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# THE LAND TRANSPORT NETWORK IN THE POST-SOVIET SPACE – PROBLEMS AND PROSPECTIVE DEVELOPMENT

*ABSTRACT*

*Road and rail networks in the post-Soviet space are analysed in view of the demands in transportation to be expected in the 21st century. The road system is found terribly underdeveloped in terms of density and carrying capacity. It widely fails to fulfil the necessary feeder function for the rail system. Both rail and road systems need substantial improvements to allow for the urgent economic recovery of that large area between those vital and dynamic regions in east (China), south (Middle East) und west (Europe).*

*KEY WORDS*

*former region, road and rail systems*

The article is devoted to the transport network situation in the former Soviet Union, to main problems and prospective development in the frame of new economic and geopolitical conditions, following the end of the Cold War, disintegration of the so-called World socialist system as well as of the Soviet Union itself. These events have caused completely new economic links, changes of the cargo structure being delivered, establishing new bypassing or straightening of the transport routes, occurring of new transit potential.

In spite of the economic crisis embracing the whole post-soviet area during the last 10-year period new railway line construction has been continued. The main reasons were geo-strategic ones, or economic development of backward areas, or developing new mineral and other resource deposits and areas, or to create new direct outlets to the export-import deep--sea ports and harbours.

In the yet independent countries 36 railway departments have been established, out of this 17 in Russia, 6 in Ukraine. The map shows the railway network as a whole, the new developments, electrification etc. The following is a review of the most important new lines being constructed, under construction or under consideration.

## 1. AZERBAIJAN

There was no new construction besides the 7-km branch-line to the Caspian terminal Djubendy to handle oil coming by tankers from the oil-deposit Tengiz to the refinery in Ali-Bairamy. Up to now there is no direct connection with the Autonomous Republic of Nakhitshevan, separated from Azerbaijan by the Armenian area. Now the traffic is going through the Iran area.

## 2. ARMENIA

The traffic on the Tbilisi (Georgia) – Wanadsor line has been restored in 1997 and the Armenian network has got an outlet through Georgia. A new project is under consideration – the Erevan – Tebriz line, which will link the country with Iran through the mountain area Zangezur.

## 3. GEORGIA

The civil war 1991-1994 caused destruction of some sections of the country's mainline Tbilisi – Batumi, separation of the Abkhasian section of the mainline, switching-off the electricity (all lines are electrified). In 1995 the bridge in Nataneby was restored and the traffic on the Samtredia – Batumi line reopened. Under the Turkish loan a single-line connecting Akhalkalaki – Kars (20 km in Georgia) is under construction as an outlet for oil from Kasakhstan and Azerbaidjan to the Turkish port Geykhan. There are proposals to construct a 20 km branch to the port Anaklia (Mingrelia) as well as a branch Poti – Supsa (oil port southward from Poti).

## 4. KAZAKHSTAN

Among the lines being built recently some should be mentioned: Makat – Inderborskiy (162 km) in the

former Gurjev province, Maikain – Ushkulyn (41 km) to the coal deposit Maikuben in the Pavlodar province, Kuljsary – Tengiz (78 km) to the oil deposit Tengiz, Kizilgar – Shubarkol (130 km) to the coal deposit in the Karaganda province, Dostik – Alashankoy (China). To avoid passing through the Russian territory the construction of the Aksu – Konetchnaja line on the left bank of Irtish (185 km) has begun. It will directly link Pavlodar with Cemipalatinsk. The line Tsharskaja – Zatshita (142 km) is going to provide a link with the mainline Turksib. Under construction is the line Jeralievo – Bekdash – Turkmenbashi (Turkmenistan), which gives a new outlet of oil from Tengiz and Mangyshlak oil-fields to the Iranian ports.

The following existing lines have been recently electrified – Tshoknar – Belj-Otar (84 km), Shu – Tshoknar (71), Dgambul – Lugovaja (118), Lugovaja – Shu (115 km), Novoishimskaja – Presnogorjkovskaja (148 km).

## 5. KIRGIZIJA

By gaining independence the country appeared to have a disintegrated railway lines network. The main line partly goes through Kazakhstan area from Lugovaja to Lake Issik-Kulj, in the South-West there are some short branches from Uzbekistan. The construction work has begun on the Trans-Kirgizian railway Issik-Kulj – Kazarman – Dgalal-Abad (900 km) with crossing a mountain ridge at the altitude of 1.5 km. Under consideration is the Andigan – Osh – Kashgar line, which will link Uzbekistan and Kazakhstan with China.

## 6. LITHUANIA

To rebuild links with Poland two lines were constructed – double-gauge (1520 and 1435 mm) line on the section Shashtokaj – Motskava and the section with 1435 mm gauge Motskava – Polish border and further on to Elk/Lyck. Now, the traffic flows directly avoiding Belarus.

## 7. RUSSIA

The most intensive construction activity was concentrated on the North of the European part. The first non-state-owned railway line was constructed – Kotshkoma–Ledmosero (126 km) which will link the lines Murmansk–Sankt-Petersburg with the West-Karelian line and with the line Ledmosero – Kostomuksha — Kiwijarwi – Wartius (Finland). This line will serve the iron-ore-dressing plant and will become the first section of the prospective mainline Belkomur (White Sea – Komi – Ural) in the length of 1200 km, which will provide for the Ural and Komi regions an outlet to the deep-sea ports in the White Sea and Gulf of Bothnia. In January 1999 began the construction of the line Wendinga – Karpogory (230 km). The branch from the Murmansk line up to Alakurti is being reconstructed and further on the construction of a line till the Finnish border and further to Salla is being proposed.

In the Kaliningrad province a section with the European gauge from the Southern railway station on the line Dzerginskaja – Mamonovo – Branevo was built, which allowed traffic of passenger trains on the Kaliningrad – Gdynja – Berlin route.

Due to the Tchetchenian war the links between the Western part of the North Caucasus and Astrakhanj province and Dagestan as well as between Russia and Transcaucasus have been fully interrupted. Dagestan was completely isolated from the Russian territory. Therefore, a new Trans-Dagestan rail line was built in 1996-1997. This line Kizljar – Babajurt – Karlan-Jurt (79 km) connected the capital Makhatshkala with Kizljar avoiding Tchetchenia and the traffic for railways trains Moscow – Makhatchkala, Moscow – Baku, Moscow – Tbilisi and Rostow – Makhatchkala was restored.

### 7.1. West Siberia

In 1996 the line in the Jamal region from the railway station Obskaja on the river Ob bank up to Kharasavey in the length of 540 km was completed. It connected the natural gas deposit Bowanenkovo (West Jamal) with the basic network. The section Workuta – Labytnangi (a part of the former "dead" line Workuta – Igarka) was rebuilt. Another railway line was constructed in the North part of the Tjumen region – from Surgut in the direction of Urengoj. To serve the big natural gas deposit in Jamburg the line was built from New Urengoj. In the South another railway was built – Srednesibirskaja – Meretj (230 km) to provide outlet to the coals of the Kuznetskij basin another railway was built - Srednesibirskaja-Meretj (230 km).

### 7.2. East Siberia

The line Kamyshta – Oznatchennoe in the length of 66 km was built in 1993 to give an outlet for the Sajanogorsk aluminium plant. In the zone of the Baikal-Amur railway mainline the last sections were built – the by-pass of the tunnel Severomujsk still under construction, the line Tungala – Werkhnesejck (156 km), the line New Tchara – Taksimo (250). Under construction is the line (65 km) from the station New Tchara southwards to the polimetallic ore deposits Tchinejsk and Katugin and further on to the copper deposit Udokan. Some branches have been con-

structed – from station Fewraljsk to the station Ogodga (a coal deposit) in the Amur province and Shimanovsk – Tshagojan (45 km) to open up a big limestone deposit. Up to the end of 70s from Baikal – Amur mainline a northward branch Amur – Jakutsk started to be built. It reached Tommota (750 km), the last section to Jakutsk (441 km) is under construction.

### 7.3. Sakhalin

Since 1994 two summer ferry lines to Japan have been in operation: Kholmsk – Otaru and Korsakow – Wakkanaj. Under consideration is the project of the tunnel under the Tatarskij Strait to replace the ferry-line Wanino – Kholmsk. In this connection a line project is under consideration: Komsomoljsk/Amur – Lazarev -Pogibi – Nogliki with a link to the Sakhalin network.

### 7.4. Far East Region (south)

Recently (1998) the railway line Tumangan from Khuntchunj (China) to the Russian port on the Japanese Sea was built (Zarubino).

## 8. TAJIKISTAN

A narrow-gauge line Kurgan – Tjube – Kuljab (150 km) is being replaced by the normal-gauge line to link the two existing lines. To open-up the deposits of gold, silver, tin and tungsten ore the construction of the new line along the Zerawshan road to Pedgikent was started.

## 9. TURKMENISTAN

The main goals of the broad railway line construction work – to link together some isolated sections of the network in the North and East by avoiding crossing the Uzbekistan area, form an outlet to the Iran territory and open-up very rich mineral resources deposits. In 1996 an international line was commissioned, Meshkhed — Seraks – Tedgen (320 km) with a 6 km tunnel under Kopet-Dag. In 1994 a 5 km branch Artik – Ljutfabad (Iran) was constructed. A new project is now under construction Gazandgik —Giziltrek and further on up to Bender – Turkemen and Gortchan (Iran). Now the first section of the new Trans-Asian transport corridor North- South along the eastern Caspian Sea shore is under construction to link the Kazakhstan oil deposits with Turkmenian and Iranian deep-sea ports (850 km).

## 10. UZBEKISTAN

The independence has caused disintegration of the railway network on particular parts separated by the areas of Turkmenistan and Tajikistan. Therefore, the construction of a new line by-passing the territory of Turkmenistan was started. This line Guzar – Bajsun – Kumkurgan (222 km) will connect the isolated Surkhan province. To link the isolated network Karakalpak and Khorezm provinces with the main network in 1995 began the construction of the western line Utchkuduk – Nukus (342 km) with crossing the Kizilkum desert.

## 11. UKRAINE

After getting the independence to organise a direct link of the Nowgorod-Cewerskij region with the remaining territory, a 16 km long line was built from the station Pirogowka and the bridge across the river Desna was erected. To open the western borders a number of railway crossings on the Polish border were re-established since 1992 Izow – Grubeshow in the Wolinsk province, Khirow – Nigankowitchi – Peremishlj in the Ljvov province, Jagodin – Dorokhusk in the Wolinsk province, Rava – Russkaja – Verkhrata in the Ljvov province.

## 12. ESTONIA

A project is under consideration to build a railway tunnel under the Finnish Bay from Tallinn to Helsinki with the length of 84 km during the next 10 years. This project will link the networks of both countries, which have the same gauges (1520 mm).

## 13. ELECTRIFICATION

Within last 10 years some big projects have been implemented. In Tchita in 1994 the section Zilovo – Kcenjevskaja (130 km) was electrified. This completed the electrification of the whole mainline Moscow – Khabarowsk. In 2001 after the completion of the section Bikin – Sibirtsewo – Ussurijsk the whole main line from Moscow to Wladiwostok will be electrified. In the North after the completion of the section Oboserskaja – Belomorsk the electrification will be from Moscow to Vologda and Oboserskaja in the direction to Murmansk. The main line S.-Petersburg – Murmansk is near completion, the work has already finished on the section Wolkhovstroj – Ladejnoe Pole. In the Central region of Russia the electrification is completed on the line Jelets – Kastornaja – Starj Oskol – Saraewka.

More detailed information on the railway network development in Russia and the neighbouring countries is shown on the respective map. As scientific hypothesis the map also shows prospective routes of the Maglev projects. Such projects in some European countries and also in China are now being discussed. The Maglev appears to have a number of advantages over alternative modes, and particularly over the High-speed Train systems. It is supposed to incur less unit costs and less environmental damage. The new network will enable trains to run at higher speeds and accelerations and climb steeper gradients. The investments are comparable with those for the HST. But with all these advantages the Maglev projects should be considered taking into account the large-scale economy principle. In this case – with due regard to two rather contradictory factors – the shortest distance between points of origin and destination, as well as the largest possible transport flow should be assessed. As to the passenger traffic up to now and in the near future the population mobility in Russia remains 2–4 times lower than in the most Western countries and is mainly concentrated on the suburban areas. In these conditions even in the near future only some of the busiest routes could become viable for introducing the Maglev trains. Among them, besides Moscow – St. Petersburg route (the HST project on this direction was recently abandoned due to the fact that the total traffic turnover between the two Russian capitals does not reach even the level of 10 million passengers per year), Moscow – N. Novgorod – Kazan (branch to Samara) – Ekaterinburg, Moscow – Orel – Kursk – Kharkov (by the condition of Russian – Ukrainian border transparent) – Rostov-Don, and Moscow – Smolensk – Minsk – Warsaw. These mentioned Maglev train lines covering the North-Western, Eastern, Southern and Western route directions from the Russian capital Moscow, could be considered as having relatively high priority within the hypothetical Maglev-line system shown on the map with the implementation period of 25–30 years. All other routes shown (besides some exclusions maybe in the Fergana Valley and in the big city suburbs) for many decades ahead would not be able to attract a justifiable amount of passengers and therefore could be implemented not earlier than over the following 4–5 decades.

As to the freight traffic the Maglev-lines can be used for the container carriage only, the amount of which has drastically dropped in Russia. There is a question of changing the transported cargo mass composition (from mainly bulk cargo to the general one) and rebuilding again the transit traffic.

So, the analysis of the recent and near future rail network development in Russia and the neighbouring countries shows that the main former tendency remains – the opening up of the mineral resources deposits (following the former trends), as well as solving some geopolitical tasks – forming new outlets to the World market and avoiding the necessity to cross the territory of the neighbouring countries. Anyhow, there is no clear sign that the new railway network development reflects the need of the economy as a whole to turn to the market system and to drive towards integration into the Western European and World economic structures.

## 14. ROAD NETWORK

The length of Russia's road network amounts to 963 thousand km, out of which only about 350 thousand with permanent cover of higher quality and among them 46 thousand km of Federal mainline network. But till now the population of the former Soviet Union and the economy as a whole are heavily suffering from the lack of good roads as well as from the shortage and depreciation of transport facilities. About 60% of the population of Russia live in extremely unsatisfactory transport conditions and 40 thousand small towns and settlements (30% of the total number) do not have any links with the public highway system.

The pattern of the network repeats generally the railway one. The main highways go from Moscow (12 routes) to St.-Petersburg, Riga, Minsk, Kiev, Simpferopol etc. To some extent out of Moscow they are connected with ring – and chord-roads. But eastward from the Ural the number, length and quality of highways fall drastically. Up to now there has been no united transit highway to connect the Western and Eastern parts of Russia. The basic highway system does not yet exist in the Far East, in Siberia, in the Northern regions. Such system is not fully completed even to link the Baltic and the Black Sea deep-sea ports.

According to the expert estimations the total network length should be increased by at least 600 thousand km, but now the construction rate of the motor roads is 6 thousand km per year only. The only way to change the transport development paradigm in Russia and other countries of the former Soviet Union and to weaken the railway monopolistic position to be able to promote the market economy is to speed up the road transport development. However, in the frame of this problem the main factor hampering the road traffic growth is the lagging behind of the road network.

The world-wide experience shows that the enormously large investment fund needed to construct a modern road network could be derived mainly from only one source – from road-users taxation, i.e. mainly from car owners. For instance, in the US the car-owner's share in the overall annual road expenditures amounts to 85%, and reaches $50 billion, or about $300 per car. In Russia, however, the road-users

taxation level is traditionally extremely low and amounts to an average of $8–10 per vehicle, or about $300 mill. p.a. in total, and there is no certainty that this sum is really directed to road construction. Thus, to derive funds for this purpose, at least two goals should be reached – to raise the private road-users taxation level up to the commonly accepted one and to increase the car fleet on account of domestic production.

Russia is experiencing rapid growth (more than 10% p.a.) of car ownership – it increased from 55 cars in 1990 to 150 cars per 1000 inhabitants last year- in spite of general decline of private consumption. This shows an enormous potential of the automobile market which had been restricted and heavily underdeveloped for many decades.

Returning to road network development and to the international aspect of this problem, it should be stressed then that a large negative effect for Russia would be caused by the implementation of the project TRASECA now under construction – the highway from China crossing Central Asia, the Caspian Sea (by ferry) Trans-Caucasian region, the Black Sea (by ferry) and reaching the West-European countries bypassing the Russian territory. First of all it will cause big economic losses for Russia. The country's economy will loose transit traffic valued up to $3.5 billion. Therefore, the competing route within the Russian territory: Omsk – Nowosibirsk – Kemerovo – Krasnojarsk – Irkutsk – Ulan-Ude – Chita – Khabarowsk – Wladiwostok is under urgent scrutiny now, and it needs heavy reconstruction and rebuilding works.

Especially difficult road transport situation has arisen in the big city suburbs where the traffic density reaches 20–40 thousand vehicles p.d. and around Moscow even 30–70 thousand vehicles p.d. The seasonal traffic density peak exceeds the average one by 20–30 %, and this causes kilometre-long traffic jams. The main part of the highway network was built with maximum axle load limits of up to 6 t. This load level is now extremely unsatisfactory and urgently needs to be increased.

As to the modern national road network development, the time limit for Russia remains very short to construct such a system which would cover the specific needs of the producers and of the population, the drive for an area coherency of regions and settlements, and finally to provide national security.

And finally, very briefly about the transitional potential of Russia and of its transport system provision. It is well-known that Russia and the neighbours due to their geo-political situation have the unique opportunity to participate in the international division of labour and therefore have an enormous transit potential, providing diverse export of transport services. However, in reality the utilisation of this potential is extremely low. In $320 billion of the value of the World transport services export, Russia's share amounts to 1.1% only, while that of the US is 15%, of France 6%, of Germany 5.9%, of the Netherlands 6.2 %.

The main advantages of Russia as far as transit potential is concerned is much shorter distance of the Trans-Siberian route in comparison with the shipping routes in the East – West traffic. But in 1999 the number of containers being transported over the Trans-Siberian railway mainline amounted to 20 thousand units only in comparison with 153 thousand units in 1991. One of the main reasons of such a drop is an enormous growth of cargo delivery time as well as a low level of services provided by the Russian forwarding enterprises. The origin-destination pattern of the transit is as follows: Republic of Korea – Finland 16%, Finland – Japan 14%, Finland – Republic of Korea 13%, Estonia – Republic of Korea 8%, Republic of Korea – Kazakhstan 5.4%, Japan – Afghanistan 5.3%, Republic of Korea – Uzbekistan 5.3%, Republic of Korea – Norway 4%, Republic of Korea – Afghanistan 3.5%. There is a big misbalance in the transit direction: more than 70% of the total transit cargo volume is being delivered in the East – West direction.

To compete with the Russian railways, the shipping lines fixed the tariffs twice as low as the railways. As a result – within a10 year period the volume of cargo delivered by sea doubled, and by rail was reduced 7 times. The speeding up of the railway delivery will reduce the delivery time up to 7–8 days and will raise the competitiveness of the railways considerably. This transit route has big prospects – the decrease of tariffs by 10% in 1997 caused the volume of delivery to increase by 29%.

Another potentially very important transit route is the North-South corridor India – Iran – Caspian Sea – European Russia – Central and West Europe. For the development of this route for transit purposes a deep waterway system needs to be established. In particular, the out-of-date Volga – Don canal (having been built in 1952) should be reconstructed to open a way crossing the Black Sea with an outlet to South-Eastern Europe using the Danube waterway. The estimated value of transit for Russia can reach $1 billion. Another version is the route along the Volga with an outlet to the Baltic and Scandinavian regions. This model of routes can work only if the modern ships of the river-sea type (Lash = lighter aboard ship) would be introduced. Another very important condition is the opening of Russian waterways for foreign shipping companies.

For future transport services it is very important to introduce some import replacement schemes of transportation till Russia is importing the transport services of the value of $3 billion.

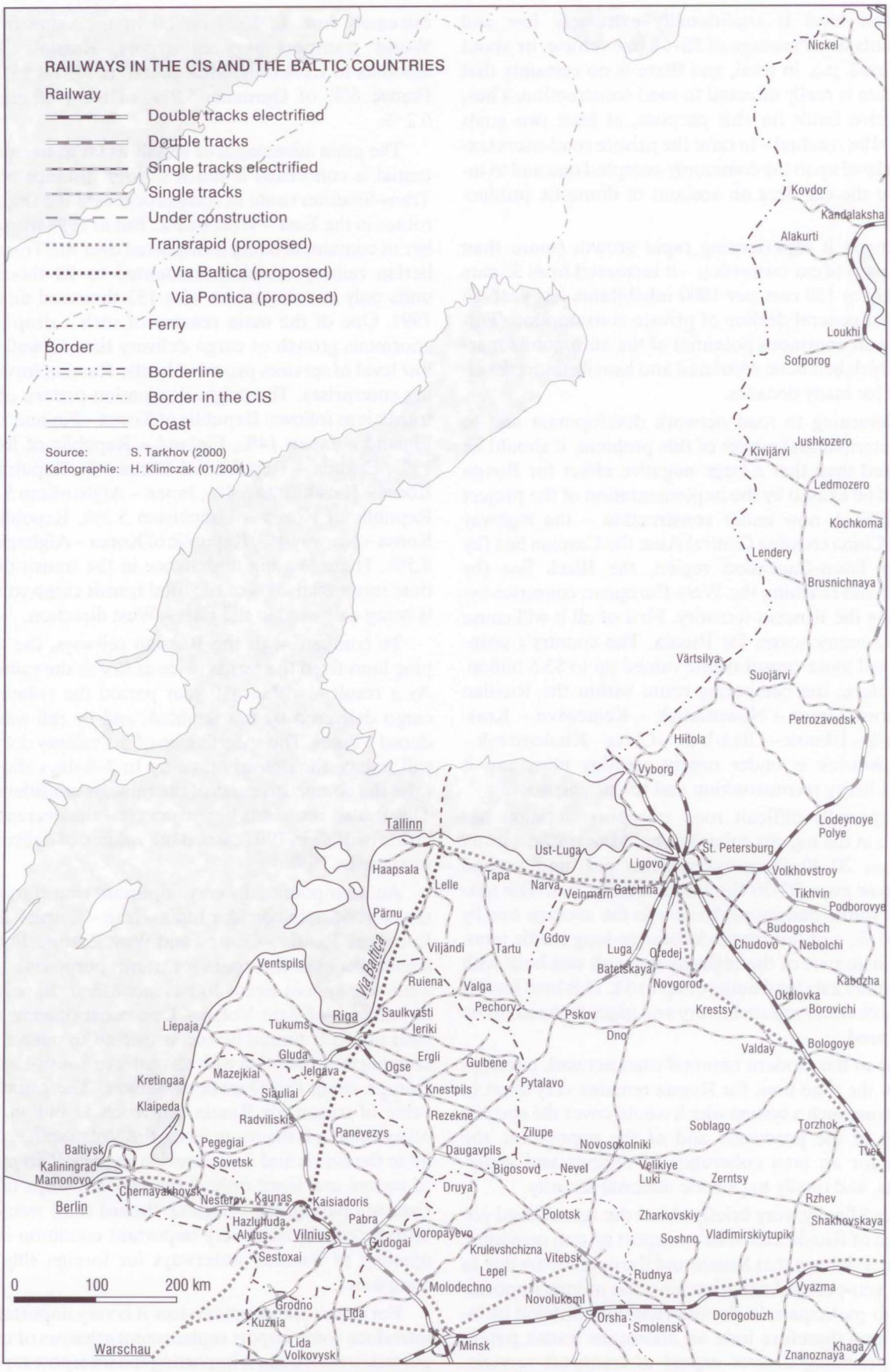



Figure 1 - Railways in the C. I. S. and Baltic countries in 2000


Figure 1 - Railways in the C. I. S. and Baltic countries in 2000 (continued)

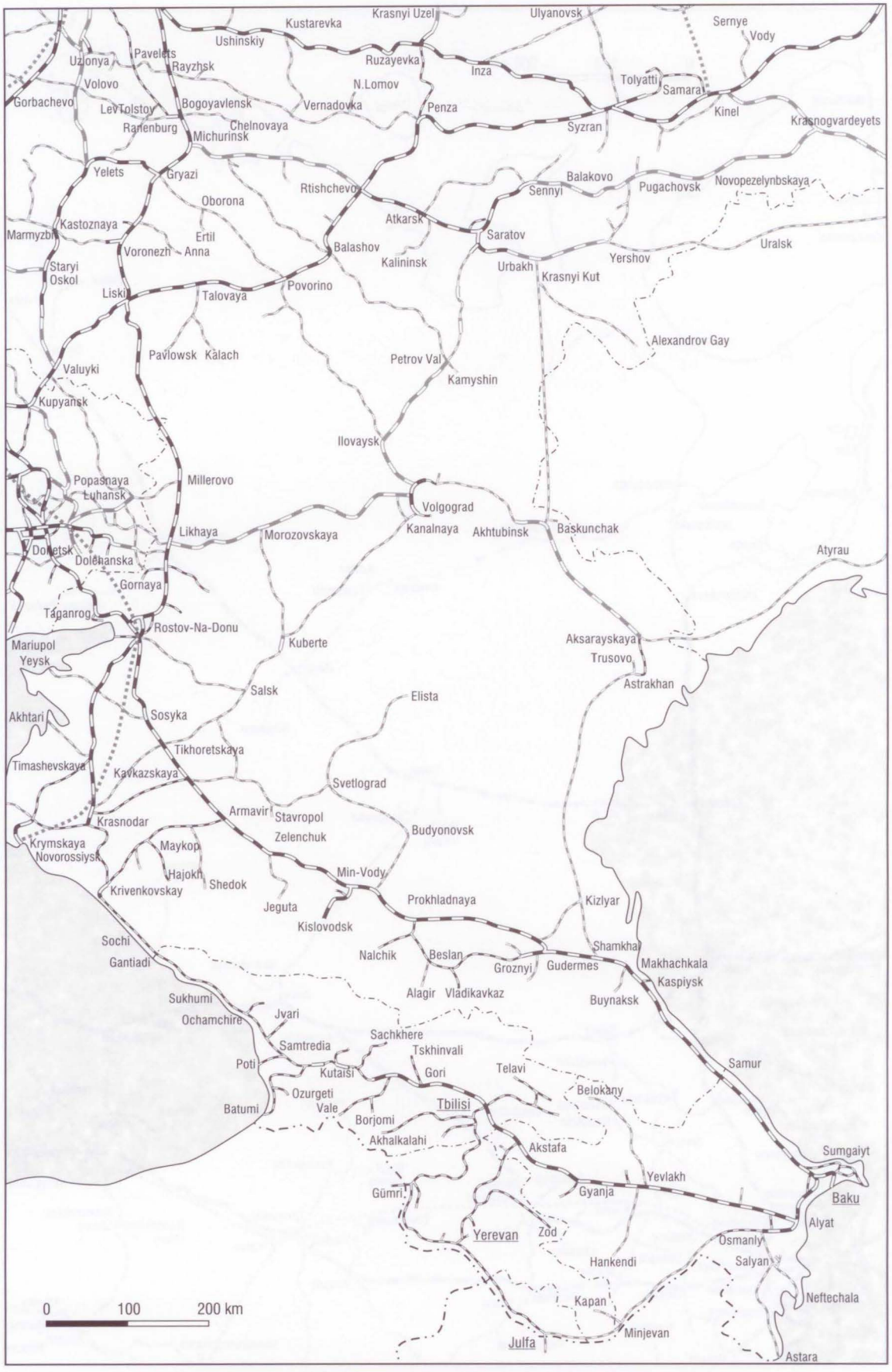
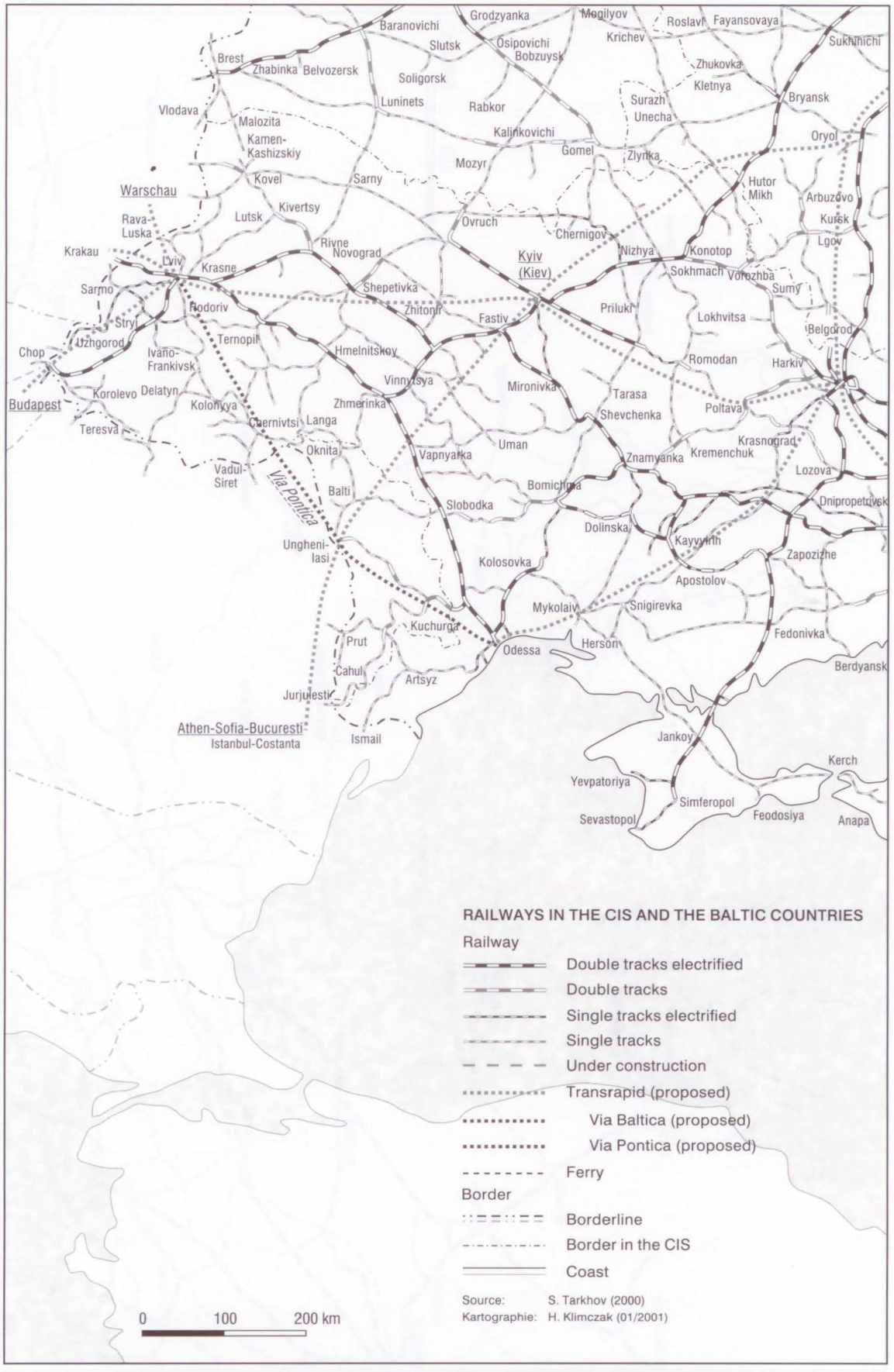



**Figure 1 - Railways in the C. I. S. and Baltic countries in 2000 (continued)**

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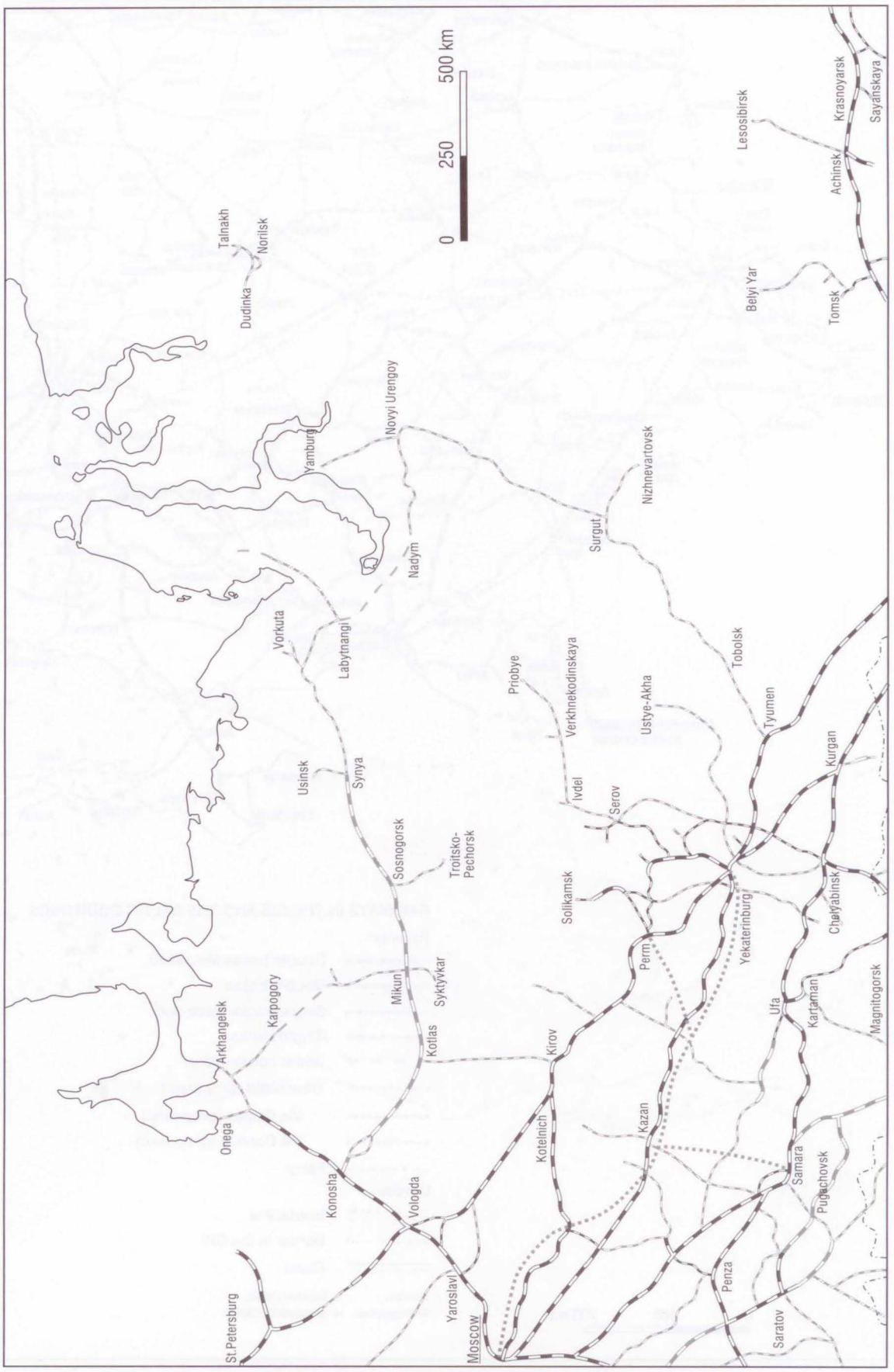


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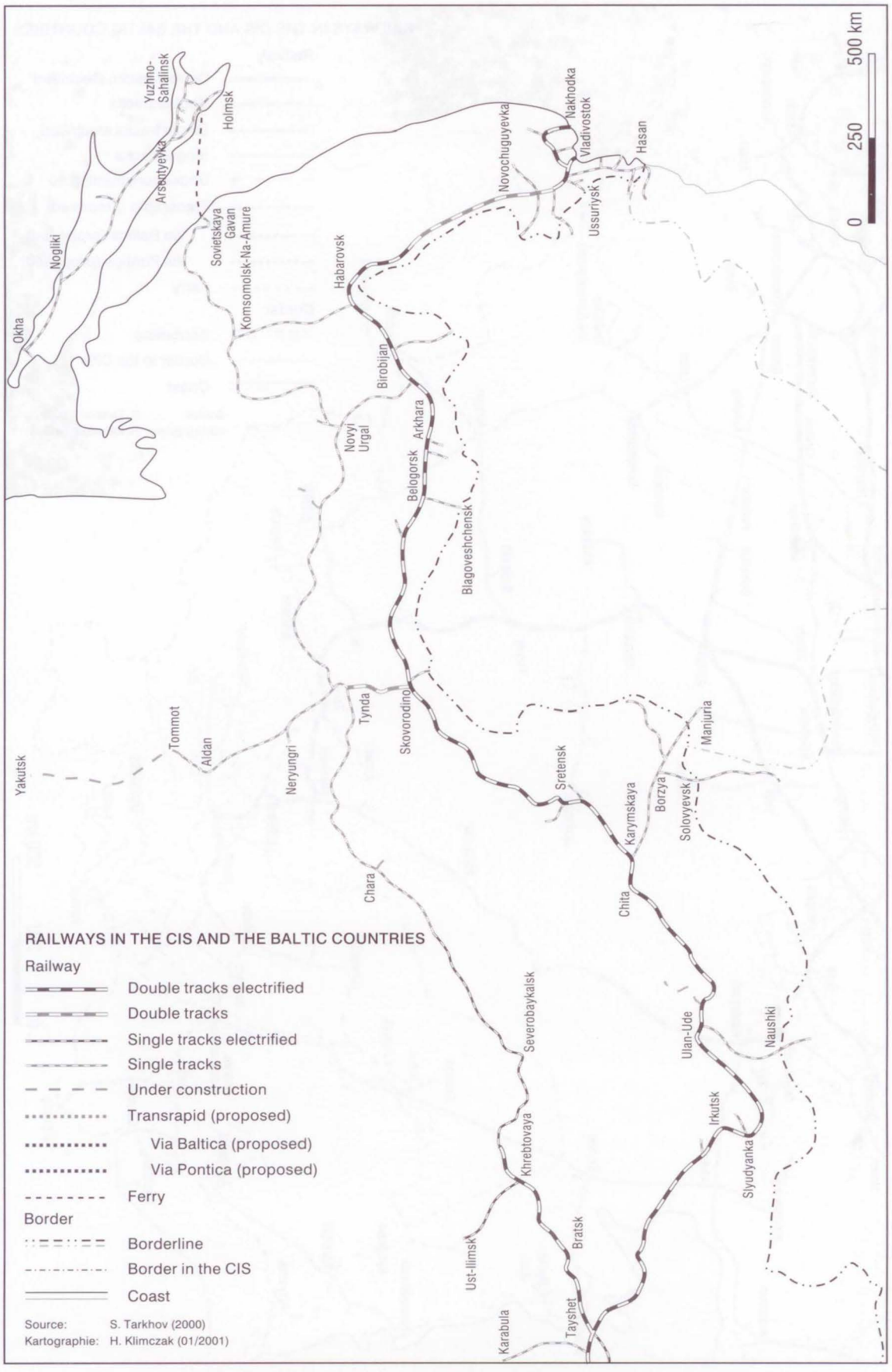


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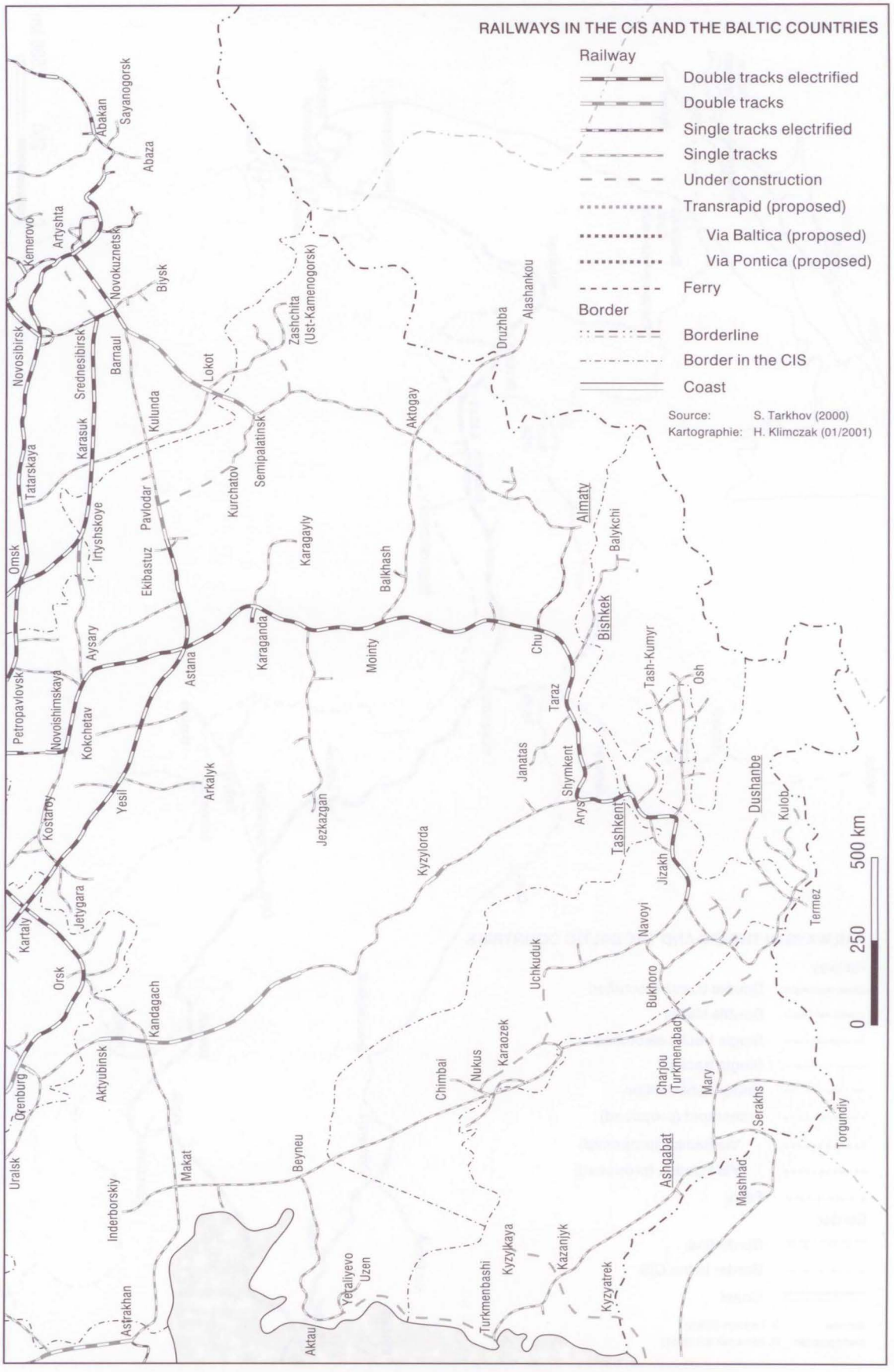


Figure 1 - Railways in the C. I. S. and Baltic countries in 2000 (continued)

In total, in the near future the transport transit services offered by Russia to the World community could increase by 7–8 times.

For Russia and other post-Soviet countries it is very important to liberate themselves from the monopolistic position of the railways, to speed-up the road network development, to develop land transport industry towards an intermodal system which needs a certain reorientation and reconstruction of each transport mode. The extreme underdevelopment of road transport and of the road network in Russia and other neighbouring countries cannot correspond to the market and integration needs, to crucial changes of the economic structure. Under such conditions the intermodality approach could be regarded as a certain substitute for the road transport development. Anyhow, it should be stressed that the road network and the road transport as a whole would be increasingly more important than the railways. The latter could survive only through further fast development of combined (intermodal) transport facilities, and this may provide the springboard for a medium-term development.