

REHABILITATION OF THE RAILWAYS
IN THE SOUTH CAUCASUS:
ASSESSMENT OF THE POTENTIAL
ECONOMIC BENEFITS

Volume 2: Kars–Gyumri–Nakhchivan–
Meghri–Baku railway



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REHABILITATION OF THE RAILWAYS IN THE SOUTH CAUCASUS: ASSESSMENT OF THE POTENTIAL ECONOMIC BENEFITS

Volume 2: Kars–Gyumri–Nakhchivan– Meghri–Baku railway

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EXECUTIVE SUMMARY

The rehabilitation of the Kars–Gyumri–Nakhchivan–Meghri–Baku (KGNMB) rail transit link has barely featured in the political, expert and media debate of the parties to the conflicts. There was talk of restoration of the Kars–Gyumri section during the thaw in relations between Turkey and Armenia at the time of the ‘Zurich Protocols’ in 2009, but no mention was made of continuing the link through Armenia and Azerbaijan.

The cost of rehabilitating the KGNMB route and potential returns on its operation have been calculated with a view to providing participants in the negotiation process with data demonstrating the project’s economic benefits for the various sides in the conflicts in the post-conflict period (once progress has been made in conflict resolution), when rail freight will become possible.

The importance of this route for the sides in the Nagorny Karabakh and Armenian-Turkish conflicts is considered in this study purely from the economic and socio-economic perspectives. The opening up of the different sections has different economic and social implications for the sides in the conflicts, but all sides need to cooperate to open the transit link. The following conclusions have been drawn after analysing the conditions whereby interdependence could deliver economic and social benefits for the parties and thus reinforce mutual interest in maintaining the railway in its entirety:

1. According to the estimates used as a basis in this study, the repair of the track bed and provision of the necessary technical infrastructure for the KGNMB railway, as well as the construction of and infrastructure for three border railway stations on the Armenian and Azerbaijani sections, would cost US\$433.7 million. Of this, the rehabilitation of the Azerbaijani section accounts for US\$278.6 million, the Armenian section US\$104.6 million and the Turkish section US\$52 million. By comparison, the construction costs for the Kars–Akhalkalaki–Tbilisi–Baku (KATB) line have today already exceeded US\$600 million and the project is not yet finished. The estimated cost of constructing the rail line that will link Armenia and Iran is US\$2–3 billion and the line that will link Azerbaijan with Nakhchivan via Kars and Georgia is projected to cost US\$1 billion. The KGNMB project is clearly more economical and could in the future prove to be an affordable alternative or addition to the existing transport routes of the South Caucasus.
2. With an average annual freight volume of 10 million tons, the Armenian and Azerbaijani sections of the railway could start to be profitable once the restored line has been operational for 13 years, which is considered to be a good indicator. The Turkish section would need annual freight traffic of 14 million tons. However, 784km of the 877-km line would start to pay for itself after 12 years with average freight traffic of 4–5 million tons. This is due to the fact that these sections only require minor restoration work and their position as international trade corridors. Based on actual freight traffic and conservative forecasts for traffic on those sections of the line that currently have no traffic, if the rail line were to open tomorrow, freight volumes of around 1–1.5 million tons could be expected. At these rates the KGNMB railway would not pay for itself. However, since the freight volume forecasts are based on a situation where there are no trade flows and economies are disconnected, an increase in freight traffic to 4–5 million tons per year with the opening of a new transport artery and the revitalisation of trade and production would seem to be an entirely realistic prospect.
3. Armenia would gain substantial advantages from the opening of the KGNMB railway. First, it establishes a connection with Turkey and access to the Turkish Black Sea and Mediterranean

ports, which is of particular importance for the extractive industries. Secondly, the opening of a line from Julfa to Iran would fundamentally change the role of the KGNMB line for Armenia, since, in addition to freight sent from Iran to Armenia, there would also be transit traffic from Iran passing through Armenia to the Black Sea ports. This would mean Armenia would begin to play a role as a transit country.

4. With the opening of the KGNMB route, Azerbaijan would gain a rail link with the Nakhchivan Autonomous Republic. This would be important socially, but would also mean savings for the national budget, from which resources are currently allocated to subsidise passenger and freight traffic between Nakhchivan and the rest of Azerbaijan by road and air. In addition, the economy of the Nakhchivan Autonomous Republic would be able to develop the sectors that involve goods being exported and thereby contribute to Azerbaijan's domestic and foreign trade.
5. The railway would be an important infrastructure component in the regeneration of the parts of Azerbaijan currently occupied by Armenian armed forces, which have been there since the period of active hostilities. The presence of the railway would facilitate the effective implementation of construction and infrastructure projects. Furthermore, the creation of significant numbers of jobs on the railway itself and in other associated areas would have a positive social effect on these regions.
6. For Turkey, the economic effect of opening the KGNMB railway would be most tangible in the northern and eastern parts of the country, which currently substantially lag behind the western and southern Black Sea and Mediterranean regions. The opening of the KATB line would open links for this region to the South Caucasus and on to the Caspian Sea. However, the KGNMB railway would facilitate the expansion of trade, which is essential for the regions bordering with Armenia. An indirect effect might be the development of tourism.

The prospects for the full rehabilitation of the KGNMB railway depend on progress being made in the Nagorny Karabakh conflict resolution process, as well as Armenian-Turkish bilateral relations. The KGNMB railway could, however, become an important and economically sound means to build confidence and constructively link the two negotiation processes.

INTRODUCTION

Theoretical framework of the study

An analysis of economic projects that could encompass the entire region or its sub-regions, and that involve conflicting parties, will help to widen the field of discussion within the peace process framework by including its economic aspects. In particular, having an economic bloc in the negotiations could open up new opportunities for parties to interact and strengthen progress in building trust through mutual interest.

Traditionally, however, political and security issues have dominated the peace process. Strong debate is needed to expand the negotiation agenda – in particular, the importance and necessity of issues of economic interaction as a special sphere in peacebuilding need to be substantiated.

Transport links are a necessary element of trade infrastructure and of economic cooperation overall. Protracted conflicts have deprived parts of the South Caucasus of a number of domestic and foreign transport corridors. The prospects for restoring transport links are viewed by conflicting and potentially interested parties not so much from a business or an economic standpoint, but primarily through the prism of security and the ability to strengthen their position in a conflict, or at least to weaken the political position of an opposing party. The lack of perspective leads to economic myths that fortify any given political line.

This approach forces into the background economic calculations of the profitability of potential transport, trade and other economic relations, which could be restored or created in the future, depriving them of demand.

In an environment where former connections are broken, regions create new logistics and economies reset their profiles, while the significance of former trade and manufacturing chains objectively drops. Moreover, the existing transport sector monopolies are not engaged in strengthening competition through the building of alternative links. Foreign players also have the potential to influence the prospects for reformatting the region's transport relations.

Protracted conflicts in the South Caucasus, which have led to an abrupt closing off of borders for a long time, have made former markets inaccessible and have cut off relations with trade and manufacturing partners. Moreover, such conflicts have resulted in the formation of new states, borders, customs, fees and currencies, and in the division of previously integrated transport routes. Also underway has been the fast-paced conversion from a planned, centralised economy focused on maintaining the unity of the Soviet Union to a market economy that focuses on minimising expenditure and maximising revenue. Railways, as with other areas of the economy, must be profitable in such a new market environment. This is problematic for a number of reasons. Firstly, many of the roads were rendered useless following wars and the economic downturn of the first post-war decade. Restoring the roads proved impossible for financial, political and security reasons. As a result, the level of industry and agriculture, along with the production turnover of new states, all fell significantly. Thus, the railways were not utilised to the necessary extent.

Meanwhile, the artificial production cycles created during the Soviet Union fell apart. Previously, factories in various regions depended on each other, which required high volumes of railway transport.

It is clear therefore that the profitability indicators of the railways during the Soviet Union era and the interconnected economy of the South Caucasus do not meet the realities of today, and cannot serve as the basis for making decisions on investments to restore any given section of the region's railway track. As a result, there is a need for a new assessment of the expenditure coefficient for restoration and of the potential revenue (profitability) of the railways that were disengaged in the early 1990s.

This study developed an original system for assessing the expenditure required for restoring the railways and the profitability of freight transport. The authors are not proposing a construction cost estimate, but rather a model of the hypothetical situation whereby railway traffic is opened in the region, potentially uniting conflicting parties. However, due to the lack of an up-to-date construction cost estimate for restoring *all inoperable areas of track*, and because all the available technical and economic documents and expert opinions were encompassed in the calculations, the appraised expenditures and revenues may be considered the most accurate estimate available.

Study strategy

The economic aspects of the hypothetical restoration of the railways have been separated from the political aspects at this stage of the analysis. This study is a variant of economic modelling and does not touch on security and political aspects.

For the first time, an assessment of the technical state of the inoperable Sochi–Sukhum/i–Tbilisi–Yerevan (SSTY) and the Kars–Gyumri–Nakhchivan–Meghri–Baku (KGNMB) railways has been made. The theoretically possible volumes of freight transport have also been calculated. The direct and equal participation of experts representing various conflicting parties residing in the zones through which the railway being studied runs is a distinctive feature of this study. The first field study and collection of expert information across the entire railway being studied was made possible thanks to this.

The study consists of two parts. The first part focuses on an assessment of the expenditure required for restoring rail traffic and of the revenue from the theoretically possible freight transport on the newly opened railway; the assessment also addresses the profitability of the railway and the investment return period. The second part assesses the indirect positive economic and social effects that could potentially arise from opening the railway.

METHODOLOGY

Assessing the current technical state of various sections of the railway

The methodology used for the research included the following elements:

- an analysis of media publications, publicly available technical documents and railway maps of the region;
- interviews and consultations with technical experts, civil servants of varying rank and business representatives in the regions through which the railway would run should it be restored;
- visual inspections of the railway, where possible.

The following classification of the physical state of various sections of the railway was developed based on the data collected:

- category 1 – operating at full capacity and requiring running maintenance;
- category 2 – operating at partial capacity and requiring both running maintenance and capital repairs for certain sections of track;
- category 3 – not operating and requiring capital repairs;
- category 4 – completely wrecked and requiring restoration;
- category 5 – new construction.

It has been established that there are significant differences in the physical state of various sections of the track. Various types of repairs are therefore needed on the different sections of track depending on the type and complexity of work needed.

Assessing the restoration cost

The costs for similarly complex work on the Kars–Akhalkalaki–Tbilisi–Baku (KATB) railway were taken into account to assess the cost of restoring individual sections of the track. This railway track also consists of sections requiring varying degrees of restoration. The KATB sections of track were assigned a category of restoration complexity in accordance with the classification developed at stage 1. Therefore, the following types of sections were defined for the KATB track:

- sections of track requiring running and partial capital repairs, including construction and reconstruction of various structures (category 2);
- sections of track being reconstructed, including the construction of various structures (category 4);
- sections of track requiring reconstruction and modernisation of the power supply system, and of the alarm and communications systems (category 5).

The classification developed at stage 1 did not include the following categories of restoration work pertaining to the KATB railway:

- construction and reconstruction of stations, including refurbishment of station equipment (category 6);
- construction and reconstruction of sorting stations (category 7).

Insofar as the restoration expenditure on various sections of the KATB track is known (see Table 1), a restoration cost assessment was conducted for one kilometre of each category of the KATB route.

Table 1: Restoration expenditure on various sections of the KATB track

Section of track	Distance in km	Total expenditure	Expenditure on 1 km
Kars–Georgian border, new construction	27	US\$154 million	US\$5.7 million
Kars–Georgian border, restoration	49	US\$51 million	US\$1.05 million
Georgian border–Akhalkalaki, including new construction	105	US\$220 million	US\$2.09 million
Georgia, restoration of flatter sections	150	US\$200 million	US\$1.33 million
Complete refurbishment of power supply, signalling and communications systems	538	US\$843 million	US\$1.57 million

Data on work on sections of other railways, in particular from Tuapse to Adler in 2011–2012 (see Table 2), were used as reference information to assess the restoration cost for railway sections requiring varying complexities of restoration work.

Table 2: Cost of restoration work of varying degrees of complexity on the Tuapse–Adler section of track¹

Section of track	Distance in km	Total expenditure	Expenditure on 1 km
Over 9 months of 2012 Tuapse–Adler	2.1 + 3.8 + 7.4 + 0.8 = 14.1	RUB28 million (US\$0.93 million) ²	US\$66,000
Over 11 months of 2012 Tuapse–Adler	19	over RUB390 million (US\$13 million)	US\$205,000
Over 4 months of 2011 Tuapse–Adler	8.3	over RUB46.3 million (US\$1.54 million)	US\$185,000
Tuapse–Adler beginning in 2011, 18 October	70	RUB2.5 billion (US\$83.2 million)	US\$1,200,000
Tuapse–Adler beginning in 2011, 15 November	70	RUB3.1 billion (US\$103 million)	US\$1,480,000

Therefore, expenditure rates were calculated for repairs of varying categories of complexity (see Table 3).

Table 3: Expenditure rates for repairs of varying categories of complexity

Category 1 (running maintenance)	US\$0.1 million
Category 2 (running and partial capital repairs)	US\$0.4 million
Category 3 (capital repairs)	US\$1.0 million
Category 4 (complete restoration)	US\$1.5 million
Category 5 (new construction)	US\$2.0 million

Note: the rates used are conditional and were determined on the basis of an expenditure analysis of similar work on other railways in the region; the rates are the result of a consensus between the project stakeholders.

¹ Source – see Annex 1.

² US\$1 = RUB30.06 (roubles).

The restoration costs of individual sections of the track were therefore evaluated based on the following information: the distance of individual sections, the categories of complexity required for the various repair works, the number of stations on the railway, and the restoration cost appraisal values used for one kilometre of track.

If the expenditure for restoring train stations and upgrading the locomotive and wagon fleet were to be added to this amount (which was not part of this study), there would be a more complete picture of the expenditure required not only for restoration, but also for operating the railway. The minimal cost for restoring railway traffic was calculated at this stage. Therefore, only the expenditure for restoring the railway bed and the necessary power supply and communications systems, which allow for organisation of freight train traffic, were taken into account.

Forecasting potential freight traffic volumes

The following elements needed to be determined to assess the possible freight traffic volumes:

- the volume of freight currently being transported by other means and that could be carried by rail should railway traffic on the studied routes be opened up;
- the type and volumes of freight that could be sent by transit;
- the destination points of the freight.

Freight was conditionally switched to the ‘container’ category. This approach was adopted as it would be impossible to take into account in the calculations all the various types of freight and containers with varying fees (e.g. freight can be transported in universal, specialised or isothermal wagons, in cisterns or on platform wagons). A 40-foot container was taken as the most common unit of freight in freight transport. Calculations were based on the 2013 rates of JSC Georgian Railways (these same tariffs are valid for the South Caucasus Railway, Armenia) as follows:

- the rate in May 2013 was \$0.96 per kilometre for a 40-foot loaded container and \$0.48 for an empty container;
- the rate for a 20-foot container was \$0.56 per kilometre for a loaded container and \$0.28 per kilometre for an unloaded container.

The rate for transporting a loaded 40-foot container per kilometre was multiplied by the length of the railway. The figure obtained was considered the aggregate budget revenue (transit duty) and the commercial revenue of the railway itself.

Methodology for analysing the indirect economic and social effects potentially arising from opening the railway

The following is the hypothesis underpinning the second part of the study: the railway operating in a stable manner can stimulate the increased production of export products, can create jobs and can lead to the development of infrastructure of administrative bodies and regions in the areas where the railway passes through. Sectors and enterprises in turn – having been given the impetus to grow and having entered new markets – will continue to grow. At the same time, the financial stability of the railway will be secured, possibly allowing for an improvement in the railway’s services and a decrease in its tariffs.

A framework for searching for areas that would benefit from the social and economic effects of opening the railway was determined to verify this hypothesis by:

- determining the geographical regions and economic sectors that could obtain an additional impetus for growth arising from the restoration of railway traffic;
- assessing the possible indirect economic and social effects arising from opening the railway.

A macroeconomic analysis and case studies served as the research strategy for the second part of the study. The data sources comprised the following:

- import and export statistics;
- media publications, publicly accessible industrial data and details of routes for transporting goods from the region;
- interviews and consultations with technical experts, civil servants of varying rank and business representatives in the regions.

THE KARS–GYUMRI–NAKHCHIVAN–MEGHRI–BAKU RAILWAY: CONTEXT

This study considers the theoretical potential of the Kars–Gyumri–Nakhchivan–Meghri–Baku (KGNMB) route as a rail transit link between Kars (Turkey) and Baku (Azerbaijan) through Armenia. It includes operational and non-operational sections of railway and runs through Turkey from Kars to Doğukapı, on through Armenia from Akhuryan to Gyumri and Yeraskh and continues through the Nakhchivan Autonomous Republic (Azerbaijan) on the Sadarak–Nakhchivan–Julfa–Ordubad route, crossing Armenia through Meghri and continuing to Baku through Horadiz and Alyat (Azerbaijan). The principal objective of modelling the economic benefit of restoring the KGNMB railway was to assess the profitability of investing in the restoration of freight traffic on this route and to evaluate other economic and socio-economic effects of opening the railway.

The importance of this route for the parties in the Nagorny Karabakh and Armenian-Turkish conflicts is considered in this study purely from the economic and socio-economic perspectives. The opening up of the different sections has different economic and social implications for the sides in the conflicts. Where there is interest in re-opening currently non-functioning sections of the railway, all the sides are dependent on each other.

The issue of the restoration of the Nakhchivan–Meghri–Baku section of the route arose during discussions of transport links that took place within the framework of the OSCE Minsk Group, the official platform for talks between Armenia and Azerbaijan on the Nagorny Karabakh conflict.³ The opening of the route from Baku through Horadiz and Meghri to Nakhchivan is presented in the Minsk Group documents as an important stage in the process towards a comprehensive settlement of the Nagorny Karabakh conflict. A condition of this will be the return to Azerbaijani control of the territories around Nagorny Karabakh that were occupied by Armenian military forces during the period of active hostilities (1991–1994).⁴ As yet, the sides have been unable to agree on the Basic Principles of the peace plan and there is ongoing public and political debate of the issue.⁵

Opening rail links between Turkey and Armenia is dependent both on the state of bilateral relations between the two countries and on progress in the resolution of the Nagorny Karabakh conflict. On 31 August 2009 the foreign ministries of Armenia and Turkey, with Switzerland as mediator, announced plans to sign protocols ‘in due course’ on the normalisation of bilateral relations between the two countries. It was expected that the border between Armenia and Turkey would be opened within two months of the protocols coming into force. In light of this, on 30 June 2010 Vladimir Yakunin, President of Russian Railways open joint stock company (OJSC), announced that the company was starting work on developing the rail infrastructure between Armenia and Turkey. He explained that this would take place within the framework of the International Union of Railways and a bilateral agreement with the South Caucasus Railways closed joint stock company (JSC), in the expectation of a normalisation of relations between Armenia and Turkey and the opening of the border. However, the parliaments of the two countries did not ratify what were known as the Zurich Protocols and there has been no further thawing in diplomatic relations.⁶ During 2008–2009 the customs control and freight transfer infrastructure at Akhuryan

3 For example, ‘Mamedyarov: mediators discuss opening Nakhchivan–Meghri rail branch with Yerevan and Baku’, 26 May 2005, www.panarmenian.net/eng/world/news/13465/

4 www.osce.org/mg/51152; M. Dietzen, ‘A new look at old principles: Making the Madrid Document work’, in *Journal of Conflict Transformation: Caucasus Edition*, 1 April 2011, extracted from: <http://caucasusedition.net/analysis/why-nagorno-karabakh%E2%80%99s-status-must-be-addressed-first/>; www.crisisgroup.org/-/media/Files/europe/b55_nagorno_karabakh_getting_to_a_breakthrough

5 For example, http://azerireport.com/index.php?option=com_content&task=view&id=2226&Itemid=48

6 www.mfa.gov.tr/relations-between-turkey-and-armenia.en.mfa

station was upgraded. On the Turkish side there is a 40-ton crane for containers and a crane for smaller loads at Doğukapı.⁷ From the technical perspective, both stations are ready to operate, but resolving the issue of opening the border has been delayed for political reasons.

In November 2012 Turkey presented the co-chairs of the OSCE Minsk Group with its *Integrated Transport Corridors Project*, which would link Europe and Asia through the South Caucasus and Russia.⁸ Armenia would be seen as a stakeholder in this project, provided the areas around Nagorno Karabakh were returned to Azerbaijani control. However, the proposal did not spark any political developments.

Thus, opening transport links along the KGNMB route remains a theoretical prospect. Nevertheless, an analysis of the competitive benefits that this route might offer the conflicting parties, as well as the economic losses associated with a lack of traffic on the route, facilitates an assessment of their potential value in respect of opening rail links through the conflict zones and the prospects for including this issue on the peace process agenda.

In the context of this study, the safe passage of freight through the areas of Azerbaijan currently occupied by Armenian military forces, as well as across the borders between Armenia and Azerbaijan and Armenia and Turkey, is seen as a minimum requirement for initiating the resumption of through traffic between Kars and Baku through Armenia and Nakhchivan (KGNMB). The political process and concrete agreements that would furnish these minimum conditions are beyond the scope of this study.

Insofar as the issue of the lack of a direct rail link between Turkey and Azerbaijan will be resolved when the Kars–Akhalkalaki–Tbilisi–Baku (KATB) route currently under construction becomes operational, this study looked at the *comparative* benefits of the KGNMB route for the countries and regions through which it passes, taking due consideration of the existence of the KATB route. In assessing the type and scale of the comparative benefits of the KGNMB route, account was also taken of other railway projects: plans for the construction of the 223.6-km Kars–Susuz–Dilucu–Nakhchivan route, linking Nakhchivan and Baku via the KATB line;⁹ plans for the construction of a North–South rail corridor through Meghri (Armenia) to Iran¹⁰ and back through Vanadzor to the Black Sea ports of Georgia; and the linking of the KGNMB route and the main North–South corridor, which went from Iran through Azerbaijan to Russia during the Soviet period.

7 'ZAO "luKZhD" gotovo otkryt' zheleznodorozhnoe soobshchenie mezhdru Armeniyei i Turtsiyei posle resheniia ob otkrytii granitsy', in *Novosti-Armenii*, 28 April 2009, www.newsarmenia.ru/arm1/20090428/42065720.html

8 S. Demirtaş, 'Turkey eyes Karabakh step from Armenia to open ways', in *Hürriyet*, 23 February 2013, www.hurriyetdailynews.com/turkey-eyes-karabakh-step-from-armenia-to-open-ways.aspx?pageID=238&nID=41713

9 'Azerbaijan i Turtsiia nachali proektirovanie zheleznoy dorogi Kars-Nakhchivan', RBC, 6 December 2013, www.rbc.ru/rbcfreeneews/20131206040730.shtml

10 'Armenii obyavlyaet o zapuske proektov "luzhnaya zheleznaya doroga Armenii" i "luzhnaya skorostnaya doroga Armenii"', in *versia.am*, 18 January 2013, www.versia.am/armenia-7/

1. AN ASSESSMENT OF THE COSTS OF RESTORING AND OPERATING THE KGNMB RAILWAY AND ESTIMATED RETURNS ON INVESTMENT

1.1 Assessing the cost of restoring the railway

The KGNMB route is shown in Figure 1. The Kars–Doğukapı (Turkey) and Akhuryan–Gyumri (Armenia) sections have not been operational for over 19 years and the rail border crossing to Turkey (Akhuryan–Doğukapı), equipped with a bogie-exchange facility, has not been functional since the early 1990s. The Akhuryan–Gyumri section (13km) has barely operated for the last 20 years (closed 14 September 1993) and is not electrified, which is also the case for the route through Turkey from Erzurum.

Figure 1: KGNMB and Kars–Akhalkalaki–Baku routes



This map is a modified version of the original taken from the Georgian Railways website (www.railway.ge). Geographical names and borders are a contentious issue in the South Caucasus context and so this map is only provided for reference and does not reflect any political or other views of the conflicts.

The Akhuryan–Gyumri section is in need of repair work and upgrading to specialist equipment and technology, as well as the restoration of a 0.7-km stretch of dismantled track.

The route from Gyumri station to Yeraskh through Masis (192km)¹¹ is in occasional use by electric passenger trains (Photograph 1). Small goods trains sometimes operate between Yerevan and Gyumri. One 4-km section of the railway between Yeraskh station (Armenia) and Sadarak (on the border with the Nakhchivan Autonomous Republic) has been completely dismantled.

11 http://вики.жд.рф/w/images/e/e5/Arman_zd.jpg

Photograph 1: Yerevan–Yeraskh suburban electric line at the terminus in Yeraskh on the Armenian-Azerbaijani border between the province of Ararat and the Nakhchivan Autonomous Republic



Source: <http://flackelf.livejournal.com/139833.html>

The length of the Sadarak–Sharur–Nakhchivan–Julfa–Ordubad section within the Nakhchivan Autonomous Republic is 190km. In view of the small volume of freight and passengers on this part of the route and the occasional running maintenance carried out, this section is suitable for regular use. It includes 12 stations – five main and seven minor ones. All stations have undergone capital repairs and some modernisation of equipment and facilities has been carried out at the main stations. The railway is operational but on a local basis. It uses a direct current power supply. In addition, capital repairs are required on 70% of the route to allow the operation of heavy trains. There is evident wear and tear to rails and sleepers, etc. In order for heavy goods trains to operate, all the netting would have to be replaced. The signalling and communications systems are outdated but in working order.

Julfa station has all the cranes and other facilities necessary for freight handling, although there is a lack of certain equipment, in particular for loading and unloading bulk materials. There are also diesel shunting locomotives (TM-2 and TGM-4), which are in working order, but outdated (Photograph 3) and so the locomotive fleet is in need of modernisation. There is a rolling stock maintenance depot, but it lacks the equipment for work such as major overhauling of wheelsets. The current state of the track bed means the railway capacity is low.

Photograph 2: Ordubad station



Source: <http://flackelf.livejournal.com/139833.html>

Photograph 3: Julfa depot



Source: <http://flackelf.livejournal.com/139833.html>

Photographs 4 and 5: Nakhchivan station



Julfa is a freight distribution hub for the consignment and reception of goods going to Iran and the Middle East. The railways in Iran are standard gauge. In the Iranian city of Julfa there is a special bogie-exchange station to deal with the change of gauge.

Trains ran to Iran until 2005. Since then the trains have ceased to operate due to the lack of the necessary volume of freight and the difficult political relations between Iran and Azerbaijan.

From Ordubad the railway continues to the border of the Nakhchivan Autonomous Republic and on through the Meghri district of Armenia. Along this section there are four stations, which have been semi-derelict for over 20 years. Even the track bed itself has been dismantled. Having been out of use for the last 20 years, the specialist structures along this section, including a tunnel, have fallen into disrepair.

Photographs 6 and 7: The Armenian section of the railway. A neighbourhood in Meghri district



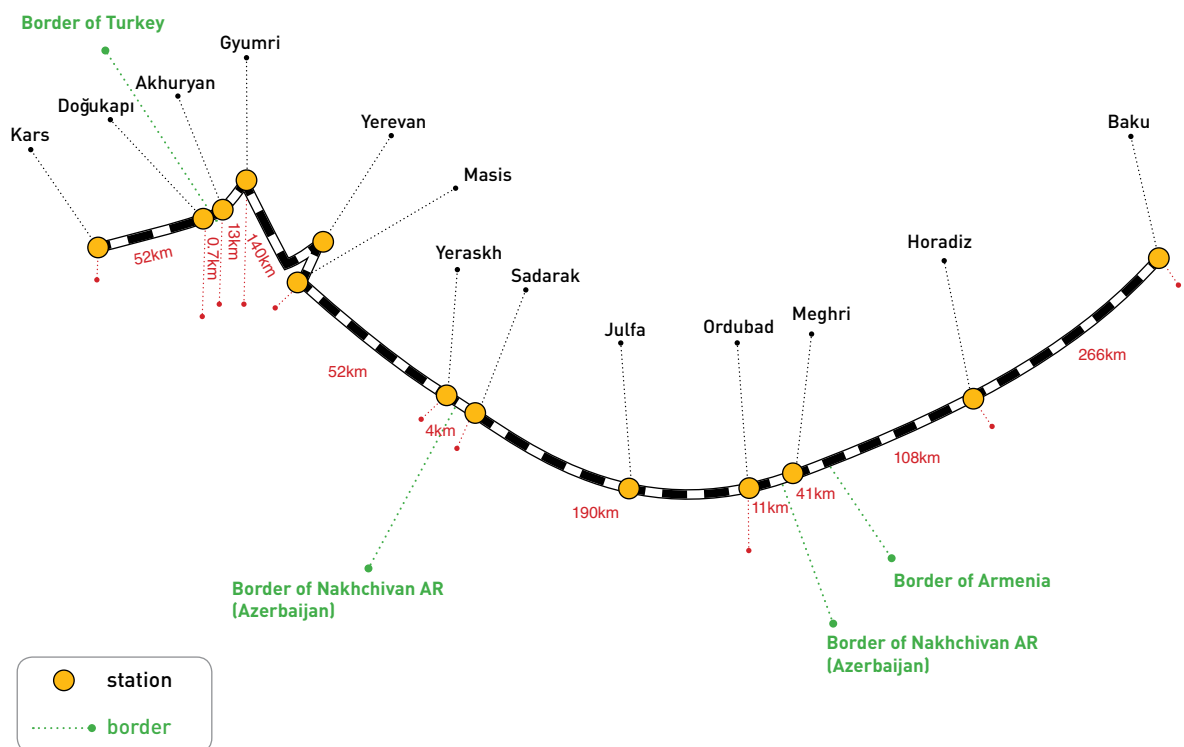
Source: <http://flackelf.livejournal.com/139833.html>

The 108km of railway from the border with Armenia to Horadiz (Azerbaijan) is completely destroyed and the track bed has been dismantled. Many structures, such as viaducts, drainage infrastructure and crossings, have fallen into disrepair. There were 12 stations on this route, some of which have been destroyed.

The Horadiz–Alyat–Baku section is 266km long. It is in working condition and is used for the local transportation of both passengers and freight. However, in order for the railway to be used for heavy goods traffic, running maintenance is needed at the very least and, in places, some capital repairs to the route are required. This section is fully electrified.

The information gathered means the KGNMB mainline can be categorised as semi-functioning and theoretically liable for reconstruction. Figure 2 shows the KGNMB railway, for which categories of restoration complexity have been assigned to individual sections.

Figure 2: Assessing the complexity and extent of restoration work



The KGNMB route from Kars to Baku was considered in this study as an investment project and the cost of restoring rail traffic to the whole route was calculated as the total cost of restoring all the sections of the route.

Table 4 shows the cost of restoring the different sections of the railway, based on an assessment of the complexity and extent of restoration work.

Table 4: Cost of restoring railway sections

Name	Route section	Distance (km)	Category of restoration work	Restoration expenditure (US\$ million)
Baku–Horadiz (Azerbaijan)	1	266	1	26.6
Horadiz (Azerbaijan) – Armenian border (Meghri district)	2	108	4	162
Armenian border (Meghri district) to border with Nakhchivan Autonomous Republic (Azerbaijan)	3	41	4	61.5
Armenian border (Meghri district) – Ordubad (Nakhchivan AR, Azerbaijan)	4	11	3	11
Ordubad–Julfa–Sadarak (Nakhchivan AR)	5	190	2	76
Sadarak (Azerbaijan, Nakhchivan AR) – Yeraskh (Armenia)	6	4	5	8
Yeraskh–Gyumri (branch line to Yerevan from Masis station) (Armenia) Yeraskh–Masis 52km, Masis–Gyumri 140km	7	52+140=192	1	19.2
Gyumri–Akhuryan	8	13	3	13
Akhuryan (Armenia) – Doğukapı (Turkey)	9	0.7	5	1.4
Doğukapı–Kars (Turkey)	10	52	3	52
Total		877.7		430.7

Thus, the cost of restoring the track bed and ensuring the necessary technical infrastructure based on the rates defined for this study would be US\$430.7 million.

To the railway restoration costs was added the cost of constructing a total of six stations: on the borders between Meghri district in Armenia and Azerbaijan, between Meghri district in Armenia and the Nakhchivan Autonomous Republic (Azerbaijan), and between Nakhchivan Autonomous Republic (Azerbaijan) and Armenia in the Yeraskh district. Prior to the conflict these stations did not exist. The minimum construction costs for one station were taken to be US\$500,000. Therefore, the costs for Armenia and Azerbaijan must each be increased by US\$1.5 million. Akhuryan and Doğukapı stations are considered to be ready to operate as border stations with bogie-exchange facilities.

Therefore, the cost to Azerbaijan and Armenia must be increased by US\$1.5 million (construction and infrastructure for three stations each). The total cost is US\$433.7 million, of which US\$277.1 million is for the Azerbaijani, US\$104.6 million is for the Armenian and US\$52 million is for the Turkish sections.

1.2 Assessment of the payback period of rehabilitating the KGNMB railway

The returns for the individual sections of the KGNMB railway were estimated as the return on investment in its restoration (cost of restoration work), the payback period for the investment based on different freight traffic volumes, and operating returns.

1.2.1 Freight traffic forecast for the KGNMB railway

Anticipated freight traffic volumes on the KGNMB railway:

- Annual freight turnover between Armenia and Iran of around 640,000 tons per year.
- Around 0.3 million tons of freight transported from Iran to Georgia.¹²
- In 2012 the volume of freight carried by South Caucasus Railways JSC was around 3.153 million tons, of which over 2 million tons were export-import. Of this, 1 million tons could be transported directly from Turkey via Gyumri. If the border were to be opened, South Caucasus Railways has projected a potential freight turnover between Armenia and Turkey of 1–2 million tons.¹³
- Around 0.5 million tons of freight transported from Azerbaijan to Armenia.
- Around 1 million tons of freight transported annually from Azerbaijan to Nakhchivan.

Case study

In 1987, which was taken as the base year for establishing freight traffic volumes between Armenia and Azerbaijan, the value of freight exported to Armenia from Azerbaijan was RUB451 million and to Azerbaijan from Armenia it was RUB117 million. The principal export from Azerbaijan to Armenia was fuel oil, with 1.89 million tons being transported. This was followed by diesel oil, petrol and other oils and petrochemical products. In addition, 5.12 billion cubic metres of natural gas was supplied to Armenia. The main exports to Azerbaijan from Armenia were chemical crop protection products, electric light bulbs, lighting equipment, general household goods and appliances, and paper and cardboard products. In 1987 the top-performing sector was Armenia's jewellery industry, which supplied RUB12.2 million worth of jewellery items to Azerbaijan. There is a lot of duplication on the lists of goods imported and exported by the two republics, a phenomenon that is explained by the peculiarities of the Soviet planned economy. Identical goods were exported from Azerbaijan to a particular region of Armenia, while Armenia in turn supplied the same product to, for example, Nakhchivan. This overview provides an idea of the trade flows between the republics during the Soviet period, but it cannot form the basis for calculating rail freight traffic volumes. In the case of many of the items supplied by Armenia, the market in Azerbaijan today has long been occupied by other countries, while for its part Armenia now also meets its demands from other sources. Consequently, new forecasts must be developed for freight traffic between the two countries, based on the current structure of their economies and foreign trade. Based on the situation today, we have calculated the potential freight traffic between Armenia and Azerbaijan at 1 million tons of goods per year.

Table 5 shows the estimated volume of freight traffic, forecasted on the basis of freight flows between points on the KGNMB railway that are currently transported by means of other routes and minimum freight traffic forecasts where there is currently no freight traffic.

In accordance with the calculation method used here, the weight of freight is divided by 20 tons to give the number of containers. We then use the tariff for transporting a 40-foot container carrying 20 tons (US\$0.96 per kilometre according to the rates on the Georgian and Armenian railways). Revenue was calculated by taking the tariff per kilometre for transporting a given number of containers and multiplying it by the distance.

¹² International Alert (2013). *Rehabilitation of the railways in the South Caucasus: assessment of the potential economic benefits. Sochi–Sukhum/i–Tbilisi–Yerevan.*

¹³ "Iuzhno-Kavkazkayazheleznayadoroga"gotovitsyakotkrytiiuTurtsii", 15October2009, www.npktrans.ru/Doc.aspx?docId=8581&CatalogId=653

Table 5: Estimated freight flow volumes

Route section	Volume of freight traffic	Number of containers	Container transit tariff	Distance, km	Revenue, US\$ millions
Revenues for Azerbaijani sections of KGNMB					
Baku–Armenian border (Meghri district)	1.5 million tons ¹⁵	75,000	72,000	374	26.93
Armenian border (Meghri district) – Ordubad (Azerbaijan)	1.5 million tons ¹⁶	75,000	72,000	11	0.79
Ordubad–Nakhchivan (Azerbaijan)	1.0 million tons	50,000	48,000	95	4.56
Ordubad–Julfa (Nakhchivan AR, Azerbaijan)	0.5 million tons	25,000	24,000	65	1.56
Julfa–Sadarak (Nakhchivan AR, Azerbaijan)	1.44 million tons (0.64 million tons Iran–Armenia + 0.3 million tons Iran–Georgia + 0.5 million tons Baku to Armenia)	72,000	69,120	135	9.33
Total (Azerbaijan)	2.94				43.17
Revenues for Armenian sections of KGNMB					
Armenia (Meghri district) from the Azerbaijani border to the border with Nakhchivan AR	1.5 million tons ¹⁷	75,000	72,000	41	2.95
Sadarak (Azerbaijan, Nakhchivan AR) – Yeraskh (Armenia)	1.44	72,000	69,120	4	0.28
Yeraskh (Armenia) – Masis (branch line to Yerevan from Masis station ¹⁸) Yeraskh–Masis 52km	1.44	72,000	69,120	52	3.59
Doğukapı (Turkey) – Akhuryan (Armenia)	1.0	50,000	48,000	0.7	0.03
Akhuryan (Armenia) – Gyumri	1.0	50,000	48,000	13	0.62
Gyumri (Armenia) – branch line to Yerevan at Masis station	1.0	50,000	48,000	140	6.72
Total (Armenia)	2.44				14.19
Revenues for Turkish sections of KGNMB					
Kars (Turkey) – Doğukapı (Turkey)	1.0	50,000	48,000	52	2.5
Total revenues for the KGNMB	5.38			877.7	59.86

14 0.5 million tons from Baku to Armenia + 1 million tons from Baku to Nakhchivan.

15 0.5 million tons from Baku to Armenia + 1 million tons from Baku to Nakhchivan + 0.64 million tons from Iran to Armenia (from Julfa).

16 0.5 million tons from Baku to Armenia + 1 million tons from Baku to Nakhchivan.

17 The branch line from Masis station to Yerevan was not included in the estimated costs of restoring the KGNMB railway and the revenues from freight traffic on the Masis–Yerevan line are also not included. Since Yerevan is considered to be the destination point for goods going to Armenia, revenues from freight traffic are calculated on the section of the line up to the branch line to Yerevan.

1.2.2 Profitability assessment of the KGNMB railway

Calculation of operating returns and return on investment

This study assessed the profitability of the railway in two ways:

- return on investment and payback period;
- operating returns.

Below is the formula used to calculate return on investment projects:

$$\text{Return on investment} = \frac{\text{Net profit}/2}{(\text{equity} + \text{borrowed capital})} \times 100\%$$

In investment projects only part rather than all of the net profit is allocated to payback period – usually this is no more than 50% of net profit. The remaining portion of profits remains with the company and is used for its development and for other purposes.

The operating returns for the KGNMB railway were calculated using the following formula:

$$\text{Operating returns} = \frac{\text{Net profit}}{\text{Operating costs}} \times 100\%$$

The freight transport revenues for different freight volumes were calculated. Profit was calculated as the difference between income from and expenditure on the operation of the railway. Net profit was calculated as profit minus profits tax. Profits tax in Armenia, Azerbaijan and Turkey is the same at 20%.

The operating costs on the Armenian and Azerbaijani sections of the railway were worked out on the basis of the 2012 cost structure for the Georgian railways, where wages and social insurance contributions accounted for 27.3%, expenditure on power supply and materials was 27.7%, depreciation of fixed assets accounted for 27.7% and other costs were 33.3%.

The level of expenditure in Azerbaijan and Armenia can be calculated relatively accurately, as the average wage of railway employees in Armenia and Azerbaijan is known.

The number of workers needed for the restoration of the route has been calculated on the basis of available data on workforce and distance for a number of railways. Thus, for example, the South Caucasus Railway (Armenia), with a track length of 749km and a freight traffic volume of 3.152 million tons per year, employs 4,300 people;¹⁸ Privolzhsk Railways (a branch of Russian Railways), with an operating length of 4,276.1km and a freight traffic volume of 37.3 million tons per year, employs 39,501 people;¹⁹ and Krasnoyarsk Railways, with an operating length of 3,157.9km and a freight traffic volume of 73.9 million tons per year, employs 35,645 people.²⁰ This translates to between 6 and 11 employees per kilometre of track. Using these examples, a projected 8 employees per kilometre of track can be estimated for the KGNMB railway, which would mean the total number of employees would be 877.7km x 8 people = 7,022 employees. This would equate to 4,600 employees on the Azerbaijani section,²¹ 2,000 on the Armenian section and 416 on the Turkish section.

18 www.ukzhd.am/ru_about_company.html

19 http://rzd.ru/enterprise/public/ru?STRUCTURE_ID=5010&layer_id=5040&refererLayerId=5039&id=406

20 http://rzd.ru/enterprise/public/ru?STRUCTURE_ID=5010&layer_id=5040&refererLayerId=5039&id=926

21 Considering that around 4,000 people are currently employed on the Azerbaijani section of the KGNMB, this estimate is reasonably realistic.

With an average monthly wage of US\$300, the annual cost of wages and social insurance contributions on the Azerbaijani and Armenian sections of the railway²² would be US\$28.99 million.

- wages: $6,600 \times \text{US}\$300 = \text{US}\$1.98 \text{ million} \times 12 \text{ months} = \text{US}\23.76 million ;
- social insurance contributions (22% of wages) = US\$5.23 million.

On the basis of the cost structure outlined above, US\$28.99 million represents 27.3% of the overall operating costs.

- Thus, 1% of costs is US\$1.06 million.
- The cost of wages for the Azerbaijani sections would be: $4,600 \times \text{US}\$300 = \text{US}\$1.38 \text{ million} \times 12 \text{ months} = \text{US}\16.56 million .

Social insurance contributions are 22% of wages (US\$3.64 million), which means that the total expenditure on wages and social insurance contributions for the Azerbaijani sections would be US\$20.2 million. The total operating costs for the Azerbaijani sections is therefore US\$74 million.

For the Armenian sections, the cost of wages would be $2,000 \times \text{US}\$300 = \text{US}\$0.6 \text{ million} \times 12 \text{ months} = \text{US}\7.2 million . Social insurance contributions would be US\$1.58 million. Thus, the total cost of wages and social insurance contributions for the Armenian sections would be US\$8.78 million. The total operating costs for the Armenian sections would therefore be US\$32.16 million.

The average wage and social insurance contributions for a railway worker in Turkey were calculated partly on the basis of data on expenditure on wages and social insurance contributions by the Turkish railway company and the number of railway workers, and partly on the basis of information about the minimum wage for Turkish railway workers, which was agreed between the Turkish railways and the railway workers' trade union in August 2013.²³ Thus, in 2008 €474 million (US\$663 million) was spent on wages,²⁴ and the number of employees in 2009 was around 30,000.²⁵ Therefore, the average cost of 'wages and social insurance contributions' for a railway worker in Turkey is US\$1,800 per month. The minimum wage for railway workers was set at TRY2,050 in August 2013, which is equivalent to US\$1,078 (exchange rate: 1.9, August 2013²⁶).

Since the people employed on the restored Kars–Doğukapı section would mainly be technical staff, their average wages are estimated to be equivalent to US\$1,200. In total, 416 people would be expected to work on this section, with overall annual wages and social insurance contributions of US\$6 million. Wages and social insurance contributions represent 45% of the operating costs on the Turkish railways²⁷ and so the total operating costs for the Turkish section would be US\$13 million.

Based on the estimated operating costs and profits from freight transport, the economic benefit of the rehabilitation of the KGNMB route can be calculated.

A period of 10–12 years was taken as the standard period before a railway delivers return on investment.

Freight transport volumes, expected revenues, operating returns and return on investment on the Armenian section of the KGNMB railway are shown in Table 6.

22 The average monthly wage for a railway worker is US\$250 in Armenia and US\$300 in Azerbaijan (2012 data).

23 www.demiryolu.com/demiryolu-iscilerine-200-lira-seyyanen-zam.html

24 www.x-rates.com/average/?from=EUR&to=USD&year=2008

25 C. Monslave (2011). *Railway reform in South East Europe and Turkey: On the right track?* World Bank, pp. 231–232, http://siteresources.worldbank.org/ECAEXT/Resources/258598-1256842123621/6525333-1306937865933/annex1_turkey.pdf

26 www.currency.me.uk/convert/usd/try#charts

27 C. Monslave (2011). Op cit.

Table 6: Freight transport volumes on the Armenian section of the KGNMB railway

Freight transport volumes, millions of tons	Revenue, US\$ millions	Operating costs, US\$ millions	Profit (loss) US\$ millions	Profit after taxes, US\$ millions	Operating returns, %	Net profit allocated to payback period, US\$ millions	Return on investment, %	Payback period, years
2.44	14.19	32.16	-18.36	-	-	-	-	-
5.6	32.55	32.16	0	0	0	0	-	-
6.44	37.43	32.16	4.88	3.9	12	1.95	1.9	53.6
10.6	61.6	32.16	29.05	23.24	71.4	10.62	10.2	9.85

Freight transport volumes, expected revenues, operating returns and return on investment on the Azerbaijani section of the KGNMB railway are shown in Table 7.

Table 7: Freight transport volumes on the Azerbaijani section of the KGNMB railway

Freight transport volumes, millions of tons	Revenue, US\$ millions	Operating costs, US\$ millions	Profit (loss) US\$ millions	Profit after taxes, US\$ millions	Operating returns, %	Net profit allocated to payback period, US\$ millions	Return on investment, %	Payback period, years
2.94	43.17	74	-31.7	-	-	-	-	-
5.1	74.87	74	0	0	0	0	-	-
5.86	86.1	74	11.23	8.98	12	4.49	1.61	62
9.7	142.5	74	67.63	54.1	72.3	27.1	9.72	10.3

Freight transport volumes, expected revenues, operating returns and return on investment on the Turkish section of the KGNMB railway are shown in Table 8.

Table 8: Freight transport volumes on the Turkish section of the KGNMB railway

Freight transport volumes, millions of tons	Revenue, US\$ millions	Operating costs, US\$ millions	Profit (loss) US\$ millions	Profit after taxes, US\$ millions	Operating returns, %	Net profit allocated to payback period, US\$ millions	Return on investment, %	Payback period, years
1.0	1.69	13.3	-11.61	-	-	-	-	-
7.87	13.3	13.3	0	0	0	0	0	0
9.05	15.3	13.3	2.0	1.6	12	0.8	1.54	65
14.28	24.13	13.3	10.83	8.67	65	4.33	8	12
15.56	26.3	13.3	13.0	10.4	78.2	5.2	10	10

Freight transport volumes, expected revenues, operating returns and return on investment for different volumes of freight traffic on individual sections of the KGNMB railway are shown in Table 9.

Table 9: Freight transport volumes necessary to initiate return on investment in the KGNMB rehabilitation project within 12 years

Section	Distance, km	Freight transport volumes, millions of tons	Revenue, US\$ millions	Operating costs, US\$ millions	Profit (loss) US\$ millions	Net profit, US\$ millions	Net profit allocated to payback period, US\$ millions	Volume of investment, US\$ millions	Payback period, years
Kars–Doğukapı	52	1.0	2.5	13.3	-11.61	-	-	52.0	-
Required		14.28	24.13	13.3	10.83	8.67	4.33	52.0	12
Turkish border Gyumri–Masis	153.7	1.0	7.37	19.98	-12.61	-	-	28.4	-
Required		3.51	25.89	19.98	5.91	4.73	2.36	28.4	12
Masis (Armenia) – border with Nakhchivan AR	56	1.44	3.87	7.28	-3.41	-	-	13.2	-
Required		3.74	10.05	7.28	2.77	2.22	1.11	13.2	11.9
Sadarak (Azerbaijan) – Armenian border (Meghri district)	201	1.5	16.24	26.13	-9.89	-	-	87.0	-
Required		4.09	44.26	26.13	18.13	14.5	7.25	87.0	12
Meghri district, Armenia	41	1.5	2.95	5.33	-2.38	-	-	61.5	-
Required		9.22	18.14	5.33	12.81	10.25	5.13	61.5	12
Armenian border (Meghri district) – Baku (Azerbaijan)	374	1.5	26.93	48.62	-21.69			188.6	
Required		4.9	87.91	48.62	39.29	31.43	15.72	188.6	12

From Table 9 it can be seen that different sections of the KGNMB route require different volumes of freight traffic in order to initiate return on investment within 12 years. The most ‘expensive’ sections are the short stretch that links Kars and the Turkish border station of Doğukapı (14 million tons per year) and the short section through the Meghri district of Armenia (9 million tons per year). These sections have no individual transport value and, in terms of payback, must be considered as a whole with the other sections controlled by the respective national rail company. They were simply detailed separately here, in accordance with the methodology for defining the sections requiring restoration work of different levels of complexity.

The sections that would begin to provide a payback within 12 years may include the section from the Turkish border through Armenia and Nakhchivan to the border of the Nakhchivan Autonomous Republic and the Meghri district of Armenia and the whole section between the Armenian border and Baku (average, 3.5 million tons). Considering that the freight traffic forecasts were based on the situation as it is today, with a lack of trade flows and disconnected economies, increasing freight transport volumes to 3–4 million tons per year with the opening of a new transport corridor seems an entirely realistic prospect.

2. THE COMPETITIVE BENEFITS OF THE KGNMB RAILWAY FOR THE DIFFERENT PARTIES

2.1 The competitive benefits of the KGNMB railway for Armenia

If the KGNMB railway were to become operational, Armenia would gain a rail link with Iran through Julfa. Currently, Armenia and Iran are connected by road. The road through the mountainous Meghri district passes through challenging terrain. The distance from Julfa to Yerevan by the KGNMB rail route is 168km, while the road route from Meghri to Yerevan is 372km.²⁸ The cost of constructing the North–South route from Armenia to Iran would be US\$2–3 billion. We estimate the cost of restoring the entirety of the KGNMB railway to be US\$433.7 million, that is five to six times less (see Table 4).

Shifting freight traffic to the railway would lead to a reduction in road traffic flows between Iran and Armenia through the towns of Meghri district, which would have an environmentally positive impact on the region. The only route currently available for Armenian imports and exports to and through Iran is by road through Meghri, and to reach the port of Bandar Abbas in southern Iran involves a journey of 2,750km. It is cheaper to transport a 40-foot container from any port in China to Bandar Abbas than to ship the same cargo to the port of Poti.²⁹ It also shortens the journey by at least 10 days. However, it is much more expensive to transport a container by road to Armenia from Bandar Abbas than from Poti.³⁰ Moreover, transportation through Iran avoids both the greater distance and a number of technical constraints. For example, Iran imposes weight restrictions on freight – a maximum of 20 tons (including the weight of the container), which obviously makes the transportation of large loads more difficult and more expensive. In addition, there are strict limits on the transportation of cigarettes and alcohol through Iran.

The annual freight turnover across Armenia’s southern border (with Iran) is currently around 640,000 tons.

Opening the line from Julfa to Iran would fundamentally change the role of the KGNMB railway for Armenia, since, in addition to goods being sent from Iran to Armenia, freight would also be sent from Iran through Armenia to the Black Sea ports, meaning that Armenia would start to play a role as a transit country.

Assuming that, with the opening of a direct rail freight link between Turkey and Armenia, the issue of customs escorts would be settled, the possibility would arise of transporting goods on a fundamentally different level and Armenian manufacturers would gain access to the Turkish market. Experts estimate the potential capacity of the Akhuryan–Doğukapı border crossing at 6 million tons per year.³¹ Currently, goods from Armenia cannot reach the Turkish market and cannot be exported to Turkey because the customs regimes in Turkey are subject to a special government decree issued immediately after the closing of the border in 1993, despite the fact that both countries are members of the WTO. Before Armenia joined the WTO, Turkey declared that the multilateral trade agreements in Annexes 1 and 2 of the Agreement on establishing the

28 www.ipinf.ru/distance/between-cities/%D0%95%D1%80%D0%B5%D0%B2%D0%B0%D0%BD/%D0%9C%D0%B5%D0%B3%D1%80%D0%B8/

29 I. Belubekyan (2011) *Transport costs through Armenia’s main trade routes: Economic analyses of transportation costs and challenges confronting Armenia’s trade*. World Bank.

30 Ibid.

31 International Center for Human Development (2012). *Perspectives on development of transport and international corridors in Armenia, Turkey and the Black sea region*, International Center for Human Development, Yerevan, p.34.

WTO would not be binding on Turkey if Armenia acceded to the WTO.³² Article XIII of the Agreement stipulates that WTO member states may choose not to apply the obligations set out in the Agreement to new members. In the accompanying documentation Armenia cannot be designated either as a recipient country or as a country of origin. However, goods from Turkey are accepted by Armenian customs. Trade turnover between Turkey and Armenia was worth US\$213,468 million in 2012,³³ having fallen from US\$246 million in 2011.

Overall, 99.5% of trade between Turkey and Armenia consists of imports from Turkey.³⁴ In real terms, Armenia exported 2,900 tons of goods to Turkey and imported 112,000 tons. Of these exported goods, 93% (or 2,700 tons) comprised untreated furs and leather, textiles, goods made from stone, cement and other similar materials, vehicles and mechanical parts for them, aluminium and items made from aluminium. In contrast, imports from Turkey are much greater both in volume and in diversity: timber and timber products, plastics and plastic products, aluminium and ferrous metals and items made from aluminium and ferrous metals, ceramic products, soap, cleaning products, sulphur, paints, varnishes, ink, paper, cardboard, glue, glass and glass products, knitwear, etc.³⁵ In spite of the absence of diplomatic relations and the closed border, Turkey ranks fourth on the list of countries that export to Armenia.

Goods going from Turkey to Armenia are documented as imports or re-exports from Georgia and enter the Armenian market unimpeded. Georgian transport regulations allow trucks with goods for Armenia to pass through Georgian customs with no need for any permits. This is because goods leave Turkey with documents (invoice) that name Georgia as the delivery country. In this case VAT should be paid at the border. However, in Georgia the drivers produce another document (invoice) where the delivery country is shown as Armenia.³⁶ As a result, VAT is not paid, but a fine of US\$320 is levied as a penalty for document irregularity. When drivers cross the border between Turkey and Georgia, they produce one document (invoice) with a customs stamp, and at the border between Georgia and Armenia they produce another document (invoice) without a stamp, which incurs a fine.

Currently, goods from Armenia that are destined for third countries can be transported through Turkey. While the border between Turkey and Armenia has been closed, these goods have gone through Georgia. A direct rail link would mean a reduction in transport costs for a number of reasons: railway tariffs are low in comparison with those that apply to road and sea transport; the additional payments to Georgian customs and to intermediaries in Georgia for ‘re-documenting’ the goods would be eliminated; and there would be no need for the freight to change mode of transport during its journey. A reduction in transport costs of around 25% could be expected.³⁷ Goods could be supplied to Armenia from southern and central Europe through Turkey, bypassing Georgia. Similarly, freight from Armenia could be taken through Turkey, bypassing the Black Sea ports, to the ports of the Mediterranean.

2.2 The competitive benefits of the KGNMB railway for Turkey

Based on the current volume of trade between Turkey and Armenia, it is unlikely that there would be a high volume of goods traffic on the Kars–Doğukapı section of the railway. Furthermore, once the KATB line is opened, the KGNMB route will no longer be a priority, because the members of the KATB consortium will have to seek maximum exploitation of the route, in order to secure a return on their investment.

32 B. Gulteking Punssmann, A. Dizman, S. Kirdar and A. Gevorgyan (2012). *Review of legal issues between Armenia and Turkey*, TEPAV and International Center for Human Development, http://www.tepav.org.tr/upload/files/1353684848-2.Review_of_Legal_Issues_between_Armenia_and_Turkey.pdf

33 www.armstat.am/file/doc/99477378.pdf

34 Ibid.

35 *Armenian-Turkish business relations through the eyes of business opinion leaders*, 2011, Support to Armenia-Turkey Rapprochement Project.

36 Ibid.

37 Ibid.

In addition, for the border regions there would be an increase in trade and tourism. This is not a direct effect but rather an indirect effect of the railway, due to the opening of the border and the free movement of goods and people in the border areas. The KGNMB line could complement the effect of the opening of the KATB railway.

There is currently an imbalance in international trade between Istanbul and the northeastern regions of Turkey.³⁸ Businesses in eastern Turkey are interested in the opening of a rail link with Gyumri to facilitate the development of cross-border trade and tourism.³⁹

2.3 The competitive benefits of the KGNMB railway for Azerbaijan

With the introduction of a rail link with Nakhchivan, bringing it out of its current transport dead-end, Azerbaijan would gain from the work of the freight distribution centre at Julfa and revenues from rail freight traffic through Nakhchivan. Some of the freight traffic from Iran to Russia could go through Julfa. The volume of this freight transport would depend on the extent to which this route could compete with the existing shipping traffic between Russia and Iran through the Caspian Sea, as well as the Russia–Azerbaijan–Iran railway line through Astaru (Azerbaijan), which is currently nearing completion, and the Kazakhstan–Turkmenistan–Iran route, which is also at the finishing stage. The freight volumes between Armenia and Russia along the KGNMB railway, which would bring transit revenues to Azerbaijan, are also dependent on the potential opening of the Abkhazian railway.

Considering that the main freight flows will be along the Kars–Akhalkalaki–Baku line, the main effect of the rehabilitation of the KGNMB line would be the opening of a direct link with Nakhchivan and on to Armenia.

The link with Nakhchivan is very important for Azerbaijan, even though the volume of traffic on this line will not recoup the cost of its restoration. Nevertheless, given the socio-economic effect, Azerbaijan may view the rehabilitation of the line to Nakhchivan as a priority.

With the current economic structure and the complete absence of economic relations over the last 20 years, the volume of trade between Azerbaijan and Armenia is expected to be minimal.

Azerbaijan is counting on the KATB. It is estimated that in the early stages of its operation freight traffic on the KATB will be around 6.5 million tons, with future projections of up to 17 million tons.⁴⁰ Kazakhstan hopes to transport 10 million tons on this line within a year. China is also expressing interest and, depending on tariff policies, could send up to 10 million tons of freight by this route.⁴¹

In fulfilment of existing plans and having already concluded a memorandum, Azerbaijan has purchased four new ferries for the Caspian shipping line.

The issue here, besides the existing levels of freight traffic to Black Sea ports, is the additional freight volumes that will be transported along the whole length of the rail route to Kars. Furthermore, this does not take into account freight going in the other direction, which is currently transported by road. Up to half of this, meaning at least 5 million tons, may potentially be transferred to rail container transport.

38 M. Özaslan, B. Dincer, H. Özgür (2006) *Regional disparities and territorial indicators in Turkey: Socio-Economic Development Index (SEDI)*, www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa06/papers/858.pdf

39 Interview with representatives of the Kars Chamber of Commerce and Industry, local government employees, business people and business association leaders, 2012. Representatives of medium-sized businesses in Van have also expressed interest in the opening of rail links with Armenia for the development of trade and tourism (interview, Van, October 2013).

40 <http://news.day.az/economy/410531.html?crnd=14993>

41 "Kazakhstan gotov prisosedit'sya k zheleznoi doroge "Kars-Akhalkalaki-Tbilisi-Baku"", 9 March 2007, www.interfax.az/view/408957

Sending transit goods from Turkey via the Kars–Gyumri–Baku line is less efficient than the Kars–Akhalkalaki–Baku route. First, the Kars–Gyumri–Baku route is longer, albeit not significantly. Secondly, Azerbaijan, Georgia (with a loan from Azerbaijan) and Turkey have invested considerable resources in the construction and reconstruction of their own railways. Therefore, the main concern for these three partner countries is to fully exploit the KATB line.

However, the carrying capacity of the KATB is not infinite and the existence of two railways linking Kars and Turkey's Black Sea ports with Baku by different routes may have a synergising effect on the development of trade relations and, consequently, an increase in freight traffic between Europe and Asia.

3. ANALYSIS OF THE INDIRECT ECONOMIC AND SOCIAL EFFECTS OF THE HYPOTHETICAL OPENING OF THE KGNMB RAILWAY

3.1 The socio-economic effect of opening the rail link for the Nakhchivan Autonomous Republic (Azerbaijan)

In the medium term, the government of Azerbaijan is considering the possibility of the construction of the railway between Kars and Nakhchivan in order to restore an overland route to the Nakhchivan Autonomous Republic. Preliminary calculations estimate the cost of such a project, over difficult terrain, to be around US\$1–1.2 billion. This clearly illustrates the direct financial benefit of restoring the KGNMB railway, which would allow savings to be made and by means of which it would be possible to transport freight to and from Nakhchivan more quickly.

KGMB rehabilitation could lead to economic revival in the Nakhchivan Autonomous Republic

Since 1992, there has been no overland link with the Nakhchivan Autonomous Republic. Communication links have been established with the main part of Azerbaijan by taking passenger and freight traffic through Iran. It should also be noted that throughout this period the economy of the Nakhchivan Autonomous Republic has developed, albeit slowly. In 2012 industrial output was 88 times that of 1995. The private sector has a 93% share of overall production. Manufacturing as a proportion of Nakhchivan's GDP increased from 8.2% in 1995 to 26.9% in 2012. There is well-established production of baked goods, meat and dairy products, sugar, salt, honey, mineral water, decorating and construction materials. Small factories and workshops have been set up for the production and processing of furniture, plastics, metal articles, vehicle assembly, etc.

Mineral resources play an important role in the economy of Nakhchivan and include salt, dolomite, travertine, gypsum, molybdenum and zinc.

An interview with transport sector employees in Julfa and Nakhchivan (road transport, railways and aviation) revealed that road haulage accounts for US\$2.5 million out of the country's annual budget. Over the course of 20 years, maintaining the overland link with the Nakhchivan Autonomous Republic has cost the government of Azerbaijan around US\$50 million.

The Nakhchivan Autonomous Republic also has air links with Baku and other regions of Azerbaijan. In view of the social significance of these flights, plane tickets between Baku and Nakhchivan are sold below cost and an annual subsidy of around US\$10 million is paid from the national budget to the AZAL airline. Over the last ten years these subsidies have amounted to at least US\$100 million.

In the past, freight was transported on a large scale on the railways of Russia and Azerbaijan from Europe to Iran, the Middle East and the Anatolian Peninsula. The goods were transferred directly to the Iranian railways at the Julfa border station (Nakhchivan Autonomous Republic), which operated as a major marshalling and transit facility in the pre-conflict period.

According to leading officials from the Nakhchivan railways, the number of people employed at the Julfa facility was as high as 17,000, of whom around 8,000 worked at the actual depot. The number of freight wagons was as much as 3,000 per month.

Today Julfa station is in a neglected state, with no more than 150 people working there. They are principally engaged in keeping some of the machinery in working order and dealing with small volumes of domestic rail freight.

The station's fleet of locomotives and wagons stands idle and rusting. Below are a number of photographs of Julfa station.

Photographs 8–11: Julfa station



Opening the railway would certainly not lead to the creation of jobs on the scale previously seen here and there are a number of reasons for this. Firstly, the freight volumes are no longer – and are not anticipated to be – as high as they were in the past. Secondly, the large number of employees during the Soviet period was due to the low levels of mechanisation and old technology, as well as the political motivation of guaranteeing work for all.

Nevertheless, even with anticipated initial freight volumes if the railway through Nakhchivan were to be opened, the station employees interviewed believe at least 500 additional jobs would be created. In addition, at first, when much of the equipment would need to be overhauled and new machinery installed, the number of people employed might rise, albeit temporarily, to as many as a thousand.

A revival of freight traffic through Julfa, in addition to creating jobs and increasing employment in the sector among the local population, would also facilitate the regeneration of small businesses engaged in the service sector of the local economy. To some extent, opening the railway would also have an impact on reducing the cost of goods produced in Nakhchivan.

3.2 Assessing the effect on the mining industry in Armenia

There are large quantities of mineral deposits in Armenia from which the extraction of metals such as copper, molybdenum, gold and iron play, and could continue to play, an important role in the country's economic development. These deposits are largely located in the provinces of Lori, Syunik and Kotayk.

In terms of the railway network, the Lori and Kotayk deposits are in the best locations. However, the Syunik deposits are also potentially attractive, particularly with the prospect of the opening of the KGNMB line.

In the main it is copper, molybdenum and gold that are currently extracted at the existing sites and, in most cases, they are transported from these sites by lorry.

Copper and molybdenum currently represent a significant share of exports from Armenia and most of the deposits are in Lori (the Teghut mine, from which ore is transported by rail) and Syunik (Kajaran and Agarak, from which ore is transported by road).

Iron ore deposits

Armenia also has large deposits of iron, none of which is currently being exploited. They are located in the following provinces:

- Kotayk – Hrazdan (77 million tons) and Abovyan (250 million tons) with high-quality ore and easy access to the necessary infrastructure;
- Syunik – Svarants has the largest deposits but the ore is of lower quality (1,500 million tons).

Figure 3: Iron ore deposits



Source: www.geostat.ge

It is expected that the Chinese company FortuneOil, which has bought all three of these deposits, will start to exploit the Hrazdan deposit in 2014–2015, followed by Abovyan. The plan is that by the following year extraction from Hrazdan alone will be 1.5–2 million tons of ore, which will yield 0.8–1 million tons of concentrate after processing. It is intended that exploitation of the second deposit, Abovyan, will yield 8 million tons of pure concentrate, ready to transport to China.

China is the world's largest consumer and importer of iron ore and the demand is rising year on year. Thus, all the ore extracted will be sent to the Chinese market. The Chinese side has indicated three possible options for its transportation:

- through the Georgian ports by the railway that is already operational;
- through the Iranian port of Bandar Abbas – with transport to the port by road;
- through Turkey.

If the rail link through Turkey (Kars–Gyumri) were to be opened, this line could carry the iron ore exports from Armenia. On the other hand, opening the rail link with Iran through Nakhchivan would mean a substantial reduction in the cost of transit to the port of Bandar Abbas. In the first case (Kars–Gyumri), Hrazdan and Abovyan would benefit most, while the route through Nakhchivan could carry iron concentrate from Svarants (Syunik), which has vast reserves. In addition, copper and molybdenum mines (Kajaran and Agarak) in the province of Syunik would also benefit.

Figure 4: Svarants



Photograph 12: Svarants



Source: <http://www.ugo.cn/photo/AM/ko/282.htm>

3.3 The role of the KGNMB railway

In March 2011 a group of Azerbaijani experts, chaired by Dr Eldar Ismailov, met in Washington to present their post-conflict vision.

The Azerbaijani experts concentrated on what could and would need to be done in a post-conflict scenario to regenerate the seven districts of Azerbaijan that are immediately adjacent to Nagorno Karabakh.

Jahangir Hajjiyev, Chairman of the International Bank of Azerbaijan, commented that the proposed business plan could also be used as a model for other post-conflict regions.

“According to our calculations, the post-conflict regeneration of the seven regions of Azerbaijan surrounding Nagorny Karabakh will cost US\$28.4 billion. This is an expensive project for our region and at the moment only Azerbaijan would be in a position to realise it,” stressed the Director of the Institute of Strategic Studies of the Caucasus, Eldar Ismailov.

In terms of the role of the KGNMB railway, rehabilitation work is being considered in five districts: Agdam, Fizuli, Jabrayil, Zangilan and Qubadli.

Principal restoration work in the five districts

In all five districts of the rehabilitation zone, two thirds of the buildings and structures have suffered severe damage. Furthermore, 45–55% of these buildings and structures require Category 4 or 5 restoration (the most extensive). In these areas all the towns and villages will require extensive renovation.

Information by administrative district:

1. Agdam: restoration of 1 town and 102 villages, including community infrastructure and facilities (over 598 structures).
2. Fizuli: restoration of 1 town and 54 villages, including community infrastructure and facilities (over 145 structures).
3. Jabrayil: restoration of 77 towns and villages, including community infrastructure and facilities (197 structures).
4. Zangilan: restoration of 80 towns and villages, including community infrastructure and facilities (138 structures).
5. Qubadli: restoration of 94 towns and villages, including community infrastructure and facilities (205 structures).

This is a very incomplete overview of the scale of the necessary reconstruction work, which includes the construction of roads and electricity substations, water supply facilities, telecommunications lines and much more. In addition to this, industrial and agricultural facilities require extensive restoration work. Looking ahead, there is also the national border from the town of Horadiz in the district of Fizuli to the boundary of the district of Zangilan, between Azerbaijan and Iran, which is damaged and currently under Armenian control. All the associated structures, border posts, facilities and demarcation lines have been destroyed.

Working on the basis of estimated costs of US\$28.4 billion for the reconstruction work across the seven administrative districts, the restoration costs for the five districts would be around US\$20 billion.

This is an approximate assessment of the volume of work in five administrative districts of Azerbaijan. In order to evaluate the importance of the KGNMB railway in the reconstruction work, a case study was carried out on the restoration process in Horadiz, a town in the district of Fizuli. Horadiz was captured by Armenian armed forces, but was subsequently liberated in January 1994.

Rebuilding destroyed towns and villages – the example of Horadiz

Photographs 13–18: Horadiz, 1994–1995



Source: Town archive

Photographs 19–24: Horadiz, 2009–2012



Source: Town archive

Over the course of the last few years, more than 150 ruined and burned-out residential buildings have been renovated and restored to the people, modern roads have been built, gas and power lines have been laid, and other major infrastructure projects have been completed (Photographs 25–30).

Photographs 25–30: Horadiz, 2013



In total, to rebuild the town, including residential buildings, roads, the railway station, telecommunications, electricity and water, the government has spent over AZN8 million (US\$9.5 million) and the work is not yet complete. A survey of local people confirmed that at least 50% of building materials (natural stone, cement, pipes, etc.), saplings for tree planting and much more is transported to Horadiz by rail.

Considering the extent of restoration work to be done in the post-conflict period, in the initial stages the role of the KGNMB line would be limited to creating jobs for the rehabilitation of the railway itself.

Approximately 60% of building materials and up to 50% of vehicles and machinery involved in the construction and restoration process would be transported by rail. Based on the example of Horadiz, the period of actual construction work could last for at least ten years.

CONCLUSION

The following conclusions have been drawn after analysing the conditions whereby interdependence could deliver economic and social benefits for the parties and thus reinforce mutual interest in maintaining the railway in its entirety:

1. According to the estimates based on this study, the repair of the track bed and provision of the necessary technical infrastructure for the KGNMB railway, as well as the construction of and infrastructure for three border railway stations on the Armenian and Azerbaijani sections, would cost US\$433.7 million. Of this, the rehabilitation of the Azerbaijani section accounts for US\$278.6 million, the Armenian section US\$104.6 million and the Turkish section US\$52 million. By comparison, the construction costs for the KATB line have today already exceeded US\$600 million and the project is not yet finished. The estimated cost of constructing the rail line that will link Armenia and Iran is US\$2–3 billion and the line that will link Azerbaijan with Nakhchivan via Kars and Georgia is projected to cost US\$1 billion. The KGNMB project is clearly more economical and could in the future prove to be an affordable alternative or addition to the existing transport routes of the South Caucasus.
2. With an average annual freight volume of 10 million tons, the Armenian and Azerbaijani sections of the railway could start to be profitable once the restored line has been operational for 13 years, which is considered to be a good indicator. The Turkish section would need annual freight traffic of 14 million tons. However, 784km of the 877-km line would start to pay for itself after 12 years with average freight traffic of 4–5 million tons. This is due to the fact that these sections only require minor restoration work and their position as international trade corridors. Based on actual freight traffic and conservative forecasts for traffic on those sections of the line that currently have no traffic, if the rail line were to open tomorrow, freight volumes of around 1–1.5 million tons could be expected. At these rates the KGNMB railway would not pay for itself. However, since the freight volume forecasts are based on a situation where there are no trade flows and economies are disconnected, an increase in freight traffic to 4–5 million tons per year with the opening of a new transport artery and the revitalisation of trade and production would seem to be an entirely realistic prospect.
3. Armenia would gain substantial advantages from the opening of the KGNMB railway. Firstly, it establishes a connection with Turkey and access to the Turkish Black Sea and Mediterranean ports, which is of particular importance for the extractive industries. Secondly, the opening of a line from Julfa to Iran would fundamentally change the role of the KGNMB line for Armenia, since, in addition to freight sent from Iran to Armenia, there would also be transit traffic from Iran passing through Armenia to the Black Sea ports. This would mean Armenia would begin to play a role as a transit country.
4. With the opening of the KGNMB route, Azerbaijan would gain a rail link with the Nakhchivan Autonomous Republic. This would be important socially, but would also mean savings for the national budget, from which resources are currently allocated to subsidise passenger and freight traffic between Nakhchivan and the rest of Azerbaijan by road and air. In addition, the economy of the Nakhchivan Autonomous Republic would be able to develop the sectors that involve goods being exported and thereby contribute to Azerbaijan's domestic and foreign trade.
5. The railway could be an important infrastructure component in the regeneration of the parts of Azerbaijan currently occupied by Armenian armed forces, which have been there since the period

of active hostilities. The presence of the railway would facilitate the effective implementation of construction and infrastructure projects. Furthermore, the creation of significant numbers of jobs on the railway itself and in other associated areas would have a positive social effect on these regions.

6. For Turkey, the economic effect of opening the KGNMB railway would be most tangible in the northern and eastern parts of the country, which currently lag behind the western and southern Black Sea and Mediterranean regions. The opening of the KATB line will to some extent open links for this region to the South Caucasus and on to the Caspian Sea. However, the KGNMB railway would facilitate the expansion of trade, which is essential for the regions bordering with Armenia. An indirect effect might be the development of tourism.

ANNEX: INFORMATION SOURCES FOR TABLE 2

‘This year the Tuapse-Adler railway infrastructure received 3.1 billion roubles in investment’, ITAR-TASS, 15 November 2011, available in Russian at <http://www.itar-tasskuban.ru/news/article?type=kray&ci=18201>

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