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The Eurasian Landbridge: Implications of linking East Asia and Europe by rail

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THE EURASIAN LANDBRIDGE:
IMPLICATIONS OF LINKING EAST ASIA AND EUROPE BY RAIL

1. Introduction

Overland transport links between the European Union (EU) and China were almost non-existent before 2011. Railway lines existed, notably the century-old TransSiberian Railway, but overland freight traffic from East Asia to Western Europe was minuscule. The paper documents the development of overland rail transport links between the EU and East Asia and analyzes the consequences of the increased connectivity.

The central argument is that the catalyst for rail services between Europe and China was demands from automobile and electronics companies coordinating their Eurasian value chains, for which air freight was too expensive and sea freight too long with imprecise arrival dates. Private sector agents responded by offering a variety of additional services which made rail freight attractive to more customers. The success of the rail Landbridge also depends upon collaboration of governments and national rail companies to facilitate transit by improving the soft infrastructure (e.g. minimizing border delays and bureaucratic requirements).

The process was largely market-driven. However, after the announcement of China's Silk Road Economic Belt in September 2013 and its incorporation into the Belt and Road Initiative (BRI) launched in May 2017, the Landbridge became consistent with the centrepiece of China's foreign economic policy. Policy statements of the EU Commission such as the 2016 Global Strategy and the 2018 Joint Communication on Connecting Europe and Asia also started to give greater prominence to connectivity to China.

Although rail freight will never match the quantity of sea freight or the speed of air freight, it has greater implications for sustainable connectivity. The nature of rail operations, compared to stacking a ship with twenty thousand containers, involves greater need for coordination, especially when shipments are links in international value chains whose success relines on just-in-time delivery of components at every stage of production, and more intimate connectivity. Electric trains along well-maintained track are also a more environmentally friendly mode of international transport than ships or planes.

2. Development 2011-19[1]

Between 1500 and 2010 trade between East Asia and Europe was dominated by maritime transport. Physical rail links existed but they were uncompetitive with sea freight, especially after the container revolution, when EU-Asia trade grew rapidly. The situation started to change in 2011 when rail services were established between western China and Europe (starting with Chengdu-Łódź and Chongqing-Duisburg). Since then, services have improved dramatically with regular services connecting a large number of China-EU city pairs and the annual number of containers travelling by rail roughly doubling each year.[2]

The process has been essentially market-driven (Pomfret, 2019b). An important initial driver of EU-China rail services was the efforts by car and electronics companies to link their European and Asian value chains into Eurasian value chains (Pomfret, 2019a). As rail services became more frequent and regular, freight forwarders responded by providing new services (e.g. part container loads, refrigerated containers, multimodal connections) with a greater variety of destinations.[3] This broadened the range of potential customers who were willing to pay more than sea freight for faster more reliable transport but unwilling to pay for air freight. The advantage of rail increased in the 2010s; air freight prices have risen, and maritime shipping times have lengthened, due to slow-steaming to save fuel and reduce pollution, while rail freight became faster and cheaper (Figure 1).

Figure 1: Time and Cost of Shipping a 40-foot Container from China to Europe by Air, Rail and Sea, 2006 and 2017.

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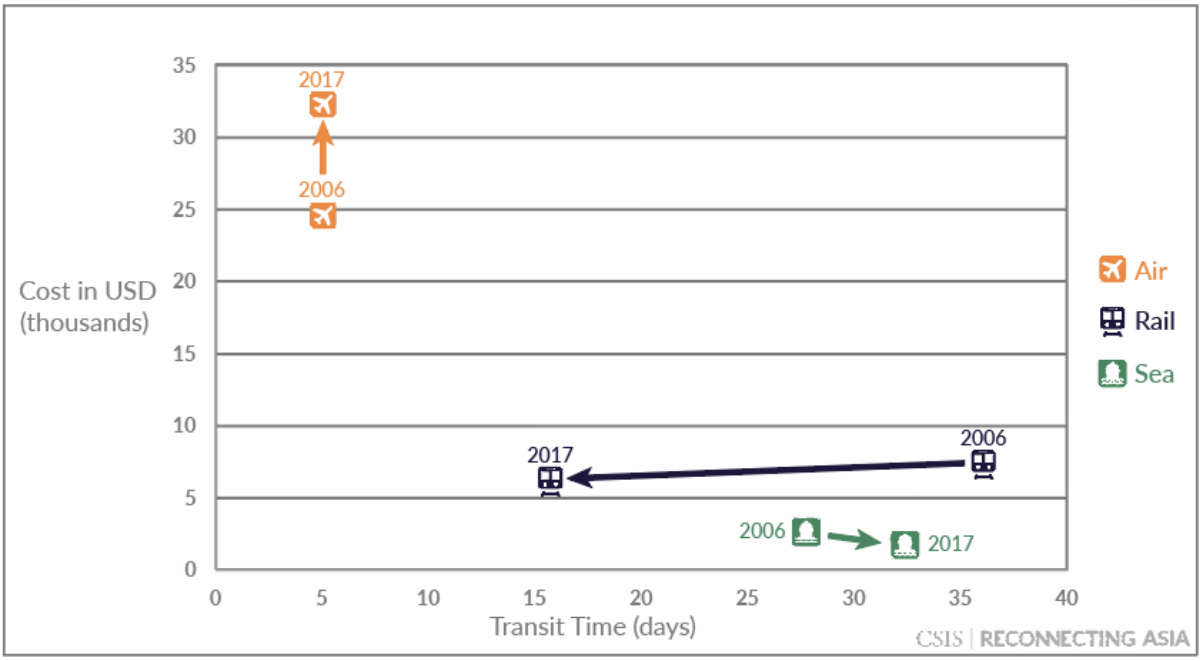
[1] This paper develops and updates arguments contained in online papers at: https://voxeu.org/article/eurasian-landbridge-linking-regional-value-chains and https://voxeu.org/article/eurasian-landbridge-and-chinas-belt-and-road-initiative. For more in-depth analysis, see Pomfret (2020, chapter 3).

[2] Typically cited numbers for journeys along the Landbridge (e.g. at https://www.mordorintelligence.com/industry-reports/china-europe-rail-freight-transport-market) are 17 (in 2011), 42 (2012), 80 (2013), 308 (2014), 815 (2015), 1,702 (2016), 3,673 (2017) and 6,363 (2018). Numbers are not necessarily balanced in both directions; in 2018, of the 1,442 trains on the most frequent route, between Duisburg and Chongqing, 728 were from the EU and 714 from China.

[3] Eastern European countries (especially the Czech Republic, Hungary, Poland and Slovakia) have been active GVC participants and also increasingly important connecting cities to China (Pomfret and Sourdin, 2018). Łódź quickly established itself as the Eastern European hub for EU-China rail freight (Jakóbowski et al., 2018). Klaipéda (Lithuania) became a hub for southern Sweden.



Source: Hillman (2018), reproduced from Zhang (2017).
Note: based on data in *Land Transport Options between Europe and Asia: Commercial Feasibility Study,* U.S. Chamber of Commerce, Washington DC, 2006. and in Zhang (2017 – reported in Schramm and Zhang, 2018).

Jakóbowski et al. (2018) have estimated shipment costs along different rail routes from China to Europe. All such numbers are approximations, but Table 1 clearly indicates the prohibitive cost of air transport for all but very high value-weight or time sensitive items. Rail is more expensive than sea, but the price gap narrows if places are further from seaports (e.g. Chengdu-Warsaw).[4] Thirdly, rail is faster than sea, with more predictable arrival time.

Table 1. Comparison of Shipping Cost, in USD per container, and Time, in days, for Goods transported between China and Europe.

	Shanghai-Gdynia		Chengdu-Warsaw		Shanghai-Rotterdam	
	Cost	Time	Cost	Time	Cost	Time
Air	37,000	5-9	37,000	5-9	37,000	5-9
Rail	4,500	19	5,000	15	5,000	18
Sea	2,600	37-42	4,500	43-50	2,200	27-37

Source: Jakóbowski et al., 2018, 69.

The number of city pairs providing freight services has increased rapidly, especially since 2015. Already in May 2017, China Railway Express trains were

[4] Pepe (2020, 13-16) emphasizes the shift in manufacturing activity away from China's eastern coast as wages and land costs increased and the integration of Eastern European countries into European value chains as they prepared to join the EU in the early 2000s as important background developments behind creation of the rail Landbridge.

connecting 37 cities in China to destinations in eleven EU countries. By December 2017 the cumulative number of trips along the Landbridge had reached 6,235, and over half of those were in 2017.[5] As more cities offer services, some successfully and others not, it is hard to keep track of numbers but in both Europe and China over fifty cities are now Landbridge termini. The most reliable volume data are those from the Eurasian Rail Alliance (Table 2), which reports growth in traffic along the China-Kazakhstan-Belarus route from 46,000 containers in 2015 to 280,500 in 2018; extrapolating the rough doubling each year, they predicted (before COVID-19) that a million containers would be transported in 2020.[6]

Table 2: Volume of Traffic on China-EU-China Container Trains, 2015-18

Year	Number of twenty-foot equivalent containers (TEUs)
2015	46,000
2016	104,500
2017	175,800.
2018	280,500

Source: UTLC website at www.utlc.com.

Note: The Eurasian Rail Alliance (UTLC) was founded by Belarus, Kazakhstan and Russia in 2014 to provide services for container block trains running between China and Europe.

In Europe, indicators of the increased salience of the rail Landbridge include the holding of an annual Silk Road Summit attended by hundreds of logistics service providers (the 3rd in November 2019 was in Venlo, Netherlands) and the EU Commission engaging in how to relate the EU-China service, and the BRI Belt, to the Trans-European Transport Network (TEN-T) as a top priority in 2020 (Walton, 2019). The Commission's interest can be traced back to the 2007-12 RETRACK project which aimed to induce a modal shift of freight traffic to rail; RETRACK's focus was on developing a high-quality commercially sustainable rail freight corridor from the North Sea to the Black Sea

[5] China Railway reported over 6,000 trips in 2018 and 5,266 in the first eight months of 2019 (http://www.globaltimes.cn/content/1164438.shtml).

[6] These numbers remain small compared to maritime freight. A single ship can carry 20,000 TEUs. No more than 5% of the value of all freight between Europe and Asia goes by rail (European Commission, 2018, 3). However, goods for which rail is preferred tend to be higher value and more tech-intensive than the bulk goods transported by sea.

(Rotterdam-Constanza), but it also considered prospects for establishing "Eurasian land-bridges" to China.[7] Connectivity via Russia to China has always had a strategic dimension and EU Commission policy is within the framework of the European Union Global Strategy (2016).[8]

For China, the rail Landbridge has been related to President Xi's flagship foreign policy, the Belt and Road Initiative (BRI), that was announced in 2013 and officially launched in 2017. However, the first trains preceded the BRI, and much of the activity has been driven by local governments in China rather than at the national level. To encourage freight trains from their city, local authorities have offered substantial subsidies that are difficult to document with any precision. The central government has imposed a cap of 30% on subsidies in 2020 (Chu, 2019) and the subsidies are eventually to be discontinued (Jakóbowski et al. 2018, 25; Pepe, 2020, 20). Given the non-transparency, it is impossible to estimate the impact of terminating subsidies, but a consensus among users is that most of the services will continue to be profitable without subsidies.

3. Prospects

Improved connectivity will intensify the economic links between EU members and China. Although routes along the Landbridge are currently point-to-point, the prospects for economic development in countries along the route (e.g. Central Asia) are good, and this would strengthen those countries' economic links to the EU. There are also prospects for physical reintegration of a geographically regionalized Eurasian continent, as Iran and Southeast Asia are brought into the rail network.[9] Such developments are often situated within China's Belt and Road Initiative as a political challenge, but it is important to recognize the solid economic foundations, as rail offers a competitive service in terms of

[7] The conclusions of the RETRACK final report (van Rooijen et al., 2012), that the TransSiberian was the most immediately relevant route and routes via Kazakhstan had the best longer-term potential, while the TRACECA corridor was the least likely to flourish, have proven correct.

[8] The TEN-T, including guidelines for the development of a Trans-European Rail Network, dates from July 1996 (Decision No 1692/96/EC). However, extension to eastern Europe was slow and, despite statements of intent to look east in 2011, only in 2017 were Eastern Partnership states included. The Joint Communication on Connecting Europe and Asia (European Commission, 2018) recognizes the significance of looking east and includes specific proposals.

[9] Prospects for overland connections with South Asia are limited by geography and by political disagreements. Pakistan is being linked to China via the China-Pakistan Economic Corridor but the geographical challenges of crossing the Himalayas are substantial. Poor India-Pakistan relations and the security situation in Afghanistan inhibit East-West links through South Asia.

reliability that is faster than sea and cheaper than air. Currently about half of China-EU rail traffic uses the TransSiberian railway directly from Northeast China or via Mongolia, and half passes through Kazakhstan to Russia, Belarus and Poland. The development of alternative rail routes is potentially important for maritime countries such as Australia because Indian Ocean ports (Bandar Abbas, Chabahar, Gwadar) and many Southeast Asian ports are linked to the Eurasian rail network.

Central Asian links are primarily through Kazakhstan to Russia and Europe (Pomfret, 2019c, 266-71). Kazakhstan is also the bridge via Turkmenistan to Iran and for transit to Uzbekistan, e.g. the Korea-Lianyungang-Tashkent service that goes on to the GM factory (ex-Daewoo) in Andijan. Kazakhstan was an early BRI partner, linking its own *Nurly Zhol* infrastructure program to the BRI. The *Nurly Zhol* programme for 2015-19 was announced in 2014; 3,000 kilometres of national roads were built and reconstructed, 15,000 kilometres of regional and district roads repaired, 1,400 kilometres of new railways commissioned, six airport runways modernised, the capacity of Kazakh-Chinese border terminals increased to 40 million tonnes per year and the capacity of the port infrastructure on the Caspian Sea increased from 17.5 million to 27 million tonnes per year (Yergaliyeva, 2019).[10]

A middle route crossing the Caspian Sea to Baku and then by rail through Azerbaijan and Georgia to the Black Sea and ship to Europe has been supported by the EU since the early 1990s under the TRACECA program. Its attractiveness has been improved by upgrading of port facilities at Aktau and Turkmenbashi and the new Alyat port in Azerbaijan, and by the Baku-Tiflis-Kars (BTK) railway, which has been operational since November 2017 and offers an overland link to Turkey. The middle route has attracted little China-EU freight due to the inconvenience of transferring containers from train to ship and back to train. However, the first China-Turkey train followed this route in November 2019 from Xian, using the BTK and crossing under the Bosporus to Istanbul (Pepe, 2020 29).[11]

The rail link between Kazakhstan and Turkmenistan, formally opened by the two presidents in 2013, offered a new connection to Iran. After UN sanctions on Iran were eased in January 2016, the first train from China reached Tehran in February and China subsequently established regular services from Ningxia Autonomous region (home to

[10] The *Nurly Zhol* programme has been extended to 2020-25. See also, Belgibayev & Zhang (2016).

[11] The *Daily Sabah*, 27 October 2019, reported that the China-Turkey service would run with 42 containers once a week; https://www.dailysabah.com/business/2019/10/27/two-years-on-baku-tbilisi-kars-railway-line-carries-275000-tons-of-freight.

Muslim minorities) and Yiwu to Iran.[12] The circuitous route for these services through Kazakhstan and Turkmenistan reflected the decision to avoid the more direct route through Uzbekistan which imposed more burdensome requirements on transit traffic.

Since Mirziyoyev was elected president in December 2016, Uzbekistan has become keen to repair the fractured relations with neighbouring countries and adopted more open economic policies. Apart from increasing its transit role on the more direct China-Kazakhstan-Uzbekistan-Turkmenistan-Iran route, Uzbekistan supports China's proposal to construct a rail link from Kashi in China via the Kyrgyz Republic to Uzbekistan. The link would shorten the route from China to Iran and the Middle East and reduce China's dependence on transiting Kazakhstan. However, the Kyrgyz government is concerned that the most direct Kashi-Andijan route, which passes through sparsely populated territory, will bring little benefit to the country and its construction may lead to debt dependence if funded by Chinese loans (Hurley et al, 2018).

The Southeast Asian countries have envisaged that the 2015 ASEAN Master Plan for Connectivity will be consistent with the BRI and benefit from financing from the Asian Infrastructure Investment Bank.[13] Most obviously, the Singapore-Bangkok-Kunming rail link would connect the Chinese rail network to major ocean ports. Construction of railways from China to ports in Myanmar will similarly strengthen these infrastructure links. In all cases, however, progress has been slow as resistance to Chinese-funded infrastructure investment has been encountered in transit countries (e.g. Malaysia) as well as in least-developed ASEAN countries (Myanmar and Laos).

In Northeast Asia, Korea and Japan have connectivity programs (Korea's 2013 Eurasia Initiative and 2015 Eurasia Express rail project) or partnerships (the EU-Japan Connectivity Partnership announced in September 2019) that potentially involve improved transport links to the EU, although they are light on details and it is unclear whether they are intended to be complementary or competitive to the BRI.[14] Korea's direct rail link to Europe passes over a rail bridge in the sliver of Korean territory at the

[12] So far, no trains from China have gone beyond Tehran. Although the track exists to Istanbul and the Bosporus tunnel eliminates need for inter-modal transfers, many parts of the Iran-Turkey rail journey are slow.

[13] At the 22nd ASEAN-China Summit in Bangkok on 3 November 2019, the heads of government of the ten ASEAN countries and China reaffirmed their commitment to synergise the Master Plan on ASEAN Connectivity (MPAC 2025) and the Belt and Road Initiative.

[14] Schultze (2019) argues that the September 2019 EU-Japan Partnership on Sustainable Connectivity and Quality Infrastructure represents a strategic reaction to the BRI rather than containing any concrete measures to improve connectivity.

mouth of the Tumen River and then joins Russia's TransSiberian railway. There is also a sea-rail connection via Lianyungang

Further expansion of the Landbridge traffic is tied to ongoing willingness of the EU, China and transit countries to continue to facilitate the international rail service. The current mainlines through Kazakhstan, Russia and Belarus work well for Łódź or Duisburg, but for Slovakia, or Hungary faster routes via Ukraine are constrained by the state of Russia-Ukraine relations.[15] Development of a southern route via Iran and Turkey could be even better for South-eastern Europe. Alternative routes also improve rail's attractiveness by reducing the potential for disruption by a transit country; any route can be disrupted by a single non-cooperating transit country whether seeking higher transit fees or in political dispute, although transit countries have strong financial incentives not to be disruptive in order to earn the transit fees.[16] Competition can also encourage countries to ease bottlenecks; the change-of-gauge transfer point at the Belarus-Poland border is the major source of delay for trains on the main Landbridge routes, largely due to managerial rather than infrastructure problems (van Leijen, 2018; Lobyrev, et al., 2018), but under current conditions there is no practical alternative to this border crossing point and hence little pressure on Polish or Belarus authorities to improve their services.

Looking further ahead the prospect of a high-speed China-EU rail link is not implausible given the speed with which China's domestic high-speed rail link has been developed and the generally favourable terrain through which Landbridge routes pass.[17]

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[15] In the present context, the Czech Republic, Hungary, Poland and Slovakia are especially relevant because they are the post-2004 EU members that have become most integrated into GVCs (Pomfret and Sourdin, 2018). However, improved connectivity offers a pathway for other European countries to become GVC participants if they adopt appropriate policies to facilitate trade and improve competitiveness. Some Western European countries have been concerned about growing Chinese influence in Eastern Europe, e.g. under the 17+1 (now 18+1) initiative, in part due to fears of lost exports to Eastern Europe due to Chinese competition. Stanojevic et al. (2020) find that Chinese exports to Eastern Europe in 2006-17 were complementary to EU members' exports of machinery and electronics (i.e. sectors characterized by GVCs) but competitive in finished goods such as textiles or furniture.

[16] According to an Asian Development Bank source, Kazakhstan earned over one billion US dollars in transit fees in 2015 (Pomfret, 2019c, 267).

[17] China's first high speed rail (HSR) service on dedicated track opened in 2008 between Beijing and Tianjin, in time for the Olympic Games. Spending on HSR was a major component of the 2008-9 fiscal stimulus ($88 billion in 2009). By the end of 2019 the HSR network covered 35,000 kms. HSR is typically defined as passenger trains running between 250 and 350 kph and freight trains at speeds over 200 kph. In 2019, China began testing maglev trains that can run at speeds of 600 kph; the only current maglev service, from Shanghai city centre to Pudong airport, reaches speeds over 400 kph and covers the 30.5 km journey in just over seven minutes. Although reporting and analysis of Chinese HSR focuses on passenger traffic (e.g. Lawrence et al., 2019), many lines along

Such a link would further improve the time advantage that rail offers over sea freight from China to Europe.

4. **Implications**

Economic prospects for continued development of the Eurasian Landbridge are positive. The rail option is attractive to traders with high-value goods for which the savings in time-in-transit over maritime transport and more assured delivery times justify paying a higher price. If the price gap can be further reduced by efficiency gains and by scaling-up and travel times can be further reduced, then the relative attractiveness of rail freight will increase. Improved connectivity will strengthen economic links between Europe and China (and potentially intermediate countries too).

This process is likely to be linked to the phenomenon of lengthening supply chains. Market integration has been a driving force of long-term economic development as local markets and production processes became regional and then national and international. The creation of international value chains relies on low costs of international trade and reliable delivery times to reduce the need for inventories at each production stage. The phenomenon of global value chains (GVCs) has been a feature of the international economy since the mid-1980s (Baldwin, 2016; Johnson & Noguera, 2017; UNIDO, 2018), initially identified with electronics, automobile and clothing production but now characterizing many goods and services.

The initial drivers of the Landbridge were GVC lead-firms. European carmakers sent components to their assembly plant in China, while companies like Apple, HP and Acer shipped electronic goods from factories in China to their marketing and distribution centres in Europe. These were items that were too heavy to airfreight but too valuable to have in transit on a ship for over a month; rail provided a mix of speed and reliability that the carmakers and electronics firms were willing to pay a premium over maritime freight rates

The GVC phenomenon observed since the 1980s has rarely included truly global value chains but rather involved three main regional value chains centred on East Asia,

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the “four vertical and four horizontal” corridors (extended to “eight vertical and eight horizontal” corridors in the 2016 plan) are mixed use passenger/freight lines.

Europe and North America.[18] The Landbridge has been instrumental in the creation of Eurasian value chains with EU carmakers sending components to their Chinese assembly plant and electronics firms sending assembled products to their EU marketing centres. This matters because GVC trade links economies more tightly than arms-length trade between independent exporters and importers

5. Conclusions

The Eurasian landbridge has contributed to increased sustainable connectivity between the EU and China during the decade of the 2010s. Felicitously, this market-driven development preceded, and also complemented, major foreign economic policy announcements by the Chinese President (the Silk Road Economic Belt and BRI) and by the European Commission (*Connecting Europe and Asia)* and reinforces their goal of increased connectivity. The resulting connectivity is likely to survive any bilateral political debacles because the economic foundation is strong.

[18] In the twenty-first century, GVCs can be observed to a greater or lesser degree in almost all sectors and any generalization about GVCs has exceptions. Some GVCs (e.g. the Boeing 787) are already global.

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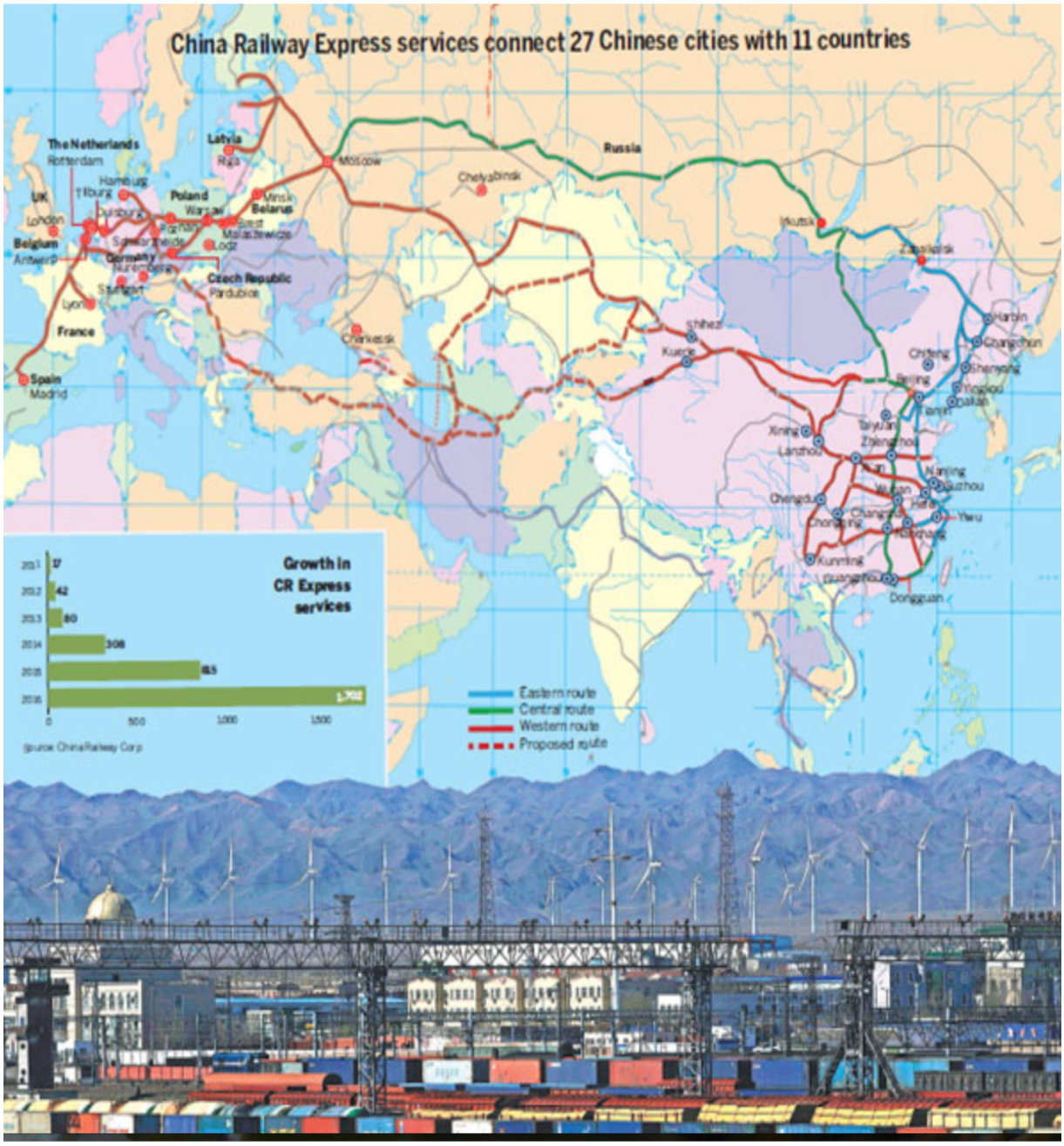
Map: China Railway Express Route Map, May 2017



Note: the green lines are the TransSiberian Railway routes. And the solid red line west of China is the main route via Kazakhstan. In most cases the track for the proposed routes already exists. The only exception is the line across the Kyrgyz Republic. The BTK railway connecting Georgia to Turkey is not shown on this 2017 map.