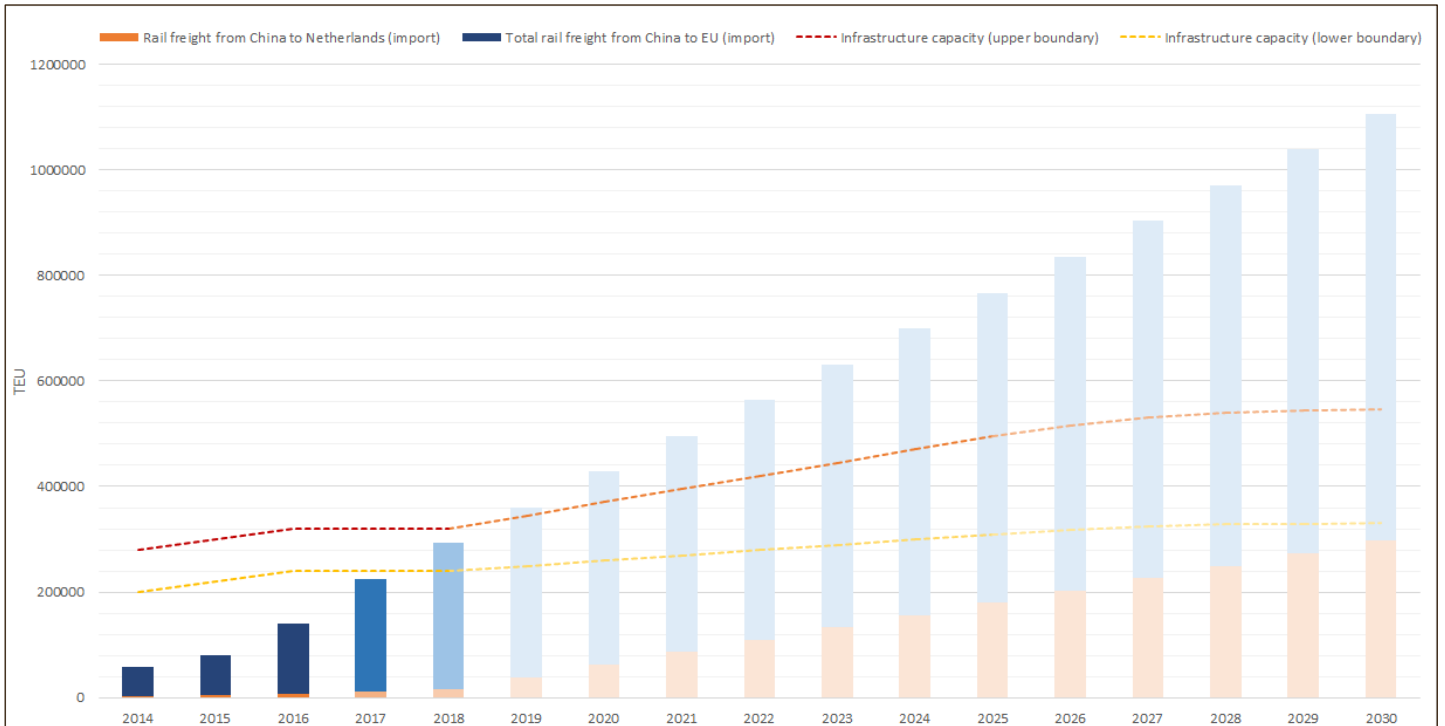


Figure 6-1. The infrastructure gap for the Russia-Kazakhstan corridor. 2017-2018 TEUs are based on growth estimations of Belarusian and Russian Railways. 2019-2030 TEUs are derived from seaport modal-shift potential (see Chapter 5). ©Panteia

The aforementioned options for infrastructure investments and alternative routes (either bypassing congestive points on the Russia-Kazakhstan route or using the southern corridor when it becomes economically feasible) can be expected to at least partially close the infrastructure gap. However, as can be easily derived from the above chart, reaching the full potential for modal shift would require a tripling or even quadrupling of infrastructure boundaries. To say the least, it will be a large enough challenge for all parties concerned to create the conditions necessary for accommodating the potential of intercontinental rail freight.

Conclusion: Extensive infrastructure investments and corridor improvement are a prerequisite for further growth of intercontinental rail freight



6.3 Scenario 2 – Investments in South European seaports

As set forth in previous chapters, a significant potential exists for modal shift of freight flows from ocean to rail. Although a large infrastructure gap continues to stand in its way, intercontinental rail freight is expected to constitute mild but noticeable competition for Northwest European deep-sea ports. However, Chinese infrastructure investments that affect Europe are seen to be aimed not only at railway connections, but also at seaports and some of their hinterland connections. Examples are the Greek port of Piraeus, a controlling stake of which is now owned by Chinese state-owned COSCO, and plans for upgrading the Belgrade-Budapest railway¹⁶. For some, this raises the question as to whether improved capacity and hinterland connections of *Southern European ports* might significantly add to the aforementioned competition to Northwest European ports, or affect intra-European rail freight flows between Northwest ports and Southern Europe (e.g. between Rotterdam and Italy).

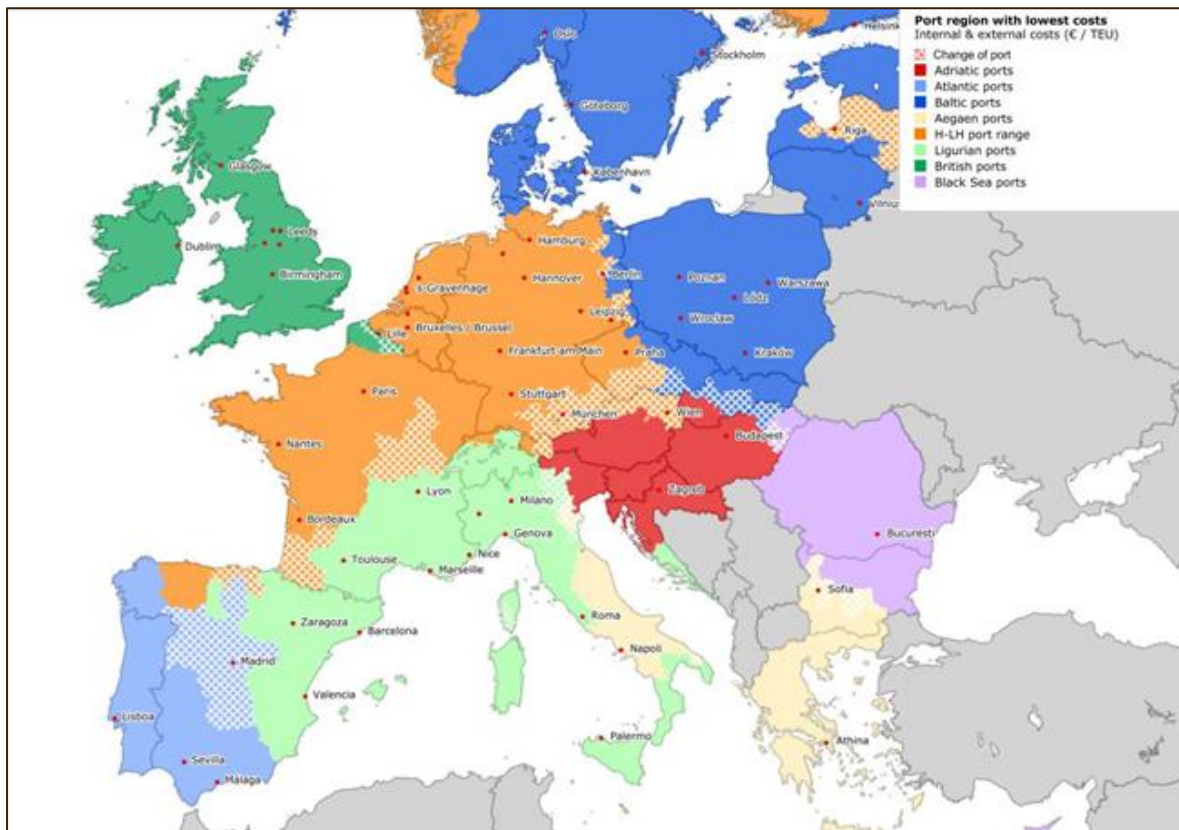


Figure 6-2. Catchment areas in the European hinterland arranged by port region. ©Panteia

Figure 6-2 shows the competitive hinterlands, or ‘catchment areas’, of the European seaport regions. The Dutch, Belgian and German ports first and foremost serve the markets of those three countries and parts of France, Italy, Austria and the Czech Republic. Competition with the Mediterranean ports is seen in a limited area where, after possible internalisation of external costs, the Northwest European ports are expected to surface as relative winners, provided they stay as competitive as they can be. This division is augmented by intra-European rail freight flows from Northwest European ports to Southern Europe.

¹⁶ www.bbc.com/news/world-europe-41654346



For an understanding of the main economic zones in the Northwest European hinterland in which the Dutch, Belgian and German seaports compete for ocean freight, we can suffice with charting the concentrations of economic activity in the German regions. From Figure 6-3 it follows that the main concentration of economic output is located in the western part of Germany, around Duisburg (*Ruhrgebiet*), with a large number of lesser concentrations to the south and southeast along the main river basins.

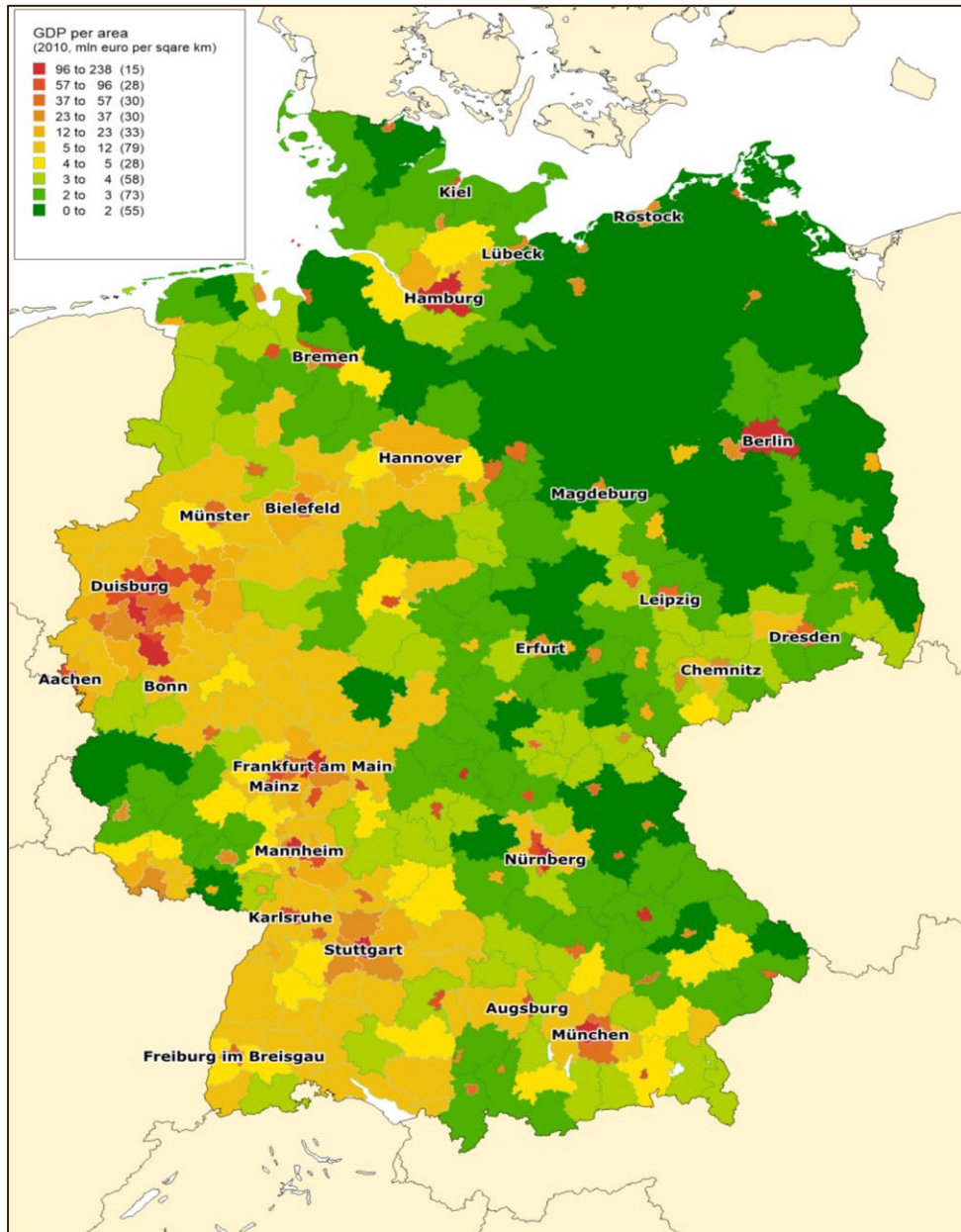


Figure 6-3. Concentration of economic activity (GDP per area) in the German hinterland. ©Panteia

Zooming in on the port of Rotterdam's catchment area, Figures 6-4 and 6-5 show the importance of the aforementioned locations of economic activity. The first chart depicts the competitive position of the port in its hinterland for all transport modes (rail, barge and road). We can see the main catchment area extends from the largest part of the Netherlands to the Western German industrial zone, with fierce competition with Belgian and German ports towards the south of Germany. The second chart demonstrates the competitive hinterlands for the different seaports.



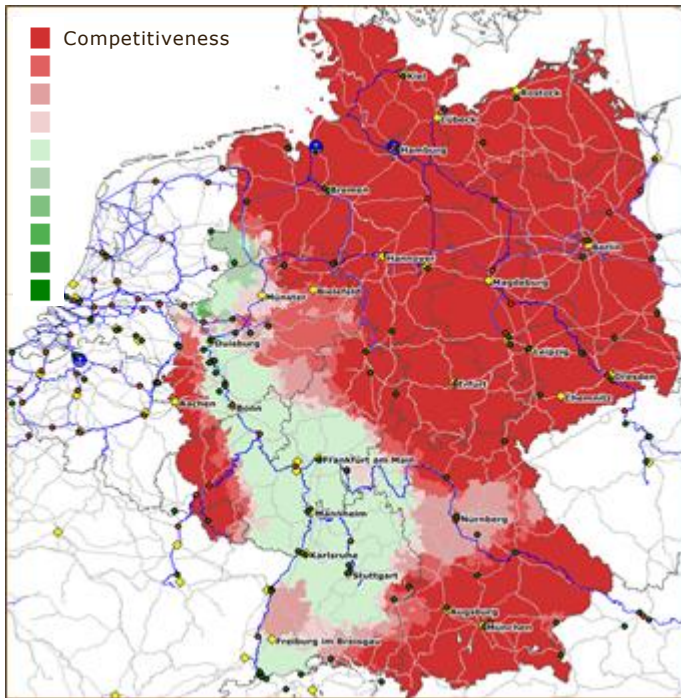


Figure 6-4. Competitive hinterland port of Rotterdam. ©Panteia

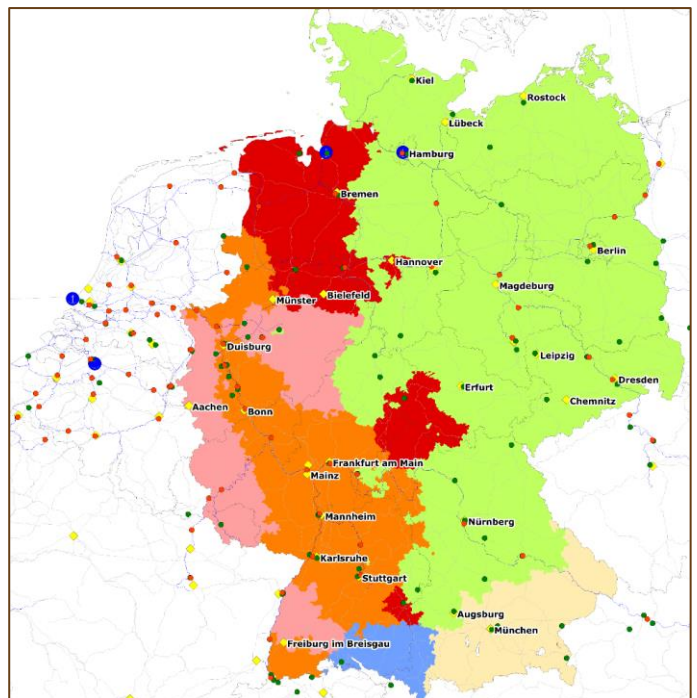


Figure 6-5. Hinterland competition seaports. ©Panteia

We can conclude that even extensive investments in Mediterranean seaports and hinterland connections have limited potential to affect either ocean freight flows or intra-European rail freight through Northwest European seaports. Expansion of Southern European ports is expected to primarily come with economic growth within their natural hinterlands.

Conclusion: Investments in Southern European ports have limited potential to affect Northwest European ports.

6.4 Scenario 3 – International interdependency

As described already, a considerable freight flow – in absolute numbers – between Europe and China is already handled by rail, with a market potential for further growth. Next to advantages, the question might be raised whether the alternative modality offered by rail entails risks for freight flows and industries that come to (partially) depend on it. A conceivable risk is associated with **international interdependency**, taking into account the interests and political stability of countries along the intercontinental rail route.

As can be seen from Figure 6-6, a number of transit countries for rail freight between China and Europe experience a higher-than-moderate/low risk of political instability. Although this is especially the case along the southern corridor, the northern corridor cannot be excluded from risk either. One such risk is that transit countries might set out to use the threat of closure, or maintain legal uncertainties, as a means for exerting political pressure. Conversely, financial and other interests that transit countries have in the rail link must not be exaggerated – indeed, estimations of incoming rail infrastructure charges from transport between China and Europe amount to several hundreds of millions of euros, which must be regarded as relatively minor. In conclusion, even as ocean and air freight routes cannot be seen as entirely risk-free either, international interdependency constitutes a moderate risk for intercontinental rail freight.

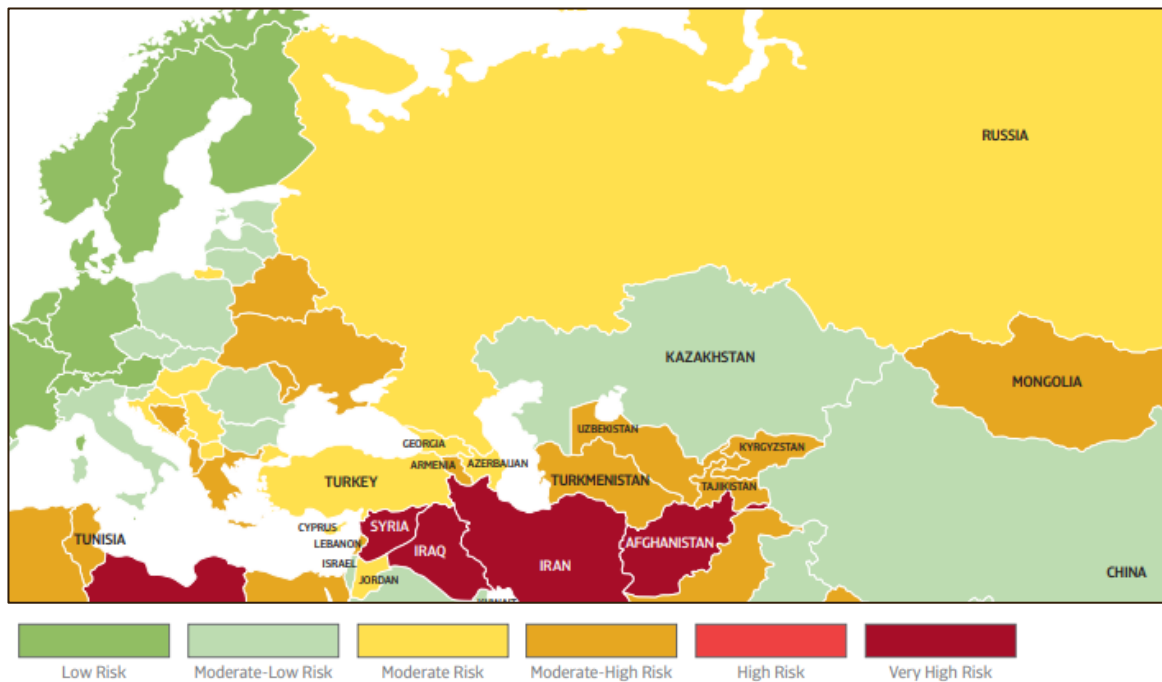


Figure 6-6. Country risk map of Eurasia, Q4 2017. ©Atradius

Conclusion: International interdependency along the intercontinental rail freight corridor constitutes a moderate risk for freight flows.

6.5 Strengths, Weaknesses, Opportunities, Threats

As we have seen, the continuing implementation of BRI and the simultaneous growth in rail freight transport between China and Europe can be expected to entail multiple implications for the Netherlands in the short, medium and long term. For transport flows, the availability of rail as an alternative or complementary modality to ocean and air freight in principle represents an advantage in terms of flexibility and reliability. When the required conditions are met, intercontinental rail freight has the potential to take in a middle position between the two other modalities, and therefore to provide shippers with additional choice and efficiency. Compared to air freight, specifically, rail may well offer benefits in terms of greenhouse gas emissions.

With the intercontinental rail connection, particular logistics centres are seen to become significantly more competitive, especially for transport and distribution of high-value goods. Although neither rail freight's capacity nor its costs compared to other modes carry a potential for bringing about a wholesale pattern shift in the European transport economy, significant regional effects are to be expected.

For the Netherlands the modal shift potential from ocean and air to the rail connection as established in Chapter 4, if fully exploited, would amount to 10 to 15 trains per day to different terminals in both the Netherlands and Germany. Set off against freight flows on the dedicated rail freight line between the port of Rotterdam and the German hinterland (*Betuweroute*), currently standing at some 500 trains per week and projected to increase, intercontinental rail's potential is certainly substantial.



A number of impediments for utilising rail freight’s potential were identified. First and foremost, severe infrastructure limitations coincide with inefficient procedures at the border between the EU and EAEU, where both customs and transshipment procedures between the European standard gauge and Russian broad gauge take place. For the transport sector as a whole, reliability of lead times as well as visibility of the shipment status are seen as major obstacles, whereas the transport of reefer containers, especially loaded with high-value cargo, is often seen as risky. For a considerable part of the sector, these matters seem to make the relatively high transport costs associated with intercontinental rail hard to justify. Of particular importance for the Netherlands is how import sanctions introduced by Russia and free-trade limitations vis-à-vis China regarding agrofood commodities limit railborne export, whereas many chemical products are not yet being transported via the rail connection due to safety concerns.

<p>Strength</p> <ul style="list-style-type: none"> • Availability of alternative modality • Faster than ocean, cheaper than air 	<p>Weakness</p> <ul style="list-style-type: none"> • Border and legal procedures • Infrastructure gap • Trade limitations • Visibility of the transport process • Refrigerated cargo (cold chain)
<p>Opportunity</p> <ul style="list-style-type: none"> • Economic benefits for specific regions • Competitive advantage specific industries • CO₂ savings compared to air 	<p>Threat</p> <ul style="list-style-type: none"> • Uncertainty Chinese government subsidies • Political stability along corridor • Share of control of transport process • Uneven control of European infrastructure

Table 6-1. Strengths, Opportunities, Weaknesses, Threats. ©Panteia

Finally, near-exclusive control over both tariffs (through large-scale government subsidies) and the transport process, as well as international interdependency, can be regarded as risks for freight flows that come to rely on the rail connection between China and Europe. In the wider strategic context, Chinese infrastructure investments in both the EU and beyond might entail a risk of uneven control. The next chapter formulates policy recommendations for the Dutch government, taking into account the insights discussed above.



7 Policy options

7.1 Active role for Ministry of Infrastructure and Water Management

As noted in previous chapters, on balance a considerable potential exists for rail freight between China and the Netherlands. Potential economic advantages for the Dutch transport economy (shippers, forwarders, service providers, distributors, operators) are expected to affect specific regions, especially in the southeast of the Netherlands. However, these benefits can only be expected to materialise when the required conditions in terms of infrastructure, border procedures, quality of services, and free trade are met. In addition, Chinese decision makers should be well aware of the Netherlands' leading position in logistics and infrastructure.

An active role for the Dutch Ministry of Infrastructure and Water Management brings a number of important advantages. The Netherlands has a clear interest in furthering the quality and efficiency of rail freight connections to the EU-EAEU border and beyond, whilst simultaneously addressing strategic challenges in a European context – both matters requiring ministerial involvement. In addition, coordinating and consolidating promotional actions towards Chinese stakeholders with regard to the Dutch leading position in transport would allow for an effective approach, both in terms of concrete actions and in terms of attaining access to the appropriate levels of decision making. As mentioned already, on the Chinese side BRI is ultimately managed at the governmental level, thus requiring involvement from the Dutch ministry as counterpart.

Actions to be started by the Ministry of Infrastructure and Water Management could thus include:

- Improve corridor quality
- Emphasise the importance of the continuing development of unified railway law for intercontinental rail freight transport at EU and CIT level
- Include BRI connectivity as one of the Dutch priorities with regard to TEN-T Rail Freight Corridors, particularly RFC North Sea-Baltic
- Establish platform with the BRI states
- Ensure that the Netherlands is represented in multilateral meetings where BRI is discussed
- Establish contacts with respective Chinese counterparts in the Ministry of Transport, important cities and regions, and intermodal operators
- Address strategic challenges coming from BRI in a European context.
- Promote the Netherlands as an integral part of BRI, capitalising on the country's leading position in transport and extensive land, shortsea and ocean connections
- Support Dutch companies and regions that are interested in BRI, including through trade missions
- The ministry should be represented when Chinese delegations visit the Netherlands, in order to support the relevant Dutch companies and regions and to ensure that the Chinese visitors meet with the right counterpart and recognise the government supports the sector

In the next paragraphs, the above actions are further elaborated on.

7.2 Improve corridor quality

The European part of the corridor has still many bottlenecks, especially compared to the rest of the route. These bottlenecks do not only include the border crossing at Malaszewicze, but also the relatively short train length (640m), the closed stretches in Poland due to maintenance over the coming 3 years, and reduced capacity in The Netherlands and the Ruhr area during construction of the third track.

The Ministry of Infrastructure and Water Management should aim to enhance the corridor quality in the several gremia the Netherlands is already participating in:



- The RFC North Sea-Baltic – the RFC is responsible for improving the quality and quantity of the corridor in The Netherlands, Germany and Poland up to the Belarus border. The Ministry is part of the RFC’s Management Board, and from this position the Ministry could support further quality actions.
- The bilateral cooperation between the Netherlands and Poland – since many years the Netherlands and Poland are cooperating on railways, especially to improve the quality of the corridor between the two countries. Topics which hinder railway transport between the two countries should be tackled.
- The recently proposed trilateral cooperation between the Netherlands, Poland and Belarus – in the context of this cooperation, the quality of the railway transport is discussed. Topics which hinder railway transport should be tackled.
- The European Commission – the Ministry could liaise with the Commission in order to prioritise actions that improve the quality of the corridor (primarily within the EU) by allocating TEN-T and/or EIB budget, focus on border issues with third countries (and allocating budget to improve borders), and connecting TEN-T corridors and RFCs to third countries. The aforementioned pending communication from the Commission is to serve as a basis.

Soft infrastructure measures
<ul style="list-style-type: none"> • Establish and use platforms with countries concerned • Improve corridor procedures • Improve border procedures • Unified railway law • Compliance with single-market rules
Hard infrastructure measures
<ul style="list-style-type: none"> • Consolidated set of infrastructure funding guidelines beyond TEN-T • Funding infrastructure projects (TEN-T, EIB)

Table 7-1. Soft and hard infrastructure measures to improve corridor quality. ©Panteia

7.3 Unified railway law

Within UN ECE, more than 30 ministers (including those of the Netherlands and other EU Member States) signed the ministerial declaration to develop a unified railway law in 2013. The declaration underlines the importance of working towards a unified legal system for framework conditions for transport crossing Europe on its way to Asia. As we have seen, the transport conditions and liability clauses are regulated in COTIF (more than 20 EU Member States members including the Netherlands) and OSJD (Members include China, Russia, and 8 EU Member States including Poland). The COTIF and OSJD have both regulated conditions of carriage between railway undertaking and shipper (CIM versus SMGS). In practice, this leads to 2 transport contracts for transport from the COTIF-CIM area (e.g. the Netherlands, Germany) till the OSJD-SMGS area.

The UN ECE initiative for unified railway laws has developed common transport conditions between shippers and railway undertakings for Euro-Asian transports, and in February 2018 the UN Inland Transport Committee decided to launch pilots to test the common conditions. The common transport conditions are compatible with COTIF-CIM. In addition, on the basis of the UN ECE/ITC



decision, a legal framework (a separate UN ECE convention or other legal form) is now being developed to apply the unified railway law and its common transport conditions in practice. The UN ECE/ITC mandate to develop the pilots and the legal framework is applicable for the years 2019 and 2020.

The unified railway law initiative has the potential to achieve one legal system for railway transport conditions from Europe to China, to the advantage of shippers who are contracting the railways. It will enable single transport contracts and create a common liability regime for such transports, potentially also reducing border crossing procedures at the COTIF-OSJD borders (such as the Polish-Belarusian border). In parallel to the unified railway law initiatives, market parties (such as the sector association CIT) are working on a common consignment note to achieve a single set of documents for Euro-Asian transport. The common consignment note may still take account of 2 legal regimes (COTIF and OSJD) and may be accepted by customs authorities. The unified railway law initiative has the potential to further facilitate Euro-Asian railway freight transport and provide railway customers with better and more transparent conditions, also in cases of delays, damage or loss of goods.

As set forth already, improving customs procedures would involve close cooperation between regulators at EU and EAEU level, CIT and OSJD, as well as between national customs authorities. The Dutch ministry of Infrastructure and Water Management should continuously emphasize the importance of improving unified railway law and uniform implementation of customs regulations at EU and CIT level. Concrete goals should be:

- Border procedures could be addressed by creating a rail-dedicated, electronic format with harmonised information between CIM and SMGS, including fiscal and non-fiscal requirements (unified railway law). Clearance would ideally take place at the end destinations, and information shared in advance, thus strongly simplifying procedures at the border crossings.
- For the EU, implementation of customs regulations by the member states should be carried out in a uniform way, so as to coordinate procedures for all EU-EAEU border crossings.
- The setting of uniform tariffs for customs guarantees throughout the EU, and the standard involvement of specialised customs brokers with Authorised Economic Operator (AEO) status who are subject to lower tariffs.
- For Malaszewicze/Brest, keeping the sealed LCL containers on the trains and carrying out clearance at dedicated customs stations close to the end terminals

7.4 Establish Platform with the BRI states

As we know from experiences with the TEN-T RFCs, improving the quality and quantity of rail freight operations heavily depends on government actions. Currently, no ministerial-level platform exists for BRI. To be sure, the EU part of the China-Europe rail corridor coincides with RFC North Sea-Baltic in which the Netherlands actively participates. Also, for the intercontinental corridor a platform exists in which the incumbent railway companies of the countries involved meet; however, the Netherlands has no incumbent railway company for freight transport and thus would not be able to participate.

Initiating a ministerial-level platform involving the countries on the route would automatically place the Netherlands on the 'BRI map'. Taking the initiative would be recognised as a welcome instrument and enhance the Dutch position. Possibly, the Netherlands could do so in cooperation with the German Federal Government and/or the governments of North Rhine-Westphalia, Poland and Belarus. Deep cooperation already exists between the Netherlands and these countries/states (RFC, Linked by Rail Netherlands-Poland/Belarus) which is an asset for establishing such a ministerial platform. This topic could simultaneously be presented to the Chinese government, and included in the implementation of the Netherlands-China MoU chapter on rail transport.



7.5 European policy towards BRI

As noted already, a discussion at the European level is taking place concerning BRI's wider strategic implications and Chinese infrastructure investments in the EU and its neighbourhood¹⁷. An EU-China 'Connectivity Platform' was established in 2015, with biannual meetings between the European Commission (DG MOVE, DG TAXUD) and the Chinese government. A communication from the European Commission detailing infrastructure investment options in the EU and Eastern Partnership countries, with the aim of improving transport connections between TEN-T and its eastern neighborhood, is expected over the summer.

Simultaneously, it has been asserted that Chinese infrastructure investments in the EU appear primarily aimed at the economically weaker member states in Central and Southeastern Europe (e.g. via the 16+1' format). This might entail a risk of uneven control over future infrastructure, especially as added value may not always come to the benefit of the countries concerned. Another point of concern expressed by stakeholders is the relatively closed Chinese domestic infrastructure market, implying an uneven playing field for European market parties.

The Dutch government could play an active role in helping to forge a common European strategy that combines awareness with an open hand to the Chinese initiative. Awareness should involve monitoring compliance with and functioning of the internal market rules with regard to Chinese investments in the EU. An open hand may aim for improved connectivity between TEN-T and the Eastern Neighbourhood and the wider Eurasian continent. A consolidated set of infrastructure funding guidelines that helps to look beyond TEN-T, however, should certainly include the possibility for the EU for making strategic infrastructure investments without the involvement of third countries.

7.6 The Road to Holland: the Netherlands as an integral part of BRI

As already hinted on, it is the predominant perception of Chinese decision makers (intermodal operators, city and regional authorities) that Duisburg is the terminus of BRI in Western Europe. This clearly follows from our stakeholder consultation. However, the extensively developed infrastructure and logistics centres and highly competitive transport sector of the Netherlands could well compete for the increasing number of services. This comparative advantage is further augmented by the aforementioned congestion issues at terminals further east. The competitive position of the Dutch logistics sector, together with the intense competition between Chinese points of departure, can certainly be regarded as an opportunity for the Netherlands.

Regions in the Netherlands with an interest in BRI are too small to have an impact on their own. In order to compete, the Ministry of Infrastructure and Water Management should support Dutch BRI services and brand the Netherlands in a unified way. A message shared among the parties involved should be consistently brought forward during government-level encounters as well as seminars and workshops.

Promoting the Netherlands as the natural End Station of BRI could include:

- The Ministry liaising with the most interested regions, such as Tilburg and Venlo, the ports of Rotterdam and Amsterdam and relevant other entities, in order to develop a common strategy. The regions and port authorities are important as they are in direct contact with interested companies, and have an interest in, or are already, promoting themselves in China
- Agreeing with the aforementioned parties that they all bring forward the shared message

¹⁷ <https://thediplomat.com/2017/10/belt-and-road-initiative-eu-strategic-interests-in-asia/>

<https://fd.nl/opinie/1248410/handelsmissie-china-moet-stevig-aan-de-bak>

www.ft.com/content/3e79ae14-0681-11e8-9650-9c0ad2d7c5b5

- Representatives from the Netherlands being present in seminars and workshops to promote this message, not only in a participant's role but also as speaker.

7.7 Support Dutch businesses and regions that are interested in BRI

In various ways, the Ministry of Infrastructure and Water Management should support businesses and regions that express an interest in BRI. The Ministry should establish contacts with respective Chinese counterparts in the Ministry of Transport, important cities, regions and intermodal operators. Also, being represented when Chinese delegations visit the Netherlands is paramount in order to support the relevant Dutch companies and regions and ensure that the Chinese visitors meet with the right counterpart and are aware that the government supports the sector.



Figure 7-1. During the recent economic mission to China, in the presence of the Prime Minister of the Netherlands Mr. Mark Rutte, a strategic framework cooperation agreement was signed between Dutch GVT Group of Logistics and Chengdu International Railway Port Investment Co.

Ministry-led actions should be accompanied by trade facilitation via the RVO Agency, involving the interested businesses and creating opportunities for business-to-government encounters. Especially the Partners in Business (PIB) programme fits well, as it integrates both marketing and governmental actions. An application for this programme has to come from a consortium of interested companies, thus ensuring active involvement of market parties whilst creating the right meeting sphere between government and businesses. The Ministry of Infrastructure and Water Management should support such initiative. Moreover, once a possible grant is approved the Ministry can cooperate with the companies to promote their interests towards Chinese stakeholders. Equally important, funding from this programme can be used to cooperate with the targeted country (in this case China) to improve business opportunities.



8 Methodological note

8.1 China-Europe trade relations

Our partner from China, the China Waterborne Transport Research Institute (WTI), provided us with trade data based upon the HS-2 goods classification for all Chinese custom areas (prefecture level with a special distinction to Free Trade Zones if applicable) to the Netherlands. Data output is given in US Dollars, per mode of transport, per direction of transport (import and export), for the years 2014-2016. translate translation from trade value (given in US dollars) to trade volume (tonnes or kg) was needed. In order to this, we estimated the trade value per kg by making use of the EU Comtrade table for transport between the Netherlands and China. The translation from HS to NST/R was made given the correspondence table available through Eurostat.

In order to estimate the potential for rail transport, we made an estimation of the transport costs by maritime transport, rail transport and air transport. We made use of the 'Kostenbarometer' data and adapted costs components to the price levels in China, Kazakhstan and Russia for the parts of the journey that took place in these countries. For maritime transport, we made use of the costs per TEU as elaborated in the "Sustainability and the role of ports" study by Panteia (2015). For intra-China costs, we have calculated the pre-haulage costs by truck to the nearest international seaport, airport or railyard.

In order to account for shorter lead times, we have added a costs representing the value of time for goods. This has been done on a NST/R second digit level.

Trade volumes for the future are estimated based upon the Rijkswaterstaat BASGOED prognosis for maritime transport between the Netherlands and China. We have further specified this data to province level in China, taking into account the economic growth of the provinces concerned as compared to the overall country performance.

In the next paragraphs a more detailed description is given of the Panteia Terminal Model, databases used for examining transport flows, and research steps required for determining transport flows fit for modal shift.

8.2 Database transport flows

Panteia makes use of public documents for road transport combined with databases from private companies. This enables us to link transport movements to municipalities and, therefore, private entities. The most recent version of public documents for road transport known to us (Publicatiebestanden wegvervoer) have been published in 2014.

Freight transport flows are classified according to NST/R 1967 standards, second digit level. This provides a workable level of detail that can be properly linked to region-specific company specifications, based on SBI categorization. Thus, specific transports can be distinguished and associated with private entities in a particular region.

An example: the main category "Miscellaneous food stuffs and cattle feed" is differentiated into e.g. "sugar" and "beverages". Also, the public documents describe the specific configuration of the vehicle (container, dry or liquid bulk, conditioned transport) and the distance covered (within and outside of the Netherlands).

8.3 Panteia Terminal Model

In answering the aforementioned research questions, the Panteia Terminal Model plays a central part. A detailed and flexible system, it model offers extensive policy and scenario evaluation options. The model has been applied in numerous studies, such as:

- Macro-level model for estimation of potential continental container transport (under PLATINA 2)
- Study of sustainable logistics chains and the role played by sea ports (Port of Rotterdam Authority)
- Several studies concerning logistics relationships between sea ports and inland terminals.
- Study of transport flows between China and the Dutch province of Gelderland (Province of Gelderland).

With the Terminal Model we can establish transport costs from a particular location within the study area (municipality level) to any other area within Europe (NUTS-3 level).

Integrating terminals in the transport chain enables us to model the transfer of cargo between modalities. This may often concern transfer between barge or rail on the one hand and road on the other. Barge and rail offer a lower cost per km compared to road, however this is (partially) offset by transshipment and pre and end haulage (between terminal and loading/offloading location) costs. Thus, cost advantages from shift to barge or rail increase with transport distance.

Identification potential modal shift

In the first step, we carried out model calculations, through which we identify transport flows that may lend themselves for modal shift. This is done by reckoning with intermodal services with a standardized filling rate.

Therefore, the analysis is divided into the following steps:

1. Flows of goods currently handled by road are taken as a starting point. This study identifies maritime transport flows with potential for modal shift. In order to filter these from total numbers a correction factor is applied.
 2. For locations in the Netherlands, origin and destination are given at municipality level.
 3. For all origin-destination combinations – with subcategories for types of goods – we examine whether or not transport by rail or barge brings a cost benefit. This is done through an algorithm in which the lowest cost option is determined for both road and multimodal transport. For cost data, the aforementioned Panteia cost models are used.
- Also, the following assumptions are made:
 - Costs for rail transport are taken from Cost Barometer on Rijkswaterstaat website.
 - Maximum train length taken from data collection in ETISplus and TENtec.
 - Infrastructure charges and personnel costs differentiated to number of kilometres for one train in a particular country.
 - Calculations based on a 90% load of container capacity, with 2/3 of containers loaded.

Concerning all intermodal transport:

- Charter costs per container are included in our calculations. Differentiations are made for the number of days of the charter, as well as for the container type (20 ft., 40 ft., 45 ft., 30 ft. tank container or reefer).

Comparison with road transport:



- Comparison with single modal road transport is made based on vehicle type (non-specialised general cargo; dry bulk; liquid bulk tanker; refrigerated/conditioned).
- Trucks are assumed to operate cross-border.
- For personnel costs, Bulgarian driver costs are used.
- For Germany and France, minimum wages for operations within these countries are included.

Toll costs in several European countries, such as Germany, Belgium and France, are included.

4. Transport via road and/or inland waterway generally also requires pre and end haulage via road (last mile). Also, terminal handling costs are encountered.

Last mile costs are included in multimodal/modal shift solutions, based on Panteia's cost models and distances from road network information in NRM or ETISplus. Terminal handling costs are derived from recent studies.

5. In cases where, for a particular origin/destination combination, at least one node is determined at which road or rail offers lower costs than road, we conclude there is potential for modal shift.
6. All combinations are calculated through the model. The total set of options is assembled in order to provide for an oversight of modal shift options.
7. Ultimately, two terminal-to-terminal matrices are delivered, in which total freight flows per direction is shown for each origin-destination combination.

The result is a list of transport flows with potential for modal shift based on cost benefit. Here, we distinguish different types of containerised goods. The forecast includes shift to rail from ocean as well as air transport, and takes into account the potential increase of total freight volumes towards 2030. An evaluation was made of transport costs for the respective modes, combined with commodity time value cost. After calculating the potential modal shift for 6 provinces, we evaluated the other provinces data through a regression distribution model. Potential increase of total freight flows until 2030 was derived from the BASGOED model for trade between China and the Netherlands. The number of TEU was calculated using data on container truck weights, types of container and commodity in the container. An average lead time of 12 days was assumed for 2030.

8.4 Stakeholder-based research

Next to data analysis, this report draws heavily on stakeholder-based research, both in the Netherlands (in-depth interviews and interactive stakeholder meeting) and abroad (Germany, Poland, Belgium, Belarus, Russia, Kazakhstan and China). The stakeholders involved are listed below.

The Netherlands

KNV

Wilderbrook Consulting

Nunner Logistics

KLG Europe / New Silkway Logistics

Seacon Logistics

MUAN Consulting

Dynasty Shipping Europe

GVT Group of Logistics

Port of Amsterdam Authority

Port of Rotterdam Authority



EWD Compass
Jonhnsn & Johnson
Combiterminal Twente
DB Cargo
LTE Netherlands
Province of Gelderland
Embassy of the People's Republic of China to the Kingdom of the Netherlands
Embassy of the Republic of Belarus to the Kingdom of the Netherlands
Embassy of the Republic of Poland to the Kingdom of the Netherlands
Rotterdam Partners
Instituut Clingendael
Trancept Groningen/NSWL-Friesland Campina
Rail Bridge Cargo

Germany

Duisburger Hafen
Bundesministerium für Verkehr und digitale Infrastruktur

Belgium

Port of Antwerp Authority
European Commission – DG MOVE

Poland

Ministry of Infrastructure
Polish Railways (PKP)
Embassy of the Kingdom of the Netherlands to the Republic of Poland
DHL

Belarus

Ministry of Transport and Communications
Belarusian Railway (BZD)

Russia

Coordinating Council on Trans-Siberian Transportation (CCTT)
Russian Railways (RZD)

Kazakhstan

Kazakhstan Temir Zholy (KZC)
Trans-Caspian International Transport Route

China

Consulate-General of the Kingdom of the Netherlands in Chongqing
Netherlands Business Support Office Chengdu
New Silkway Logistics/InterMax Logistics Solutions
Chengdu International Rail Port Investment & Development Group (CIPI)
Administrative Committee of Chengdu International Railway Port
Logistics Council of Chongqing Municipal Government
Yuxinou Logistics
Chongqing Xiyong Comprehensive Bonded Zone Administrative Commission
Chengdu Southwest JiaoTong University
Administrative Commission of Chengdu Qingbaijiang District
Wuhan Asia Europe (WAE)
Wuhan Transport Bureau (Intermodal Transport)



