Iran-Europe Transport Corridors

Within the last few years Iran has demonstrated its strong political will to re-emerge as regional transport-poration hub. The country’s effort to improve its physical connectivity and to become a center-piece for regional supply-chains has been spearheaded by an ambitious development plan for the Iranian railway sector that has been dubbed “Iran’s railway revolution”.1

1. INTRODUCTION

With currently 7,500 km of railroad under construction, the declared goal is to extend the national railroad network from less than 15,000 kilometers today up to approximately 25,000 kilometers by 2025.2 According to officials of Republic of Iran Railways (RAI), the expansion will not only produce almost 12,000 km of new railroad, but also considerable progress in the fields of electrification and double-track lines.3

In 2017 Iran has achieved considerable progress on its national connectivity agenda. This article first reviews major milestones reached in 2017. It then discusses the wider strategic context of Iran’s corridor development programs and concludes with an analysis of potential routings between Iran and Europe.

2. IRAN’S CONNECTIVITY AGENDA IN 2017 REVISITED

Like other oil-exporting states, Iran is seeking to reduce its heavy-reliance on oil and gas exports by diversifying its economy. Since President Rouhani took office in 2013 the Iranian railway sector has profited immensely from government investments.

As a result, the share of rail cargo has increased from 8.5% to 12% in overall cargo volume during the period from 2013 to 2017. RAI sources expect it to climb up even further, reaching a share of 30% by 2022.4 The Iranian government has confirmed its determination to realize this rapid development by integrating railway investments into its sixth five-year development plan for the period of 2016 to 2021. In 2017, further progress has been achieved on this path; In January, the Iranian parliament adopted a bill that allocates a fixed share of 1% of national oil-driven revenues to connectivity projects in the Iranian railway sector. In this context Khierolah Khademi, deputy minister of roads and urban development, expressed his conviction about the role of connectivity projects for Iran’s economy: “I believe we should do away with the oil-dependent economy and turn to transit-driven economy […] Transit can be a replacement for oil revenues.”5 Together with an additional multi-billion USD funding stream for RAI, the recent developments are judged by some as foreshadowing a “new era of railway investment” in Iran.6

A potential roadblock to Iran’s connectivity vision is its lack of foreign investment flows, which have failed to reach anticipated levels after the relief of international sanctions in 2016. In its 10/2017 economic outlook for Iran the World Bank highlights the absence of a complete integration of the Iranian banking sector into the international banking system and continued uncertainties regarding full implementation of the Joint Comprehensive Plan of Action as the two main reasons for the shortfall in international investment.7

In light of these challenges, completion of the cross-border link from Astara in Azerbaijan to Astara in Iran in March 2017 is especially worth mentioning.8 The newly constructed 82.5 meter long dual-gage (1520 mm and 1435 mm gauge) bridge over the AstaraChay River is the second rail border-crossing between the two countries. The completion of this single project was of strategic importance for regional corridor developments; It is the first segment of the Qazvin-Rasht-Astara railway route, a critical link in the so-called International North South Transport Corridor (INSTC). The INSTC is an intermodal freight corridor that is mainly sponsored by India, Iran, Azerbaijan and Russia. The missing part between the two Iranian cities of Qazvin and Rasht is expected to become operational by March 2018 and construction for the final linkage between Rasht and Astara will start in 2018.9 Moreover, together with the Baku-Tbilisi-Kars railway (BTK), completed in October 2017, the Qazvin-Rasht-Astara railway route will integrate Iran even further into the network of rail corridors that are being developed under the umbrella of China’s Belt and Road Initiative (BRI).

3. THE STRATEGIC CONTEXT OF IRAN’S CORRIDOR DEVELOPMENT

In fact, the purpose of Iran’s rail sector development becomes much clearer with a view to its integration into a network of regional transport corridors. Iran’s geographic position offers potential corridor routings that could link the Persian Gulf and the Gulf of Oman in its south with the landlocked Central Asian states, Russia, China and with Europe.

References:

2) http://www.presstv.com/Detail/2016/02/10/449526/Iran-transportation-rail-Italy-deal-FS
3) http://www.globalconstructionreview.com/markets/how-islamic-republic-set-become-land-br8i8d8ge/
8) http://www.railjournal.com/index.php/freight/azerbaijan-inaugurates-new-link-to-iran
This is why China is channeling one of its six proposed BRI-corridors, the so-called “China—Central Asia—West Asia Corridor”, through Iran. Chinese interests in Iran’s corridor development come along with visible investments into Iran’s rail infrastructure. In July 2017, for example, China EximBank entered into a 1.5 bn USD loan agreement for financing the electrification of the 926 km Tehran–Mashhad main line, a project that will help to increase the routes maximum speed to up to 120 km/h for freight trains (250 km/h for passenger trains) and its yearly freight capacity to 10 million tonnes.\(^{10}\) Chinese companies, lead by the China Railway Group Limited (CREC), are also constructing the 375 km long Tehran-Qom-Isfahan high-speed railroad.\(^{11}\) The landmark project of China’s engagement in Iran might be a high-speed connection from Urumqi to Iran for which plans have first been proposed in 2015.\(^{12}\) During his Iran visit in 2016 Chinese President Xi Jinping announced that – partly due to Chinese infrastructure investments – Sino – Iranian bilateral trade volume could increase tenfold during the next decade.\(^{13}\)

What adds to Iran’s importance for China’s BRI-corridors, is the fact that capacity limits have been reached at several cross-border bottlenecks on the northern routes of the BRI. Already in spring 2017 shortages at the border Malaszewicze/Brest (Belarus/Poland) have been reported. According to different sources, between 50 and 100\(^{14}\)\(^{15}\) trains from and to China cross this border every week. Together with the opening of the Baku-Tbilisi-Kars railway, such capacity limits increase the strategic role of trans-Iranian rail corridors. Already today, freight trains run from several cities in China to Tehran.\(^{16}\) They make use of two routings; there is a direct routing via Kazakhstan, Uzbekistan and Turkmenistan and secondly a recently opened routing along the Caspian Sea (Uzen – Serhetyaka – Etrek – Etrek – Gorgan). The map below displays the present state of rail transport along the corridors and its cross-border bottlenecks. The thickness of lines illustrates the volume of traffic.

The INSTC, the second emerging transport artery crossing Iran, is the second focal point of Iranian rail investments. The planned multimodal corridor is envisaged to connect Mumbai via shipping to Iran’s Ports in Chahabar and Bandar Abbas. The northern part of the corridor will link Iran via Azerbaijan to Moscow. With the opening of the cross border bridge from Astara (Azerbaijan) to Astara (Iran) in 2017 the INSTC gained new momentum.

Various other projects are underway in Iran that have the potential to boost new patterns of regional trade. For example, lines are being developed to connect Iran with Basra in Iraq and with Herat in Afghanistan.\(^{17}\) Clearly, the country seeks to leverage its geo-

\(^{11}\) https://financialtribune.com/articles/economy-domestic-economy/68698/china-finances-tehran-Isfahan-high-speed-railroad
\(^{13}\) https://www.foreignaffairs.com/articles/2016-02-15/new-armis-race
\(^{14}\) U. L. Company, Interviewee, New Silk Road Trans. [Interview], 20 6 2017.
\(^{15}\) http://www.xinhuanet.com/english/2018-01/02/c_136867206.htm
\(^{16}\) https://financialtribune.com/articles/domestic-economy/7977/3three-freight-trains-due-in-tehran-from-china-this-week
\(^{17}\) https://reconasia.csis.org/analysis/entries/irans-railway-revolution/
strategic position “at the cross roads of the East and the West”. Abbas Akhoundi, Iran’s Minister of Roads and Urban Development, has described his country’s ambition as an attempt to become the “the point of equilibrium in the region.”

4. POSSIBLE ROUTES BETWEEN IRAN AND EUROPE

Despite Iran’s strategic ambitions, routing for freight trains along its emerging transport corridors still faces a host of infrastructural and political challenges. Railway systems are not homogenous along the route and border crossings often come with a break of gauge or other systemic requirements. Politically, the terrain is no less challenging. Contested territories, such as Abkhazia, Nakhchivan and Kurdish territories in Turkey are in the close vicinity of the Iran’s transport corridors. The railway routings need to navigate through a region that is marked by inter-state conflicts. Tensions between Turkey and Armenia, Armenia and Azerbaijan and between Ukraine and Russia are some examples, which could have detrimental or even disrupting effects on Iran’s connectivity.

At present conditions, the travel time for a train from Western Europe to Iran will be at least 10 days. While container rates on most of Chinese-European trains still receive considerable Chinese subsidies, costs for railway transport via Iran would be more difficult to fund. The following sections portray and compare potential routings focusing on aspects of efficiency.

A. ROUTES VIA TURKEY

Several railway routes and freight train connections are operational connecting Western Europe to Turkey. Infrastructure has been upgraded recently, e.g. between Dimitrovgrad, Bulgaria and the Turkish border. Nonetheless, on each of the three possible entry routes to Bulgaria, lines are single-tracked and without electrification.

The alignment of many railways in Turkey is not beneficial for heavy freight transports. The two main East-West transit routes are mountainous and equipped with ramps, not electrified, and mostly single tracked. Various projects will improve this situation on some stretches. There are existing plans to connect Bulgaria via Istanbul with the recently opened BTK railway in Kars by high-speed lines until 2023 (partially under construction, partially finished). While the high-speed line from Ankara to Sivas should be ready in 2018, construction of the Sivas-Erzurum-Kars section has not started yet.

A big issue is the greater Istanbul area: The Marmaray tunnel is now in operation for four years. The rail connection to both networks (Asian and European) will be finished by 2018. This connection of both sides via rail is basically built as commuter/subway line. It is still unclear, if freight trains will receive an allowance for the use of the Marmaray tunnel. In any case, dangerous goods will not be allowed to pass the tunnel and freight traffic will be limited to night times, when there is no commuter traffic. A second railway will be built in Istanbul connecting the railway networks of its Asian and European part. It will include the new airport and uses the combined (rail and road) Yavuz Sultan Selim Bridge, that has been recently opened for road traffic. Construction of the railway has not started yet. There is no decision so far, whether this line can be used for freight trains or not. The two routes described would be the only connections for freight trains to cross from Europe to Asia on rails without taking a ferry. At present rail transport always includes a ferry passage through the Sea of Marmara.

18) http://www.presstv.com/Detail/2016/02/10/449526/Iran-transportation-rail-Italy-deal-FS
20) Bachelor’s Thesis Lukas Mani
21) https://www.thefreelibrary.com/Edirne+to+Kars+High+Speed+Rail+Line.-a0462384207
24) https://railturkey.org/2016/03/03/frequently-asked-questions-about-marmaray-project/

www.eurailpress.de/etr

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i. The only Route without Gauge Change: Istanbul – Lake Van – Tabriz (Train ferry)

<table>
<thead>
<tr>
<th>2018</th>
<th>2025</th>
</tr>
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<tbody>
<tr>
<td>Km</td>
<td></td>
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<tr>
<td>5701</td>
<td>5452</td>
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<tr>
<td>+</td>
<td>Only 1435 mm</td>
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<tr>
<td>−</td>
<td>Istanbul: Reload to ferry Political tensions</td>
</tr>
</tbody>
</table>

This route was used by a weekly passenger train from Ankara to Tehran until it was interrupted in 2015 due to political tensions. More than 1,800 km separate Istanbul and Tatvan at the western end of the Lake Van. From there a rail ferry carries the train to Van at the eastern end of lake. Newly built ferries allow to transport a 500 m train (four tracks, 130 m in length each) in a single ride and one hour faster than the current ones. In January 2018 test runs of the first ferry have been completed. Still in Turkey, the track heads for the border with Iran at Kapiköy, before reaching Tabriz. With the opening of the Bostenabad – Mianeh railway in 2018, the line to Tehran will be shortened by 114 km. The announced electrification from Tehran to Tabriz will also benefit this route.

ii. Via Baku – Tbilisi – Kars and Astara

<table>
<thead>
<tr>
<th>2018</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km</td>
<td></td>
</tr>
<tr>
<td>6180</td>
<td>5941</td>
</tr>
<tr>
<td>+</td>
<td>Modern railroads</td>
</tr>
<tr>
<td>−</td>
<td>Trucking from Astara: Reload to 1520 mm Istanbul</td>
</tr>
<tr>
<td></td>
<td>Reload to 1520 mm Istanbul</td>
</tr>
</tbody>
</table>

After several delays the BTK railway was put into service by October 2017. First freight trains have been sent along the new track. The BTK is often mentioned as one of the important pieces of the “New Silk Road”. Along the whole route modern and new railroads have been built. But still, the BTK is a detour compared to the direct route. Breaks of gauge in Akhalkalaki and Astara require reloading.

iii. Via a new Line between Kars and Tabriz

<table>
<thead>
<tr>
<th>2018</th>
<th>2025</th>
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</thead>
<tbody>
<tr>
<td>Km</td>
<td>5478</td>
</tr>
<tr>
<td>+</td>
<td>Only 1435 mm</td>
</tr>
</tbody>
</table>

Discussions are underway to build a new standard gauge line between Kars and Tabriz. Together with the Ankara-Kars high speed line, this project would finally complete a high capacity standard gauge railroad between Europe and Iran. First ideas would route this line through Nakhchivan, where already a 1520 mm stretch exists.

B. ROUTES VIA RUSSIA

In fact, routes via Russia are the shortest possible ways via rail to Iran. In comparison with Turkey as transit country Russian railroads are mostly flat, straight, often electrified and double-tracked. However, at least two transshipments to different wagons are required due to the wider CIS 1520 mm gauge.

26) https://www.seat61.com/Iran.htm
34) FIGURE 3: Possible rail- and multimodal routes between Western Europe and Iran
i. The only Route without Leaving Rails today: Via Kazakhstan and Turkmenistan

With the inauguration of the Uzen–Serhetayka–Bereket–Etrek–Gorgan in 2014, on the eastern shore of the Caspian Sea it is possible (within an affordable way) to send trains to Iran. The route is longer than the routes via Turkey or Azerbaijan and two additional countries (Kazakhstan and Turkmenistan) need to be crossed.

![Map of Black Sea ferries and ports](https://example.com/black-sea-map)

**FIGURE 4: Black Sea ferries and ports**

<table>
<thead>
<tr>
<th>2018</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km</td>
<td>Km</td>
</tr>
<tr>
<td>6344</td>
<td>6344</td>
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</tbody>
</table>

+ All on railroad
- Long route, 1520 mm

 Via Kazakhstan and Turkmenistan

The fastest way in near term will be the usage of a combination of well-developed freight corridors in Europe and Asia. The TEN-2 corridor (Berlin-Moscow) together with the China-Europe train development is connected to the INSTC from Moscow to India. The whole length of this line will be further developed and modernized. With the predicted completion of the last stretch between Astara (Iran) and Qazvin the line can be seen as modern freight corridor along the entire path. Shortcuts to the south of Moscow (starting already in Belarus) cut the distance by some hundred kilometers. The line via Briansk and Volgograd is the shortest possible route, without crossing regions with considerable political risks.

![Map of Black Sea ferries and ports](https://example.com/black-sea-map)

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<tbody>
<tr>
<td>Km</td>
<td>Km</td>
</tr>
<tr>
<td>5155</td>
<td>5155</td>
</tr>
</tbody>
</table>

+ Short
- Trucking from Astara
  - Reload to 1520 mm

The fastest way in near term will be the usage of a combination of well-developed freight corridors in Europe and Asia. The TEN-2 corridor (Berlin-Moscow) together with the China-Europe train development is connected to the INSTC from Moscow to India. The whole length of this line will be further developed and modernized. With the predicted completion of the last stretch between Astara (Iran) and Qazvin the line can be seen as modern freight corridor along the entire path. Shortcuts to the south of Moscow (starting already in Belarus) cut the distance by some hundred kilometers. The line via Briansk and Volgograd is the shortest possible route, without crossing regions with considerable political risks.

**iii. The shortest: Via Ukraine**

Even shorter would be a possible routing via Ukraine. Heading from Poland all the way through Ukraine to Rostov and further to the Caspian Sea coast. This route is the shortest possible route with just over 5000 km. Currently this railway is threatened by tensions in the Donezk region.

In future, another short route could possibly cross the Crimean peninsula via the new Crimea-Bridge, which is currently under construction, and then run along the Black Sea Coast (Sochi/Adler) connecting to Georgia via Abkhazia. The railway bridge between Abkhazia and Georgia is still destroyed, but

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35) 26 [https://www.azernews.az/business/125875.html](https://www.azernews.az/business/125875.html)


reconstruction has been discussed.\textsuperscript{38) Due to several political tensions (Ukraine-Crimea and Abkhazia-Georgia) this route will not be operational in the near future.\textsuperscript{39)}

C. MULTIMODAL ROUTES VIA BLACK SEA

The Black Sea is crisscrossed with railway ferry connections in both (1435 mm and 1520 mm) gauges. The map on page 29 gives an overview about the ports and their modalities.

However, under efficiency considerations it does not make much sense to opt for rail ferries, if the Black Sea needs to be crossed. This option would always entail a break of gauge at the European coast, thus raising transport times and costs. A more suitable solution would be the transshipment of containers only. Currently, transshipment from Bulgaria to Georgia is faster or equal to the route via Turkey. Some shippers have already tested this solution. In Georgian ports of Batumi and Poti containers can be loaded onto the train. Still, this option needs an additional transshipment at the Azerbaijan-Iranian border to trucks or, in the future, to 1435 mm gauge. Today, it might be more reasonable to use only trucking services between the Black Sea and Iran.

E. CONCLUSION

Today, no optimal route solution exists for freight trains from Europe to Iran. Various routings exist, but each has its own characteristic downsides. If railway is the preferred mode of transport, transport should be directed via Russia today and in near future. It is the shortest way with the best infrastructure conditions and the remaining gap between Iran and Azerbaijan will be closed soon.

In 2018 new ferries on Lake Van should become operational and cargo trains should be able to use the Marmaray tunnel. Under these circumstances, and if the political situation in Kurdistan allows for it, a test train could be sent with European and Turkish wagons from Western Europe to Iran without leaving 1435 mm standard gauge.

Under efficiency considerations, the route via the BTK railway and Azerbaijan is currently not the preferred choice, as it requires too many changes of the modes of transport. However, due to the growing number of railway projects in and around Iran, several routes are likely to become faster and better suitable for railway transports in the near future.

\textsuperscript{38) http://www.iai.it/sites/default/files/2013_core-policy-brief-5.pdf

\begin{table}
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
Project & Country & Kind of Project & Benefits & Inauguration \\
\hline Dimitrovgrad – Kapikule Railway & Bulgaria & Railway upgrade & Faster connection and more capacity between Bulgaria and Turkey & 2016 \\
\hline Astara – Astara Railway & Azerbaijan+Iran & New line & Border crossing line to Iran & 2017 \\
\hline BTK & Turkey+ Georgia & New line & Connection of Turkey and Georgia & 2017 \\
\hline Qazvin – Rasht railway & Iran & New line & INSTC completion & 2018 \\
\hline Bosutenabad – Mianeh railway & Iran & New line & Reduction of 114 km between Tabriz and Tehran & 2018 \\
\hline Tatvan – Van ferry & Turkey & Railway ferry & 500m trains on a single ferry, shorter travel time & 2018? \\
\hline Marmaray tunnel & Turkey & New line & Connection of European and Asian networks & 2018? \\
\hline Ankara – Sivas railway & Turkey & New high-speed line & Fast and shorter Railway for both trans-Turkey routes & 2018? \\
\hline Tbilisi – Makhindzhauri & Georgia & Upgrade + Tunnel & Batumi/Poti – Tbilisi route 1 hour faster & 2019 \\
\hline Rasht – Astara railway & Iran & New line & INSTC final gap & 20xx \\
\hline Sivas – Erzincan railway & Turkey & New high-speed line & Fast and shorter Railway for the Istanbul-Kars line (construction start 2017/2018) & 20xx \\
\hline Erzincan – Erzurum – Kars railway & Turkey & New high-speed line & Fast and shorter Railway for the Istanbul-Kars line (construction start 20xx) & 20xx \\
\hline Edirne – Istanbul railway & Turkey & Upgrade & Faster Service, more Capacity & 20xx \\
\hline Yavuz Sultan Selim bridge & Turkey & New line & 2nd Connection of European and Asian networks & 20xx \\
\hline Kars – Tabriz railway & Turkey+ Iran & New line & Iran rail network connection with Turkey without using a ferry & 20xx \\
\hline Tehran – Tabriz railway & Iran & Upgrade & Electrification & 20xx \\
\hline Sumgayit – Yalama railway & Azerbaijan & Upgrade & INSTC benefits & 20xx \\
\hline Budapest – Belgrade railway & Hungary+ Serbia & Upgrade & Shortest way to Istanbul will be even faster & 20xx \\
\hline Nis – Dimitrovgrad railway & Serbia & Upgrade + Electrification & Europe-Turkey all electrified & 20xx \\
\hline
\end{tabular}
\end{table}