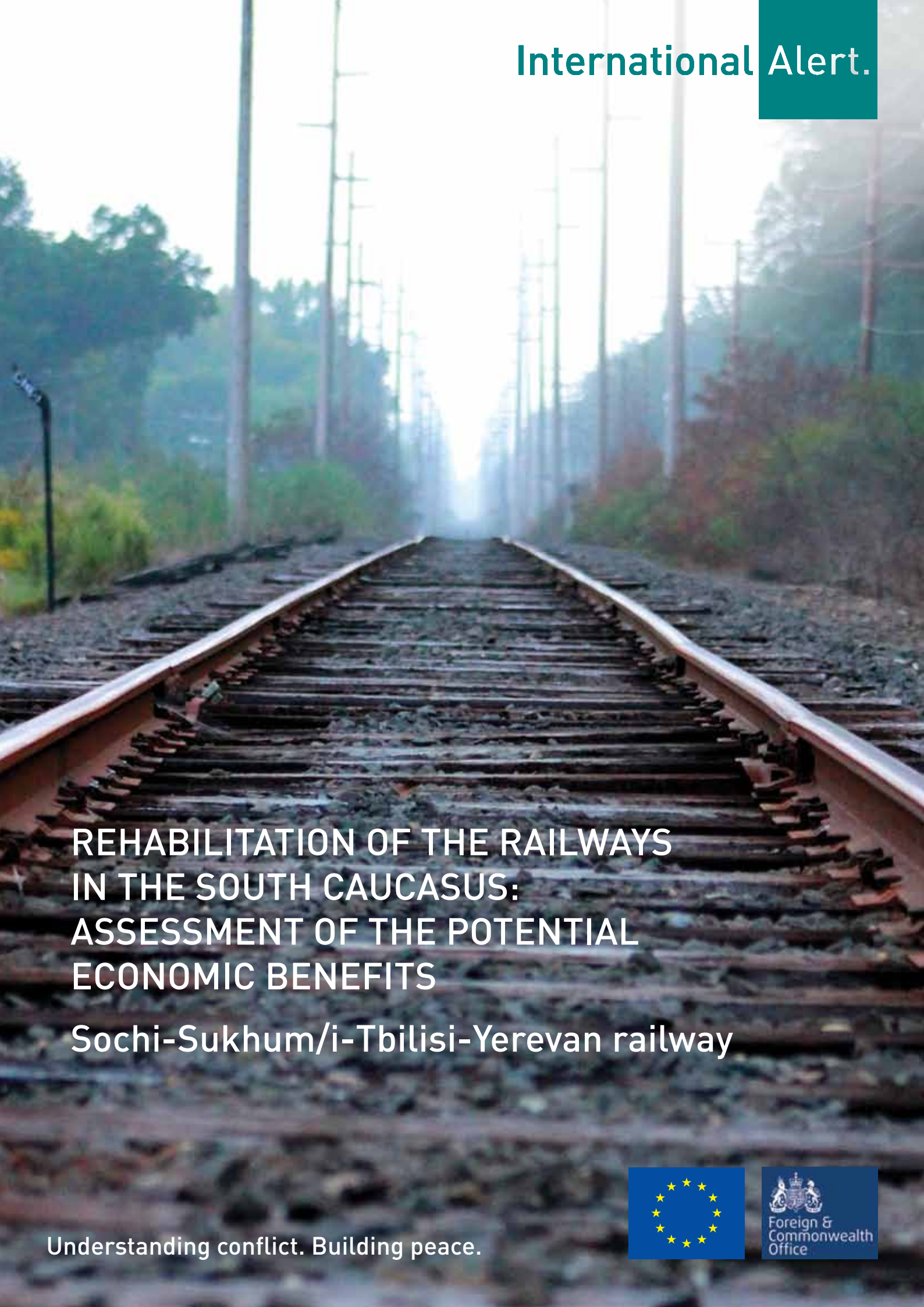

International Alert.

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

Sochi-Sukhum/i-Tbilisi-Yerevan railway

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Sochi-Sukhum/i-Tbilisi-Yerevan railway

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CONTENTS

EXECUTIVE SUMMARY

Transportation links in the South Caucasus have been physically and politically disrupted as a result of the protracted conflicts that broke out in the early 1990s and which continue to remain a source of instability, jeopardising the socio-economic development of the whole region.

The prospects for restoring transport links in the region are not considered by the conflicting and potentially interested parties from a commercial or economic perspective. Rather, they view it primarily through the prism of security and as a chance to strengthen their position in the conflict, or at least to weaken the political position of the opposite side. Due to the absence of economic calculations, myths have emerged supporting this or that political line.

Traditionally, the process of resolving protracted armed conflicts has been dominated by political and security concerns. Strong arguments are needed to broaden the agenda for talks. Particularly in terms of proving the importance of economic interaction as a specific sphere of peacebuilding.

Estimated cost of restoring the railway and its economic effects

In this research, the economic effects of hypothetically restoring the railways were separated from the political aspects in the analysis. This made it possible to assess the costs of restoring separate segments of the railway and the income from freight (direct effect). It also enabled analysis of the indirect effects of restoring the railway for some branches of the economy, enterprises and the social sphere.

The team of researchers devised their own original research methodology, bearing in mind that the profitability ratio of railways during the Soviet Union era and the interconnected economies of the South Caucasus is no longer valid. Moreover, there is no modern and comprehensive analysis estimating the cost-worthiness of investing in the non-functioning segments of the railway, which have not been used since the 1990s.

The evaluation of all sections of the railways was based on visual analyses, technical documentation and interviews with experts. The estimated cost of repair works on sections of different complexity was based on the known cost of construction or repair works of similar complexity for other railways in the region. The estimated income from freight was based on tariffs for a 40-foot loaded container as applied in a number of countries in the region (US$0.96 per kilometre).

Assessment of the indirect economic and social effects was based on macro-economic analyses and analysis of several sectors and enterprises (case studies).

Analysis of Sochi-Sukhum/i-Tbilisi-Yerevan repair works and profitability of freight

The total cost of repair works to restore the Sochi-Sukhum/i-Tbilisi-Yerevan railway route – taking into account the present state of its sections and the cost of different types of restoration work – comes to US$277.5 million. Of this, US$251 million is needed to restore the Psou-Ingur/i segment (190 km). Restoration of the railway (6 km) and bridges from Ingur/i to Ingiri (Zugdidi) is estimated to cost US$26.5 million.

The railway from Ingiri (Zugdidi) to Tbilisi and further to Gyumri and Yerevan is used for cargo transportation and does not need repair works.

If two different segments of the railway – Psou-Ingur/i and Ingur/i-Ingiri (Zugdidi) – are considered as separate investment projects, investment into 190 km of the railway running through the territory of Abkhazia gives the lowest return, even with maximum possible cargo of 10 million tons per year and will not be profitable for at least 16 years. Investments into the Georgian segment of the railway would provide a return on investment with the minimal (less than three million tons per year) cargo. However, if restoration of this section of the railway is seen as a single investment project, it will not justify expenses due to the high cost of restoration works over a long distance and the low return of freight. Another significant factor that makes profitability of freight on this railway problematic is the lack of cargo, even taking into account the cargo currently being transported from Iran to Russia via Armenia and Georgia and from Armenia and Georgia by trucks and through the seaport of Poti.

Even the most optimistic scenario does not envisage more than four million tons of cargo a year; in other words, the profitability threshold of 10 million tons of cargo remains unachievable. Bearing in mind that none of the interested or third parties today has pronounced itself in favour of investing in this expensive project with its problematic rate of return, the plans to restore the railway appear unrealistic given that investments into the Psou-Ingur/i segment would only yield a return in 200 years' time based on the abovementioned cargo amounts.

Indirect socio-economic effects of opening the Sochi-Sukhum/i-Tbilisi-Yerevan route

The expected economic benefits of railway transport include incentives to the economy, the emergence of new industries, higher productivity of enterprises due to access to new markets and lower transport costs, and the creation of new jobs.

In terms of Abkhazia, today's economy is focused on tourist services, and consumers of these services mostly come from Russia. The export of goods, on the other hand, is minimal and mostly oriented towards the Russian market also. Therefore, a railway connecting Abkhazia with the South Caucasus is not likely to produce an economic effect.

With regard to Georgia, during the years of the gradual and eventually full closure of the Russian market, the country's importers and exporters reoriented themselves towards the markets of Europe, the United States, Japan, China, Ukraine and Turkey. Trade with Russia, which could have possibly recovered with the opening of a railway through Abkhazia, constitutes 5% of all Georgian foreign trade. Some enterprises such as Rustavi Azot, the Zestafoni Ferroalloy Plant or HIPP-Georgia function with 100% of their production capacity using all the raw material available and cannot step up production; besides, all their products have stable demand on non-Russian markets. Opening an alternative transport route may also produce a negative effect on sea and track transport systems, which today can provide a much higher profit and 10 times more jobs than a restored railway section.

According to expert forecasts, launching the Kars-Akhalkalaki-Baku railway could result in serious reductions of cargo flow in the seaport of Poti, reducing the income of one of Georgia's biggest taxpayers and leading to a loss of hundreds if not thousands of jobs all over the country.

Turning to Armenia, the Armenian segment of the railway does not require capital investment. As a result, restoration of the railway to Sochi is *a priori* desirable for Armenian transporters, who currently have to use the seaport of Poti (Georgia) or of Bandar-Abbas (Iran) along with

railway and truck transportation. Switching to a single transport system could save Armenian importers and exporters 20% of their transport costs, on average. In this case, exports to Europe could be partially reoriented to Russia, but this is prevented due to the high servicing tariffs in the "Kavkaz" seaport compared with the seaport of Varna. In 2012, approximately 20% of Armenian exports went to Russia, while exports to the EU countries made up 40% of total exports. Building stone and mining industry products, especially from northern Armenia, could have particular potential as export products for the Russian market if there was a direct railway. Indirectly, the mining industry has the potential for an increase in by-products parallel to the increase in general production; by-products can fully satisfy the demand of the internal market.

However, an increase in exports is determined not only by transport costs but also by a number of other factors – such as the tariff policy of the importing countries, the presence or lack of trade agreements, the structure of the market, the competitiveness of Armenian export products compared with similar products from other countries and local ones, the potential for increasing industrial capacities in Armenia, and the prospect of investments. All of these factors together should be borne in mind when calculating the potential economic effect for Armenian exporters of launching railway links with Russia. This approach needs strict and precise estimation.

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, 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-Nakhichevan-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 track[1]

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[3] 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 of the railway's services and a decrease in its tariffs.

3 See Annex 3.

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 macro-economic 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.

1. ASSESSMENT OF THE RAILWAY REHABILITATION COST, PAY-BACK PERIOD AND REVENUE FROM FREIGHT TRAFFIC[4]

1.1 Assessment of the railway rehabilitation cost

Sochi-Sukhum/i-Tbilisi-Yerevan railway

Figure 1: Railway route

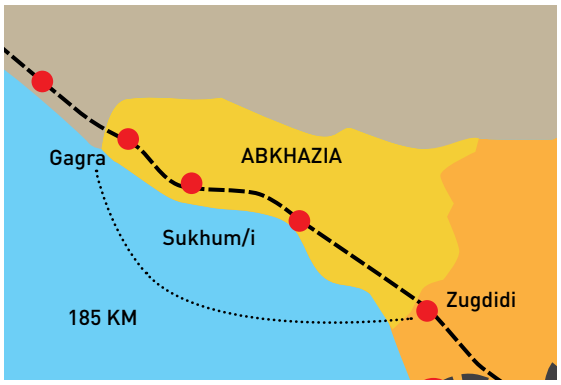


Figure 2: Gal/i-Ingiri railway section

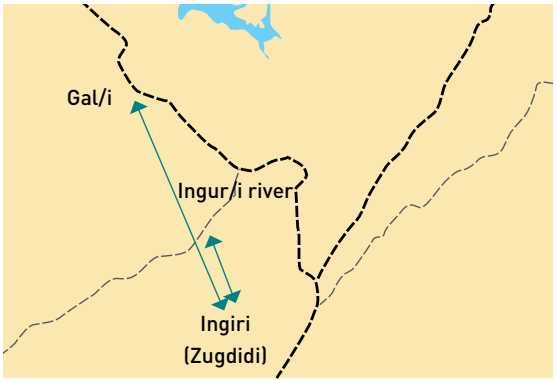


Figure 3: Sukhum/i-Ochamchira/e railway section

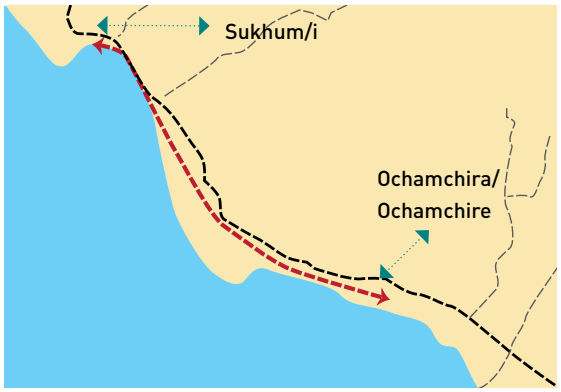


Figure 4: Ochamchira/e-Ingiri railway section (Zugdidi)

Abkhazian assessment

Restoration and repairs in 2004

In accordance with the Agreement between the Government of the Republic of Abkhazia and Open Joint Stock Company (OJSC) Russian Railways, of 19th July 2004, work was performed on the Abkhazian railway (AR) on the track section from the bridge across the Psou River to Sukhum station. The work involved repairing the upper track structure and the artificial structures, replacing the defective ties and beams, track switches and individual rails, filling in and packing down pit gravel, and straightening the track.

4 The authors' transcription and names are preserved in the description of the field study results.

The total cost of the work fulfilled amounted to RUB240 million (US$8.8 million[5]). The completed works provided the opportunity to open up passenger traffic between Sukhum and Sochi (commuter train) and to link up Sukhum-Moscow and Sukhum-Rostov wagons to the Adler-Moscow train.

The current state of the Abkhazian railway is shown in the following photographs:

Photograph 1: Gudauta, category 3

Photograph 2: Gulripsh region, category 4

Photograph 3: Sukhum/i region, category 4

Photograph 4: Ochamchira/e region, category 4

Photograph 5: Gal/i region, category 5

5 The exchange rate of the Russian rouble in US dollars in 2004 was taken from the website http://afga.ru/?p=78.

The total length of the operating railway across the chief routes in January 2013 was 183 km (102 km from the Psou River to Sukhum station; 54 km from Sukhum station to Ochamchira station; and 27 km from Ochamchira station to Tkuarchal station).

The Psou-Ochamchira-Tkuarchal section has 14 railway stations, 10 tunnels, 7 large bridges, 175 medium and small bridges and overpasses, 9 overhead crossovers, 6 pedestrian bridges, 2 walkways, 1 mud flow chute and 100 water pipes.

The given rolling stock is as follows:

- 10 electric locomotives (part to be written off);
- 9 diesel locomotives (part to be written off);
- 5 gasoline locomotives, motor-rail wagons;
- 54 freight wagons;
- 20 passenger wagons (unserviceable and to be written off).

The state of the Psou-Sukhum section of the railway is as follows:

- rails with side wear in the upper track bed structure at a 9–10 mm section and vertical wear of up to 4 mm and higher;
- defectiveness of clamp fastenings at 40% to 55%;
- more than 200 defective rails;
- general unsuitability of wood ties and bridge ties at 45% to 60%;
- defectiveness of spike fastening at 35% to 40%;
- decreasing level of ballast layer and lack of ballast section girder;
- corrosion of main reinforcement in places, with damage to the protective layer of concrete on bridges' reinforced superstructures – an unfit layer of paint on the metal superstructures of large bridges decreased the longevity of the superstructures and could decrease their load-carrying capacity;
- established train speed of 40 km per hour – however, with significant train speed limitations up to 15–25 km per hour based on the condition of the upper track bed rail and the artificial structures (tunnels, bridges).

The overall technical condition of the upper rail structure and the artificial structures does not ensure the required speed limit, or the uninterrupted and safe transport of freight and passengers.

In terms of communications, one of two trunk, seven-quad cables was partially operating by 2010. The integrated cable system and amplifying equipment continue to be unsuitable for operation, and repairs are not rational.

With regard to power supply, the overhead system was installed in 1956. Up to 12 km of this section of track does not have a second overhead wire. Out of 3,000 overhead line supports, 2,250 (75%) are defective and 450 (15%) are highly defective.

The porcelain insulators in suspension points, along with the section insulators and the overhead network disconnecting switches, need to be replaced. Out of five minimally necessary railway substations (six overall), all of them need capital repairs. There are no automatic lock-out features and electric centralisation, wigwag crossing or tunnel signals.

Main types of work needed to fully restore the Abkhazian railway

The following work is needed to fully restore the Abkhazian railway infrastructure:

- capital repairs of the Sukhum-Ochamchira section and new construction of the upper track bed structure and crossings at the Ochamchira-Gal section;
- repairs of the Sukhum-Ochamchira section and new construction of the artificial structures and ballast bed at the Sukhum-Ochamchira-Gal section;
- restoration (construction) of the overhead system at the Sukhum-Ochamchira-Gal section;
- restoration of five traction substations and construction of four traction substations;
- restoration of centralisation and blocking devices and of communications equipment for the entire section;
- restoration of paramilitary security service facilities for the entire section;
- restoration and construction of station buildings and structures for the entire section;
- design and exploration work.

The total expenditure for restoring the railway line infrastructure from the Psou River bridge to the Inguri River bridge (according to official Abkhazian railway estimates) would be approximately RUB11–12 billion (US$350–400 million).

Georgian assessment

Railway experts believe that the estimated cost of restoring the railway at the Ingiri (Zugdidi)-Sukhumi section would amount to US$73 million (for 86 km). The corresponding calculations are provided in Table 4 below. Detailed calculations are given in Annex 2.

Table 4: Estimated cost of restoring the Ingiri-Sukhumi railway section (2011 prices)

Estimated cost of restoring the railway at the following sections:	
Ochamchire-Inguri	GEL81.1 million (US$49 million)
Sukhumi-Ochamchire	GEL25.5 million (US$15.5 million)

Estimated cost of associated work:	
Adaptation to electric traction	GEL9.2 million (US$5.6 million)
Signalisation and communications	GEL3.2 million (US$2 million)
Buildings	GEL1.4 million (US$0.8 million)

Note: figures are based on expert estimate of railway employees

Table 5: Assessment of the cost to restore the Psou-Inguri railway section and for freight traffic at calculated estimates

Section	Distance (km)	Category of restoration work	Restoration expenditure (US$ million)
Psou-Sukhumi	102	3	1 x 102 = US$102 million
Sukhumi -Ochamchire	54	4	1.5 x 54 = US$81 million
Ochamchire-Inguri	34	5	2 x 34 = US$68 million
Psou-Inguri	190	3, 4, 5	US$251 million

Table 6: Comparison of cost estimates to restore the Psou-Inguri railway section

Section of track	(km)	Cost estimate for restoring freight traffic, Abkhazian experts	Cost estimate for restoring freight traffic, Georgian experts	Cost estimate for restoring freight traffic, our estimate
Psou-Sukhumi	102		0[6]	US$102 million
Sukhumi-Ochamchire	54		US$18.7 million	US$81 million
Ochamchire-Inguri	34		US$54.2 million	US$68 million
Psou-Inguri	190	US$350–400	US$73 million[7]	US$251 million

Inguri-Ingiri track section

The share of investments needed to restore the railway track from Inguri to Ingiri[8] makes up an insignificant portion of the total investment required for restoring freight railway traffic from Psou and further on. The main part requiring restoration (80 km) is on the Abkhazian section, while the Georgian side requires the restoration of only a 6 km segment of the track. The Inguri-Ingiri section of the track has not been in operation since 1992–1993; since this time, the railway bed has been partially preserved, while separate sections have been taken apart, fallen into decay or been destroyed (see Photographs 6–7).

Photograph 6: Inguri River-Ingiri section (February 2013)

Photograph 7: Inguri River-Ingiri section (February 2013)

6 It is believed that Russia has completely repaired the track from Psou to Sukhum/i.
7 The figure does not include the cost of work on the Psou-Sukhum/i section.
8 The track further on is in working order.

Restoring the railway section in Georgia from Inguri station (6 km) will cost US$9 million (1 km – US$1.5 million). The Inguri River bridge will also need to be reconstructed, which according to the expert estimates of Georgian railway employees will cost roughly US$17.5 million. Therefore, the total cost of restorations is estimated at US$26.5 million (US$17.5 million + US$9 million).

Table 7: Estimated cost of restoring the railway on the Georgian side of the Inguri River[9]

Name of damaged facilities	Approximate restoration cost
Railway bridge at Inguri River (2.187 km)	GEL15.26 million (US$9.1 million)
Railway bridge at Rukhistskali	GEL11.5 million (US$6.9 million)
Composite bridge at the canal end of the Inguri River	GEL2.4 million (US$1.5 million)
Total	GEL29.16 million (US$17.5 million)

According to our estimates therefore, the total cost of restoring the Psou-Sukhumi-Tbilisi track is approximately US$277.5 million (US$251 million for the Psou-Inguri segment plus US$26.5 million for the Inguri-Ingiri part).

1.2 Assessing the pay-back period of the Sochi-Sukhum/i-Tbilisi-Yerevan railway

Psou-Ingur/i track section

In accordance with the train traffic schedule of the Abkhazian Trans-Caucasian Railway at the beginning of 1992, 17 pairs of freight trains and 16 pairs of passenger trains passed through the section each day during this period (peak freight traffic before 1988 was 24 pairs of freight trains). The annual freight turnover in 1991–1992 was around 10 million tons.

The tariff for transporting one freight wagon, approved by Resolution of the Cabinet of Ministers of the Republic of Abkhazia, was initially used as the basis for calculating the economic performance and revenue of Abkhazian railways. This tariff was set at US$70 for the Skurcha (Ochamchira district)–Sukhum section. Such low tariffs, however, make the railway unprofitable.

Therefore, when calculating the economic performance of the Abkhazian railway, the tariffs for railway traffic applied in neighbouring regions were used as the basis (as a guide). This tariff was roughly US$1 per kilometre for the transfer of one 40- or 20-foot container weighing 20 tons.[10]

9 According to Georgian expert estimates.

10 Forty-foot containers can transport up to 26 tons of freight; however, as a rule, both 20-foot and 40-foot containers transport 20 tons (http://www.konteynerline.ru/index.php/40-futovyj-kontejner.html).

Table 8: Profitability assessment of the Psou-Ingur/i railway at an estimated restoration cost of US$400 million

Volume of freight traffic (millions of tons)	Quantity (number of containers)	Transit revenue[11] (US$ million)	Rate of profit (%)	Balance-sheet profit[12] (US$ million)	Net profit[13] (US$ million)	Project profitability[14] (%)	Pay-back period (number of years)[15]
1.0	50,000	9.5	–	–	–	–	–
3.0	150,000	28.5	6	1.7	1.4	0.4	250
5.0	250,000	47.5	9	4.3	3.5	0.9	111
8.0	400,000	76.0	10	7.6	6.2	1.6	63
10.0	500,000	95.0	20	19.0	15.6	3.9	26

Table 9: Profitability assessment of the Psou-Ingur/i railway at an estimated restoration cost of US$251 million

Volume of freight traffic (millions of tons)	Quantity (number of containers)	Transit revenue (US$ million)	Rate of profit (%)	Balance-sheet profit (US$ million)	Net profit (US$ million)	Project profitability (%)	Pay-back period (number of years)
1.0	50,000	9.5	–	–	–	–	–
3.0	150,000	28.5	6	1.7	1.4	0.5	200
5.0	250,000	47.5	9	4.3	3.5	1.4	71
8.0	400,000	76.0	10	7.6	6.2	2.5	40
10.0	500,000	95.0	20	19.0	15.6	6.2	16

Ingur/i-Ingiri section

Table 10: Profitability assessment of the Ingur/i-Ingiri railway at an estimated restoration cost of US$26.5 million[16]

Volume of freight (millions of tons)	Quantity (number of containers)	Revenue of Georgian railways (US$ million)	Net profit of Georgian railways (US$ million)	Rate of profit (%)	Profit (%)	Pay-back period (number of years)
1.0	50,000	13.4	3.3	25	10	8.0
3.0	150,000	40.2	9.9	25	31	2.7
5.0	250,000	67.0	16.5	25	52	1.6
8.0	400,000	107.2	26.4	25	83	1.0
10.0	500,000	134.0	33.0	25	104	0.8

11 Calculated as the tariff cost on Abkhazian railways of a container (US$1) multiplied by distance multiplied by the quantity of containers (US$1 x 190 km = US$190 x 50,000 = US$9.5 million).

12 Balance-sheet profit = revenue multiplied by the rate of profit.

13 Net profit = balance-sheet profit minus taxes.

14 Profitability = net profit divided by the volume of investment.

15 Pay-back period = 100% divided by profitability (%).

16 US$17.5 million for restoring bridges and US$9 million for restoring the railway infrastructure.

1.3 Freight traffic forecast for the Sochi-Sukhum/i-Tbilisi-Yerevan railway

Abkhazia

As the Abkhaz economy is geared towards Russia and consists mainly of the export of services (tourism) to Russia and the import of goods and raw materials from Russia, freight traffic is not a key factor. Road freight traffic and maritime relations with Turkey fully cover freight transport. Abkhazia does not have its own freight necessitating railway transport.

As there is no developed manufacturing of goods in Abkhazia, it would not be able to ensure the efficient and profitable operation of the Abkhazian railway. Therefore, restoring the railways could be viewed only in terms of transit traffic, which would allow the Abkhazian railway to obtain a profit.

Georgia

Georgia has significant volumes and types of freight that could be transported by railway, as shown in Table 11 below.

Table 11: Trade of Georgian goods that could be transported by railway to Russia

	Export (US$ million)					Import (US$ million)				
Year	Wine	Mineral water	Ferrous-based alloys	Ferrous metals	Total exports	Wheat	Cement	Oil and oil products	Bitumen and accompanying products	Total imports
2004	48	140	42	95	646	75	59	186	49	1,844
2005	81	204	80	84	865	45	126	336	116	2,487
2006	41	230	89	72	936	99	167	443	213	3,674
2007	29	293	159	96	1,232	139	309	556	277	5,212
2008	36	79	267	128	1,495	108	574	762	292	6,301
2009	31	106	130	63	1,133	105	267	555	328	4,500
2010	41	146	263	109	1,677	174	221	697	512	5,257
2011	54	150	254	116	2,189	184	242	910	333	7,057
2012	64	208	260	43	2,377	239	406	951	476	7,842

Source: National Statistics Office of Georgia (www.geostat.ge)

Types and volumes of freight that could be transported from Georgia to Russia by railway include the following:

- wine – 10 million bottles of Georgian wine will initially be exported to Russia (13,000 tons), with a possible quota increase up to 50 million bottles (65,000 tons);
- mineral water – 50 million to 150 million litres are exported to Russia (55,000–165,000 tons);[17]
- vegetables and fruit (including greens) – an additional 200,000 to 300,000 tons;
- fossil fuels – up to 500,000 tons;
- other goods – up to 100,000 tons.

The railway capacity level can be calculated on the basis of the different types of freight. For example:

- 1 wagon = 60 tons of freight maximum;
- 1 bottle of wine = 450 grams (container) + 750 ml (wine) = 1.2 kg;
- 1 wagon = 40,000 bottles of wine (48 tons + 3 tons of packaging);
- 325 wagons, or 7–8 rolling stocks, would be needed to transport 10 million bottles of wine a year – this would load the railway for one day;
- 50 million bottles of wine could be loaded into 1,625 wagons, or 36 rolling stocks – the railway would operate for five days.

Other types of goods include:

- mineral water – the railway would operate for one to two weeks when exporting 50 million to 150 million litres (55,000–165,000 tons);
- vegetables and fruit – exporting a volume of 200,000 to 300,000 tons of vegetables and fruit would require two to five weeks of railway operations.

In terms of reverse freight traffic, i.e. from Russia to Georgia, an analysis of the Georgian product balance (see Annex 4), and of the potential goods import from Russia by railway through Sukhumi, has shown that they can potentially transport the following types of freight (annual volume):

- oil and oil products, as well as liquefied natural gas (200,000–300,000 tons);
- bitumen and accompanying products (100,000–150,000 tons);
- meat and dairy products (100,000 tons);
- wheat (up to 700,000 tons);
- other types of freight (an estimated one million tons).

Other countries

Experts believe that the Armenian economy can import and export to Russia goods weighing up to one million tons a year.

In addition, Iran, by redirecting its current freights (truck traffic) to this railway line (which would be more economically efficient), would be able to add an extra 500,000 tons of freight.

It is possible that this railway could also be of interest to Turkey. The railway could take on 4,000–5,000 trailers a year in transit through Georgia (80,000–100,000 tons).

17 In 2013, 3,461,044 litres were supplied to Russia by Georgia. In May–June 2013, 4,834,514 litres of mineral water were supplied (I. Gorbenadze, 'Accustomed to living without Russia', Rosbalt, 3rd September 2013, available in Russian at www.rosbalt.ru/exussr/2013/09/03/1171615.html).

Part of the maritime freight traffic from Turkey to Russia could also be redirected to railways, especially from the northeast regions such as Trabzon. Our forecasts show that, after commissioning the Kars-Akhalkalaki-Tbilisi-Baku portion of freight from Turkey, the freight destined for European Russia could be transported to Tbilisi by railway through Abkhazia. Given the volume of such freight, including permanent freight, the growth in the commodities turnover between Russia and Turkey could initially be one million tons.

In total, the freight traffic from Georgia and through Georgia to Russia would be, at most, four million tons and, at least, two million tons a year. Even though these volumes would be sufficient to give a return on Georgia's expenditure on restoring the Inguri-Ingiri section, the promise of making an initial profit in 100 years' time has failed to entice investors to restore the Abkhaz section of the track. Moreover, a rapid pay-back period for the Georgian section would no longer be feasible if traffic through Abkhazia could not be restored.

Under the most optimistic freight scenario, it does not seem feasible to ensure more than four million tons a year. This means that the profitability threshold of 10 million tons a year remains unattainable. Given that none of the interested or third parties has so far expressed the desire to invest in this high-cost project and in light of the prospects of a problematic pay-back period, the very idea of restoring the railway is likely to remain an illusion.

2. ANALYSING THE INDIRECT ECONOMIC AND SOCIAL EFFECTS POTENTIALLY ARISING FROM OPENING THE RAILWAY

2.1 Georgia

Export structure

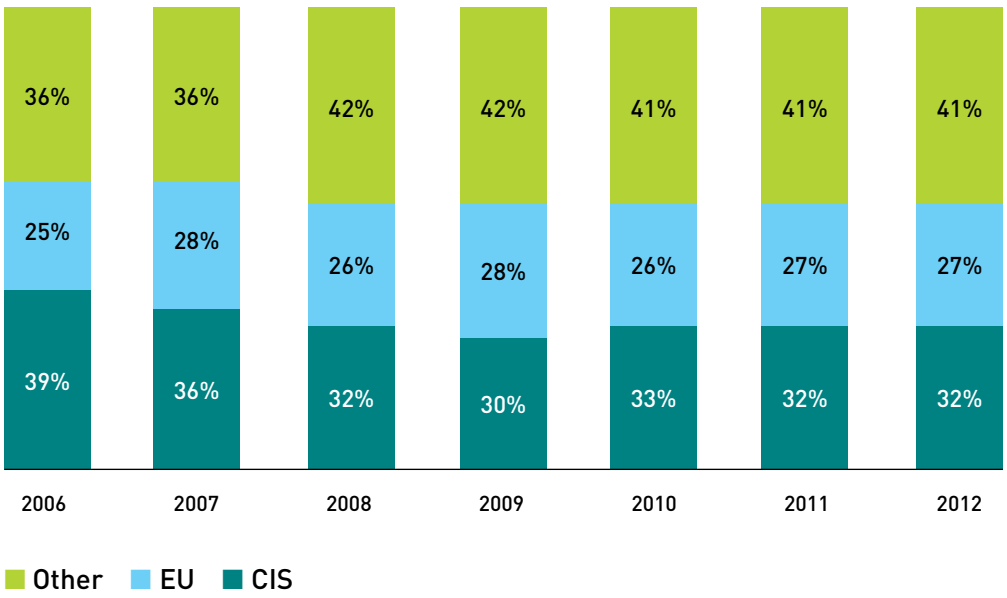
To assess the potential sectors of the Georgian economy that will either directly or indirectly supply and/or obtain freight from the Sochi-Sukhum/i-Tbilisi-Yerevan railway, we analyse first the main economic indicators of the country, based on the real capabilities and needs of the Georgian economy.

The National Statistics Office of Georgia (GeoStat) reports that in 2012 Georgian imports grew by 11%, while exports increased by 9% compared with the past year. Moreover, the commodities turnover with 148 countries totalled US$10.2 billion.

The main portion of Georgian trade takes place with countries of the Commonwealth of Independent States (CIS) and the EU (see Figure 5). However, Georgia's chief trading partner is Turkey, which makes up 15% of Georgian exports and imports. This is followed by Azerbaijan (12.3%) and Ukraine (7.5%). These three countries make up a third of the country's entire turnover.

Just 10 to 15 years ago, Russia was the main, if not only, large trading partner of Georgia. However, over the past decade Russia has forfeited its position to a large degree because of a fall in demand for Russian oil and gas, on the one hand, and due to a drop in Georgian exports (wine, mineral water, ferrous alloys and agricultural products) to Russia, on the other hand. Georgia has found new markets to export its few products to and for imports.

Figure 5: Regional Georgian trade, 2006–2012 (%)



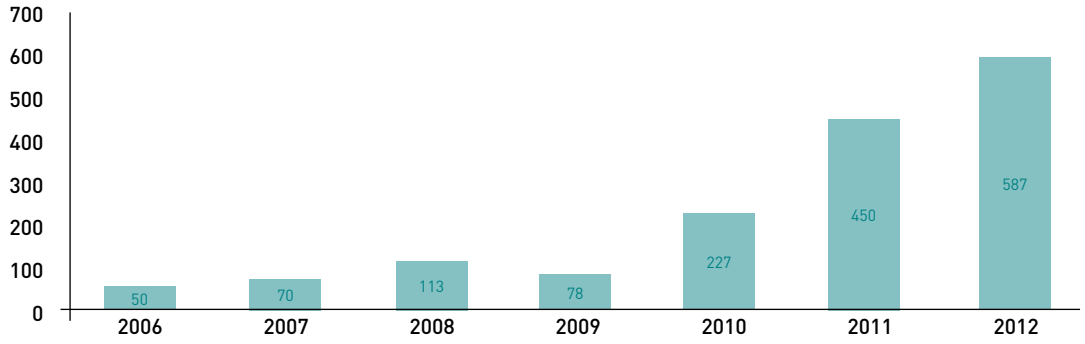
Source: Ministry of Economy and Sustainable Development of Georgia (www.economy.ge)

The trade structure between Georgia and its main partners is as follows:

- Turkey – exports totalling US$143 million (including ferrous metals (17%), ferrous alloys (13%), knitted goods (9%)) and imports totalling US$1,393 million (including ferrous-metal structures (3.1%), insulated wires and cables (2.7%) and pharmaceuticals (2.4%));
- Azerbaijan – exports totalling US$627 million (including automobiles (55.1%), live bovine cattle (6.2%), carbon steel pivots (5.6%)) and imports totalling US$633 million (including oil and oil products (53%), oil gases (30%) and pharmaceuticals (1.1%));
- Ukraine – exports totalling US$167 million (including spirits (21.5%), mineral water (17%), wine (16.2%), ferrous alloys (15%)) and imports totalling US$597 million (including cigarettes (12%), sunflower oil (5%), fixtures (6.2%) and coal coke (6%)).

In terms of Georgian export products, light-duty automobiles (24.7% or US$587 million) are the leader (see Figures 6 and 8). However, since all these automobiles are not Georgian produced, they are considered to be re-exports. Moreover, the export or re-export of light-duty automobiles to Russia does not make business sense because of the extremely high customs duties. In addition, it is not necessary to transport automobiles for sale by railway, since the automobile itself is a means of transport. Therefore, this product is viewed in terms of the prospects for loading the railways connecting Russia with Georgia and Armenia.

Figure 6: Export of light-duty automobiles from Georgia, 2006–2012, US$ million



Source: GeoStat (www.geostat.ge)

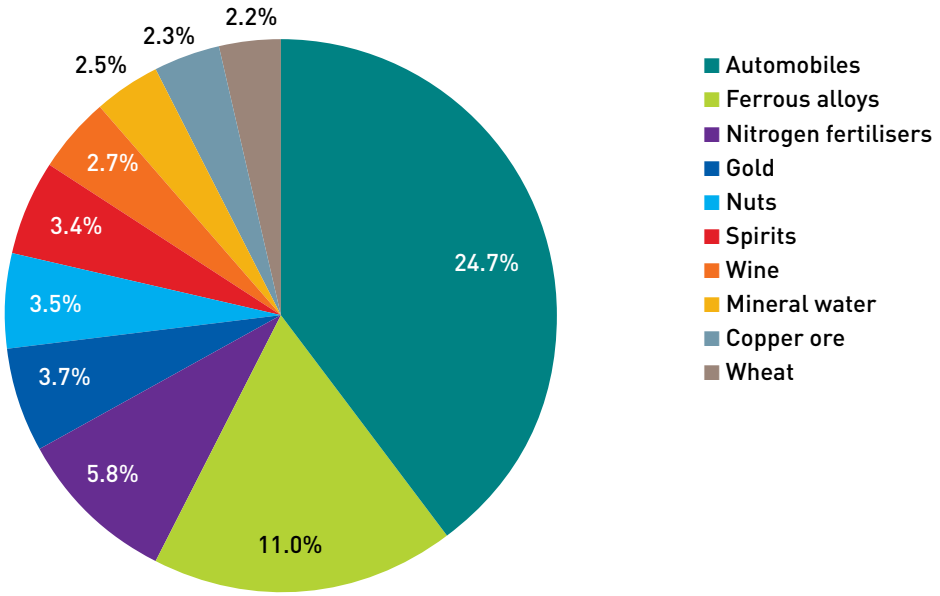
The current export leader in Georgian-made goods is ferrous alloys (11%), whose export grew from US$254 million in 2011 to US$260 million in 2012 (see Figure 9). This is an interesting product for this research, thus a separate case study was compiled for ferrous alloys (see below).

Figure 7: Export of nitrogen fertilisers

Source: GeoStat (www.geostat.ge)

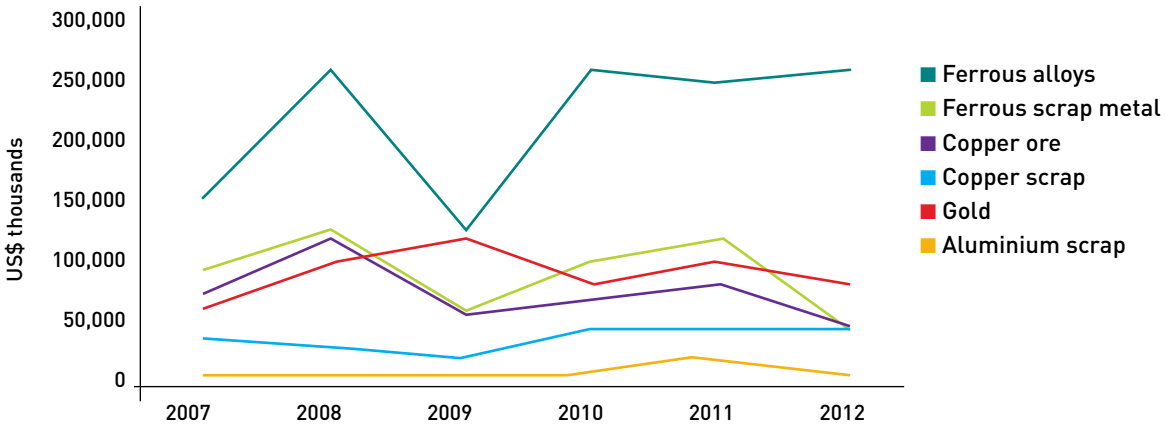
Georgia's third most important export product is nitrogen fertilisers (5.8% of total exports) (see Figure 8). Export opportunities for nitrogen fertilisers stemming from the opening of railway traffic with Russia are examined separately.

Figure 8: Georgia's 10 chief export products for 2012



The export of ferrous and non-ferrous metals and fossil fuels is insignificant (see Figure 9). For example, the export of gold is approximately US$100 million, but the high price and low volume means that gold does not require cheap transport such as railway transport in order to be competitive on the global market. Compared with the previous year, the export of ferrous metal has decreased significantly (by 62% to US$44 million in 2012), and in the future it is expected to decrease further. Therefore, there is no point in examining this product in connection with railway transport, especially since this business already has its own sales market in Turkey. Other remaining products combined bring in a little less than US$200 million a year in revenue, but, just as with gold, they are relatively light and therefore there is no point in examining them as a possibility for railway transport.

Figure 9: Ferrous alloy and scrap export performance, 2007–2012



Source: Ministry of Economy and Sustainable Development of Georgia (www.economy.ge)

Georgian-Russian trade relations

It is logical to assume that trade with Russia is the most relevant aspect for the opening of railway traffic. To investigate this assumption, an analysis was conducted on trade relations between Georgia and Russia over the past 20 years. Despite slow, unstable and unbalanced growth in the Georgian economy over the past two decades, progress is still evident. Over the past decade, Georgian exports have increased five-fold (from 2003 to 2012), while imports have increased nearly seven-fold (see Table 12). Moreover, the only drop in growth was in 2009, the year after the Russian-Georgian War.

Table 12: Georgian exports and imports, 2003–2007, US$ million

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports (US$ million)	461	646	865	936	1,232	1,495	1,133	1,677	2,189	2,377
Imports (US$ million)	1,139	1,844	2,487	3,674	5,212	6,301	4,500	5,257	7,057	7,842
Total (US$ million)	**1,600**	**2,490**	**3,352**	**4,610**	**6,444**	**7,796**	**5,633**	**6,934**	**9,246**	**10,219**

Source: GeoStat (www.geostat.ge)

It should be noted that, even after Russia imposed an embargo on Georgian goods, Georgian exports (as well as imports) still increased. It is to be expected that goods meant primarily for the Russian market (wine and Borjomi mineral water) incurred serious losses and have not been able to return to 2006 level. Should the Russian market open up, these products would have serious potential to regain the positions lost, especially given the opportunity to reduce transport expenses by restoring traffic on the Abkhazian railway.

Russian-Georgian trade relations are a complex phenomenon. Experts believe that, in Soviet times, 60% of all commodities and goods that went to Georgia were produced in Russia and other Soviet republics. This percentage can be further broken down as follows:

- 85% of fuel and energy resources (including 57% from Russia);
- more than 80% of wood;
- 50% of cement;
- 75% of grain;
- 60% of dairy products;
- 30% of meat;
- 95% of materials and assembly parts for the Kutaisi Automobile Factory;
- 90% of raw materials for all light industry in Georgia.

On the other hand, Georgia made a significant contribution to the Soviet economy through a number of industries, including the following:

- 22% of all black-iron ore;
- 30% of carbon ferrous black-iron alloys;
- 7% of metal-cutting machine tools;
- 8% of silk cloth;
- mainline electric locomotives, trucks, agricultural tractors, tools, automation equipment and steel pipes (produced for the entire Soviet Union);
- 20% of grapes;
- 25% of grape wine and cognac;
- 30% of mineral water;
- 97% of citrus fruit (for the entire Soviet Union);
- 92% of tea leaves.[18]

18 V.S. Advadze (2011). 'Georgia: Is there a future?', available in Russian at http://ni-journal.ru/archive/2f64ca2c/n2_2011/eb84fae7/1c280fbd/.

After the fall of the Soviet Union, Georgia's commodity turnover with other former republics, and first and foremost with Russia, fell to under 30% in the 1990s, and then to 15% in the 21st century.

In absolute numbers, Georgian exports to Russia over the past five years did not exceed US$50 million (no greater than 2%) (see Table 13). Moreover, even though imports from Russia grew from 2009 in terms of Georgia's overall imports, this proportion was still just a little over 5%.

Table 13: Georgian exports and imports to Russia, 2003–2012, US$ million

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports (US$ million)	83.8	104.5	153.7	75.3	45.3	29.7	21.1	34.7	36.6	45.8
Imports (US$ million)	157.8	254.4	381.5	555.3	573.8	423.3	291.6	290.5	389.7	473.7
Total (US$million)	**241.6**	**358.9**	**540.2**	**630.6**	**619.1**	**453.0**	**312.7**	**325.2**	**426.3**	**529.5**

Source: GeoStat (www.geostat.ge)

Georgia's commodities turnover with Russia dropped in particular after 2008 to 5%–7% for imports and to 2% for exports (see Table 14). This meant that Russia shifted from first (until 2006) to sixth place among Georgia's top 10 importer countries and dropped out of Georgia's top 10 exporter countries.

Table 14: Russia's percentage share of Georgian exports and imports, 2003–2012

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports to Russia (%)	18.17	16.15	17.76	8.04	3.68	1.99	1.86	2.07	1.67	1.93
Imports from Russia (%)	13.85	13.79	15.34	15.11	11.01	6.72	6.48	5.53	5.52	6.04
Total (US$million)	**15.10**	**14.41**	**16.11**	**13.68**	**9.61**	**5.81**	**5.55**	**4.69**	**4.61**	**5.18**

Source: GeoStat (www.geostat.ge)

The majority of this freight to and from Russia was transported by railway, partially through Abkhazia and mainly through the Azeri section of the Trans-Caucasus railway.

With a current commodities turnover between Russia and Georgia of little more than US$500 million (data from 2012), there is no prospect of loading the Abkhazian railway with the necessary freight traffic of 10 million tons a year to make it profitable. Additional opportunities can follow though when including Armenia and Iran.

Case studies

Rustavi Azot (RA)

Rustavi Azot (RA) is one of the largest industrial plants in Georgia, with 50 years of experience in the chemical industry. It is the only producer of nitrogen fertilisers in the South Caucasus.

The decision to build the RA plant was taken back in 1947. It was commissioned in 1955 and since then has become known for its continuous growth in capacity. Rustavi chemists completed the plant's full transfer to natural gas in 1960. A facility was engaged a year later to produce weak nitrogen acid and production of organic products began to grow. Two technological lines of large ammonia synthesis units were commissioned in 1979–1981 and large production capacities of weak nitrogen acid came on line. Large-capacity production of electrolytic manganese dioxide was commissioned in 1980 and provided basic industry with high-quality raw materials. February

1991 was a particularly significant date for the plant, with the assimilation and production of cosmetics, pencils and lipstick.[19] The main RA goods are actively transported by railway (see Photographs 8–10).[20]

Photograph 8: Transport of Rustavi Azot goods by railway (a)[20]

Source: http://azot.ge/gallery/id/21

Photograph 9: Transport of Rustavi Azot goods by railway (b)

Source: http://www.azot.ge/gallery/id/6

Photograph 10: Transport of Rustavi Azot goods by railway (c)

Source: http://www.azot.ge/gallery/id/6

19 Rustavi Azot, 16th August 2013, www.azot.ge.

20 Photographs 8–10 were provided by Rustavi Azot, www.azot.ge.

Rustavi Azot supplies both the local and international market with its products (see Tables 15–16).

Table 15: Rustavi Azot's production structure

Type of product	Volume (tons per year)
Ammonia	400,000
Nitrogen acid (AK-72)	372,000
Ammonia nitre	450,000
Sulphate ammonia	140,000
Sodium cyanide	8,000
Anon	75,000
Oxygen	78,000 m^3
Dry ice	3,000
Carbon dioxide	12,000

Source: Rustavi Azot (http://www.azot.ge)

Table 16: Export of mineral and chemical fertilisers from Rustavi Azot plant

	2011		2012	
Countries	**US$ thousand**	**Tons**	**US$ thousand**	**Tons**
USA	38,805	124,598	83,982	268,779
Bulgaria	15,793	46,661	18,425	55,945
France	15,780	50,768	10,522	30,802
Armenia	5,477	17,103	3,773	13,333
Mozambique	–	–	3,498	11,000
Other countries	68,236	214,433	17,022	53,153
Total exports	144,091	453,564	137,221	430,011

Source: Rustavi Azot (http://www.azot.ge)

The RA plant has more than 2,000 workers with an average monthly salary of GEL600 (US$363). Production capacities at full load are estimated to provide each year 450,000 tons of mineral fertilisers, 400,000 tons of ammonia, 8,000 tons of sodium cyanide and other products (see Table 15). Only mineral fertilisers, however, provide high levels of revenue, while the other products either export in small quantities (in 2012: ammonia US$505,000 and nitrogen acid US$10,000),[21] or go towards satisfying local demand.

It should be noted that the demand for mineral fertilisers is growing steadily across the world. This demand in 2010–2011 grew by 2.6% compared with 2009–2010, totalling 104 million tons.

Based on interviews with representatives of RA, an analysis of the plant's indicators and a study of the Russian market of mineral fertilisers, it was concluded that opening the Russian market with a restored railway through Abkhazia would not stimulate an increase in production for the following reasons:

- RA is already operating at high turnovers, virtually at full capacity, and a future increase in production will be tied to huge investments that the plant is still not ready for.

21 GeoStat figures (www.geostat.ge).

- The business of mineral fertilisers in Russia is one of the chief sectors in the Russian chemical industry, with an annual turnover of more than US$10 billion (production volume of 18.79 million tons of fertilisers (2011)).[22]
- Russia has industry giants such as EuroKhim, a producer of mineral fertilisers that is one of the top three European and top 10 world leaders in the industry.[23]
- Russian plants are all over the country – this does not leave a chance for RA, even given the savings on transport through Abkhazia, to conquer even the closest geographical Russian regions, not to mention the most distant ones.

Therefore, one of the largest Georgian commodity exports – nitrogen mineral fertilisers – would not have any new prospects with the restoration of railway traffic through Abkhazia.

The following are profiles of other prominent industries in Georgia and their relationship with the Russian market.

Hipp-Georgia (children's nutrition)

- **Transport type:** railway and trailers across Georgia, then by sea
- **Production type:** children's nutrition, fruit concentrates
- **Destination countries:** European countries
- **Transport expenditure:** 10% of the end cost
- **Seasonal workers (summer, autumn):** 200 people
- **Non-seasonal workers (winter, spring):** 100 people
- **Average monthly salary:** GEL550 (US$333)
- **Production volume:** 20,000 tons a year
- **Largest possible load:** 20,000 tons a year
- **Of them fruit concentrates:** 2,500 tons a year
- **Demand for entering the Russian market:** none

The reasons why the Russian market is not of interest to Hipp-Georgia are as follows:

- 95% of its products are exported and it already has stable sales markets;
- there are no additional resources (Georgian fruits) to increase production;
- production capacities are already at a maximum.

Fruit concentrates (overview of production across Georgia)

- **Transport type:** railway and trailers across Georgia, then by sea
- **Product variety:** apple, citrus and grape concentrates
- **Destination countries:** Germany and other European countries
- **Transport expenditure:** 10%–15% of the end cost
- **Seasonal workers (summer, autumn):** 100–150 people
- **Average monthly salary:** GEL600 (US$363)
- **Production volume:** 5,000 tons a year
- **Largest possible load:** 20,000 tons a year
- **Of them fruit concentrates:** 2,500 tons a year
- **Demand for entering the Russian market:** none

22 Source: ID-Marketing, http://www.id-marketing.ru/goods/rynok_mineralnyh_udobrenij_2011_avgust_2012_gg.htm.
23 Ibid.

The reasons for the lack of interest in exporting fruit concentrates to Russia are as follows:

- 90% of all products are exported and already have stable sales markets;
- there are no additional resources (Georgian fruits) to increase production;
- opening up the Russian market to Georgian fruits would decrease the access to fruit resources of Georgian companies manufacturing fruit concentrates.

Zestafoni Ferrous Alloy Plant

- **Type of transport: r**ailway and maritime
- **Type of goods:** silicon manganese
- **Share of ferrous alloy in country exports:** 11% of all Georgian exports (US$260 million)
- **Supplier:** Chiatursky Manganese ore mine
- **Sales countries:** USA, Canada, England, Japan and France
- **Transport expenditure:** 10%–20% of the end cost
- **Workers:** 1,500 people
- **Average monthly salary:** GEL600 (US$363)
- **Production volume:** 200,000 tons (2012)
- **Largest possible load:** 200,000 tons a year
- **Demand for entering the Russian market:** none

The lack of interest in exporting ferrous alloy to Russia stems from the following reasons:

- up to 100% of all products are exported and have stable sales markets;
- production is already operating at full capacity;
- it is not planned to further grow the plant to increase production – it is possible only to refurbish the plant to increase the quality of the production process.

Transporter trucks

- **Type of transport:** trailers
- **Route:** Georgia-Russia (European part) – Georgia
- **Types of products being transported:** wine, Borjomi mineral water, fruits, etc.
- **Automobile fleet and number of workers:** 300 automobiles and 1,000 workers in the sector
- **Average monthly salary:** US$1,000
- **Transport cost for business people:** wine (15,000 0.7 litre bottles, US$3,500–4,000), Borjomi mineral water (20,000 0.5 litre bottles, US$3,500–4,000), fruit (20 tons, US$4,000–5,500)
- **Transport cost for transporter (at a price of US$4,000 for one shipment):** Maximum amount of expenses = US$2,400
- **Budget revenue (income tax, profit tax and dividend tax):** US$800–900
- **Amount of transport (per year):** 3,000
- **Freight turnover from 3,000 automobiles:** 60,000 tons
- **Company and budget revenue (per year):** US$9 million + US$3 million = US$12 million
- **Transfer of freight to Abkhazian railway and revenue:** 45,000 tons, US$800,000
- **Demand on the Russian market:** none

Opening up railway traffic with Russia is currently not advantageous for the automobile freight transport sector for the following reasons:

- it would cause job losses in the automobile freight transport sector (300–400 jobs);
- it would decrease companies' annual revenue by approximately US$5 million and then lead to local companies being pushed out by foreign companies (Turkish, Azeri and Armenian);
- budget revenue shrinks by roughly US$2 million a year.

Judging from the many cases studied all across Georgia, it appears that opening up railway traffic with Russia may increase Georgian exports, but will also have a negative effect on the revenue of both automobile freight transporters and Georgian ports. The latter two industries are able to make much greater revenue and provide a much larger number of jobs than the section of railway being studied ever could if it were restored.

After operations began on the Kars-Akhalkalaki-Tbilisi-Baku railway, experts have been forecasting a drastic decrease in freight traffic to the Poti port. Therefore, a further reduction in freight stemming from a new railway could ratchet down even further the freight traffic and revenue of one of Georgia's largest taxpayers, leading also to the loss of hundreds if not thousands of jobs across the country.

2.2 Armenia

Simulated models were conducted on possibilities for a change in the economic and social situation in several sectors of the Armenian economy, as well as in the Lori district (a northern Armenian province), after the opening of direct railway traffic connecting Armenia and Russia. The models were run by assessing the changes in production and revenue volumes from a drop in transport and storage expenditures and the cost value of the end product.

Data from plant exporters and the Armenian Copper Program (ACP) Vallex Group were used. An assessment was made of the possible growth in production volumes at the plants in question should there be a change in the routes and cost value of transporting freight.

Identical production indicators in the republic – in particular from the Alaverdi and Kajaran copper and molybdenic factories as well as other export plants – were used as additional reference values to determine the potential for growth of the mining and production of blister copper, the prospects for new job creation, and the level of tax revenue for the state budget that could be generated at such volumes.

Indirect economic effects of opening railway traffic

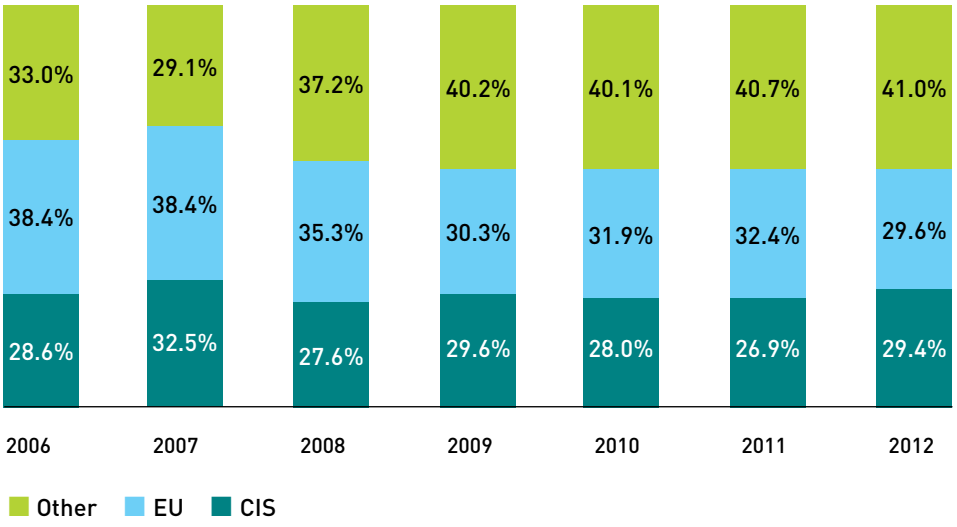
Reduced expenditure on transport

Several experts believe that opening railway traffic with Russia through Abkhazia would significantly reduce the cost value of transport. On average, this decrease would be in the region of 20%, possibly ranging between 15% and 25% depending on the distance from the destination point. Such a decrease would be possible mainly due to the fact that there would no longer be the need to ship by ferry. This would in turn exclude additional expenditure on switching owners and other expenditures tied to other transport enterprises having a stake in the freight transport process.

Moreover, opening the railway could significantly accelerate traffic (by 5 to 10 days) and make such traffic more profitable, since ferrying to the Kavkaz port takes place only when the entire ferry is loaded. This would lead to an extra decrease in the cost of imported and exported commodities by reducing the volume of working capital invested, because the capital turnover accelerates for the importer company.

However, assessing the macro-economic effect of the Russian market becoming more accessible to Armenian exporters needs to also take into account the relevant structure and geography of the country's commodities turnover (see Figure 10 and Table 17).

Figure 10: Structure of foreign trade turnover of the Republic of Armenia, 2006–2012 (%)



Source: Russian Ministry of Economic Development (http://www.ved.gov.ru/exportcountries/am/about_am/ved_am/)

The geography of Armenia's exports and imports gives a more detailed picture.

Table 17: Geographic structure of Armenia's commodities exports and imports, 2011–2012 (%)

Exports	2012	2011	Imports	2012	2011
Russia	19.6	16.7	Russia	24.8	21.5
Germany	10.7	11.8	China	9.4	9.8
Bulgaria	9.1	11.4	Germany	6.2	5.9
Belgium	8.9	5.3	Iran	5.2	5.2
Iran	6.8	8.0	Ukraine	5.1	5.6
USA	6.1	7.5	Turkey	5.0	5.8
Netherlands	5.6	8.8	USA	3.4	3.6
Canada	6.0	5.3	Italy	4.0	4.1
Georgia	5.7	4.6	Japan	2.3	1.7
Spain	2.1	6.7	Bulgaria	2.0	2.5
Kazakhstan	0.3	0.3	Kazakhstan	0.2	0.6
Belarus	0.5	0.5	Belarus	0.8	0.7
Other countries	37.3	34.4	Other countries	42.3	42.6
Countries of the CIS	23.5	20.1	Countries of the CIS	31.3	29.2
Countries of the EU	39.2	45.5	Countries of the EU	26.4	28.2
Total	**100.0**	**100.0**	**Total**	**100.0**	**100.0**

Source: National Statistics Service of the Republic of Armenia

Approximately 20% of all Armenian exports were sent to Russia in 2012, while exports to EU countries totalled roughly 40% of all exports (see Table 17). The high price of servicing freight at Russia's Kavkaz port compared with Bulgaria's Varna port is obviously one of the factors that increases the advantages of the European market compared with the Russian market for Armenian exporters. The export share to Russia could increase should the price of transporting freight to Russia drop by 20%.

Reducing transport expenditure and accelerating supplies could decrease consumer prices and expenditure on imported raw materials for producers.

It should be kept in mind, however, that an increase in exports is determined not only by transport expenditure, but also by a number of other factors. Each specific case requires taking into account factors such as the tariff policy of the importer countries, whether or not there are trade agreements, the structure of their market, whether Armenian export commodities are competitive with the same goods from other countries and with local production, the possibilities for increasing production capacities in Armenia and the investment prospects. The export growth prospects from Armenia to Russia with the opening of direct railway traffic need to be clearly assessed.

Assessment of the effects on the textile sector

The profit margin in the textile sector is generally low because of tough competition in the global market (e.g. China, India and Bangladesh). Local textile factory owners estimate that contractual production generates a profit of 5% to 10% for plants. Therefore, even an insignificant drop in prices for freight transport could have a significant effect on export volumes. The Armenian textile sector in recent years has begun to recover, mainly thanks to contractual production largely with transnational producers of clothing, although there is still a lot of potential that has not been engaged. The growth of this sector stemming from a decrease in transport expenditure owing to additional railway traffic would create many jobs, because this sector is labour intensive.

Assessment of the effects on the mining of construction materials

Armenia mines various types of rock, such as tuf, basalt, travertine, felsite and marble. Transport expenditure for travertine, for example, totals 45% to 55% of the final cost on the Russian market. The cost can be broken down as follows:

- The average Delivery at Point (DAP) price for Moscow is US$24 per square metre.
- The average travertine price after clearing customs is US$28 per square metre.
- A 20-ton, 20-foot container totals US$10,800 for 450 square metres.
- The aggregate price for transporting a 20-foot container totals US$5,000.

If the transport price drops by 20%, then the price after clearing customs will drop by US$2.5 per square metre and total US$25.5 per square metre. Therefore, the travertine price in Moscow will drop by roughly 10%.

This case shows that opening up direct railway traffic will have a positive effect on Armenian rock exports – although a rock export boom should not be expected, because the demand for construction rock is not very elastic, and a 10% reduction will not make a significant change to the breakdown of the Russian market. It is well known that the Russian market offers a large number of different rocks (natural and artificial) as well as alternative construction material.

Assessment of the effects on chief deposits of the ore mining industry

Armenia has a large number of ore deposits. Metals such as copper, molybdenum, gold and iron are important for growing the Armenian economy, including exports. The statistics of the Armenian customs service show that, in 2011, the share of all types of minerals and metals in total exports was 57.6% in monetary terms. Such deposits are mainly located in the Lori, Syunik and Kotayk districts. Copper and molybdenum, which make up a large share in the Armenian export structure, are mainly mined in Lori (Tekhut deposit) and Syunik (Kadjaran and Agarak).

The Lori and Kotayk deposits are dominant (on the map around Vanadzor and Razdan), because they are located close to the railway; the ore from the Tekhut deposit is transported by railway to Poti port.

Figure 11: South Caucasus railway traffic

Note: This map is a modified version of the original taken from Georgian Railway (www.railway.ge). The geographic names and borders are a contentious issue in the context of the South Caucasus. Therefore, this map is used only for links and does not reflect any political or other opinions on the conflicts.

Case study

Tekhut deposit (Lori district)

Change in transport and storage component of product cost – Tekhut quarry

The Tekhut quarry is currently operating at partial capacity, producing 1,100 tons of blister copper, all of which is exported to smelting plants in Belgium and Germany. Concentrate in 20-ton containers is sent by railway to Poti port, where after being loaded onto a railway ferry it is sent to Varna (Bulgaria) and then to the destination point.

Table 18: Indicators for the growth potential of the ASS plant Tekhut deposit

Indicator	Current value	Growth potential
Number of workers	180	1,200–1,300
Annual production volume	12,000 tons	95,000–100,000 tons
Chief export markets	Belgium, Germany	Russia, Belgium, Germany
Accompanying production	–	Sulphuric acid, mineral fertilisers
State budget tax revenue, excluding income tax	US$4.8 million	US$40–45 million

The main reason for the lack of Armenian producers on the Russian market is the high transport cost, which makes concentrate uncompetitive. Exports in this domain gave a clear picture of transport expenditure, spent primarily on port servicing, especially at the Kavkaz port, where US$3,800 is charged for transporting through and unloading one wagon. For the same operation, despite a greater transport distance, the Varna port charges US$3,000 per wagon. It is well known that Abkhazian railway traffic does not require ferry transport, which in turn excludes the additional expenditure on changing owners.

Photograph 11: Tekhut deposit (Lori district)

Source: www.reporter.am – provided by Babken Der-Grigoryan

Therefore, opening direct railway traffic with European Russia as an alternative to maritime traffic could make the Russian market more attractive for copper exporters.

Expected effects of additional production at the Tekhut deposit

Studies on the technology of mining and obtaining enriched concentrate (blister copper) show that 8,000–10,000 tons of concentrate yield approximately 1,000 tons of sulphuric acid, which is the raw material for producing urea – one of the key types of mineral fertilisers. Even without taking into account the production of all other quarries, the volumes of sulphuric acid yielded from Tekhut concentrate processing would be sufficient to produce and substitute the entire volume of such mineral fertilisers imported to Armenia today.

Such potential volumes of production would make it feasible to re-commission the chemical plant to produce mineral fertilisers. The production of nitrate would be one of the products that the plant would produce. Moreover, the reduction in the price for its own mineral fertilisers would have a positive effect on Armenia's agriculture sector.

Expected indirect economic effects of railway traffic

Railways in Armenia currently face serious competition from other transport market sectors. Users believe that the railways are losing because the railway routes rarely provide "door-to-door" links.

It should be noted that Armenia has elastic demand for transport services, and the smallest change in the cost of any given type of transport could cause the market to look towards other transport means. There are quite a number of examples of how the slightest increase in railway traffic prices has caused a switch to automobiles and vice versa.

In 2012 South Caucasus railways carried out 34% of all the country's freight traffic in monetary value. This suggests that a change in railway traffic prices, even in today's environment, could lead to a significant increase in demand for such means of transport.

Statistics for 2011 show that railway traffic's share within Armenia's overall foreign trade turnover was 28% in monetary value and 40% in freight value. Over the same period, the share of automobile freight traffic, as the chief competitor of railway freight traffic, was 49% and 25%, respectively.

In 2011 the export volume from Armenia was worth US$1.3 billion (730,000 tons), while the import volume totalled US$4.2 billion (3.7 million tons). Therefore, the aggregate volume of all freight was 4.43 million tons, of which approximately 1.8 million tons was railway traffic.

If direct railway traffic was opened, the opportunities for increasing export volumes and raising the country's competitiveness would open up as well. Exporters of construction materials and textiles and the mining industry would be large beneficiaries here. Moreover, prospects would open up for importers of raw materials. It should be noted, however, that, after the fall of the Soviet Union, the economy's structure went through significant changes, as a result of which there are not many such businesses left.

Expected direct social and economic effects of railway traffic

The benefits of railways to society are not necessarily seen in terms of a direct financial return. Generally, railways have a multifaceted effect: less crowded roads reduce the need for the construction of new roads; the level of road safety increases; automobiles have a lower impact on people's health and the environment. Railway construction supports the region's industrial development, which in turn ensures direct and indirect employment across trade enterprises and municipality administrations.

Compared with automobile and air transport, railway transport is capable of transporting large freight volumes. This is the reason why it requires fewer energy expenditures per unit of transported mass, especially for long distances, and also why it is safer and more environmentally friendly. Moreover, having a developed railway system helps to develop districts and reduce the imbalance between the capital city and the regions.

The number of tourists coming to Armenian resorts would also increase, because the cost of flights at the moment is expensive for many middle-class tourists. It should be noted, however, that passenger traffic alone cannot be considered a profitable area for railway companies, even though overall railways reduce transport expenditure for the public.

The relatively low cost of direct railway traffic in the country, although insignificant, would also cause prices for many goods to fall.

However, it should be pointed out that the direct and indirect economic and social effects of opening direct railway traffic would only be possible with significant state support to redirect companies to new markets or to expand production capacities. This support could come from a public-private partnership (PPP).

Overall, opening direct railway traffic could have a significant impact on the Armenian economy in the mid and long term, as it would depend on structural changes in several sectors of the economy.

CONCLUSION

The hypothetical re-opening of railway transport on the Sochi-Sukhum/i-Tbilisi-Yerevan route is economically irrational, and freight traffic would not ensure a return on investment because of the high cost of repair works on the Psou-Ingiri (Zugdidi) segment and the relatively small volume of potential cargo.

Bearing in mind that for Abkhazia transit earnings would be a remote prospect and that there is no economic justification for using this railway for export-import operations, the investment attractiveness of restoring the railroad segment from Psou to Ingur/i is virtually zero.

For Georgia's part, participation in repair works on the Ingur/i-Ingiri segment of the railway would not require considerable expenditure and even minimal freight traffic would give a return on investment. However, the project would not have an overall positive effect on the national economy and its socio-economic results are deemed to be negative; all these factors taken together make the investment prospect unattractive. Moreover, if through traffic via Abkhazia was not restored, the rapid pay-back of investments on the Georgian side would lose its significance.

For Armenia, a direct railway connection would have a significant economic effect in the medium to long term, as it would require structural changes in several sectors of the economy to generate an economic advantage. Railway transport would provide a particular incentive for the mining industry, as it would offer an alternative to expensive Russian and Georgian seaports.

Overall, therefore, there is no economic rationale for adding the issue of restoring the Sochi-Sukhum/i-Tbilisi-Yerevan railway to the negotiations agenda of conflicting Georgian-Abkhaz parties. Research has shown that neither the Georgian nor Abkhaz side would obtain an obvious economic advantage from restoring the route due to the high cost of repair works and modernisation, the small amount of cargo anticipated and the lack of positive economic spinoffs. The Armenian economy, on the other hand, could obtain a few important benefits and incentives – firstly, from reducing transport costs in its trade with Russia and providing direct access to the European part of Russia for its mining industry and construction materials. However, in the final analyses, the cost-effectiveness of a direct railway link with Russia for the Armenian economy depends on service costs in Russian and Georgian seaports, as well as in the Bulgarian seaport of Varna and the Iranian port Bandar-Abbas. The overall outcome of this project for Armenia also depends on the prospect of additional investments into restructuring several sectors of the economy to strengthen their presence on the Russian market.

ANNEXES

Annex 1: Information sources for Table 2

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

'Tuapse-Adler railway to have two-tracks by 2025', RIA Novosti, 31st January 2012, available in Russian at http://ug.ria.ru/economy/20120131/82229594.html

'Investment in the project "Strengthening the infrastructure of the Tuapse-Adler railway" on the Northern Caucasus trunk line over 11 months in 2012 totalled more than 390 million roubles', TREK SERVICE, 24th December 2012, available in Russian at http://www.track.ru/news/investicii-v-realizaciju-proekta-usileni/

'Investment in strengthening the Tuapse-Adler railway at the beginning of the year totalled more than 2.5 billion roubles', ITAR-TASS, 18th October 2011, available in Russian at http://www.itar-tasskuban.ru/news/article?type=economy&i=16799

'Tuapse-Adler railway spent 290 million roubles in year', Komsomolskaya Pravda, 25th December 2012, available in Russian at http://kuban.kp.ru/online/news/1328728/

'More than 46 million roubles spent on capital repairs of railway track from Tuapse to Adler since beginning of year', ITAR-TASS, 13th May 2011, available in Russian at http://www.itar-tasskuban.ru/news/article?type=sochi&i=10449

'Structure of North Caucasus railway branch of OJSC Russian Railways', Russian Railways website, available in Russian at http://rzd.ru/news/public/rzd?STRUCTURE_ID=5010&layer_id=5040&refererLayerId=5039&id=952

Annex 2: Georgian experts' assessment of expenditure for restoring the Sukhumi-Ochamchire track (2011)

1. Reinforced concrete bridge at Chasha River (2,142 km) with a distance of 1 x 11.2 = 11.2 lm.[24] The bridge was repeatedly blown up in warfare.
2. Reinforced concrete bridge at Tamishi River (2,142 km) with a distance of 4 x 11.2 = 44.8 lm. One edge column and three middle columns were damaged. All columns on the gratings and the inventory grid on them need to be replaced.
3. Reinforced concrete bridge at Kodori River (2,142 km) with a distance of 3 x 55.5 = 166.5 lm. The bridge was blown up and heavily damaged.
4. Railway bridge at Agudzera River (2,112 km) with a distance of 3 x 10.8 = 32.4 lm. The support portion of the edge structure's vertebra, and the edge and middle columns, were blown up and placed on for gratings.

24 Linear metre.

5. The approximate estimate for restoring the artificial structures on the Sukhumi-Ochamchire section are shown in Table A1 below.

Table A1: Georgian experts' estimate of the expenditure required for restoring bridges on the Sukhumi-Ochamchire track (2011)

No.	Name of damaged facilities	Condition in 2013	Approximate restoration cost
1	Reinforced concrete bridge at Chasha River (2,187 km) Distance 1 x 11.2 = 11.2 lm	Both columns were damaged and were put on gratings. The temporarily installed steel inventory grid needs to be replaced.	0.4
2	Reinforced concrete bridge at Tamishi River (2,142 km) Distance 4 x 11.2 = 44.8 lm	One edge column and three middle columns were damaged. All columns on the gratings and the inventory grid on them need to be replaced.	11.56
3	Railway bridge at Kodori River (2,142 km) Distance 3 x 55.5 = 166.5 lm	The bridge was heavily damaged. Full replacement is needed.	3.0
4	Railway bridge at Agudzera River (2,142 km) Distance 3 x 10.8 = 32.4 lm	The support portion of the edge structure's vertebra, and the edge and middle columns, were blown up and placed on for gratings.	2.16
	Total		**17.12**

- Roughly GEL81.1 billion (US$49.2 billion) is needed to restore the rails at the Ochamchire-Inguri section.
- The restoration of the rails at the Ochamchire-Sukhumi section will require roughly GEL25.5 million (US$15.4 million).
- The full restoration of the rails at the Inguri-Sukhumi section will require roughly GEL106.6 million (US$64.6 million).

The estimated cost of other work is as follows:

- Electrification – GEL8.4 million (US$5 million)
- Signalling and communications – GEL6.12 million (US$3.7 million)
- Constructions – GEL1.36 million (US$0.82 million)
- Total: GEL122.48 million (US$74.2 million)

Annex 3: Base tariff rates of Georgian Railway

Table A2: Base tariff rates of Georgian Railway (US$ excluding VAT)[25]

For one ton of freight												For one container unit		
	Weight category for loading wagons													
	10	15	20	25	30	35	40	45	50	55	60			
(km)	0–12 tons	13–16 tons	17–23 tons	24–26 tons	27–31 tons	32–36 tons	37–40 tons	41–46 tons	47–51 tons	52–55 tons	56 tons and more	Gross weight, 3–5 tons, 10 and 20 ft	30 and 40 ft	More than 40 ft
1	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
1–10	1.26	1.01	0.89	0.75	0.69	0.63	0.57	0.52	0.47	0.44	0.42	5.78	9.83	11.78
11–20	3.65	3.02	2.51	2.39	2.24	1.99	1.79	1.63	1.50	1.40	1.32	16.18	29.47	35.36
21–30	6.16	5.16	4.15	3.89	3.62	3.24	2.93	2.65	2.45	2.30	2.14	27.74	49.70	59.63
31–40	8.56	7.16	5.78	5.41	5.03	4.49	4.06	3.67	3.41	3.19	2.97	38.14	69.34	83.20
41–50	11.06	9.18	7.43	7.03	6.54	5.84	5.28	4.78	4.44	4.15	3.87	49.70	88.98	106.79
51–60	13.45	11.19	9.05	8.56	7.95	7.10	6.42	5.81	5.39	5.06	4.71	60.09	108.63	130.37
61–70	15.98	13.33	10.69	10.05	9.35	8.34	7.55	6.84	6.33	5.92	5.54	71.65	128.85	154.63
71–80	18.35	15.34	12.32	11.69	10.88	9.71	8.77	7.95	7.37	6.90	6.44	82.63	148.51	178.20
81–90	20.87	17.35	13.96	13.20	12.27	10.96	9.90	8.98	8.30	7.79	7.26	93.61	168.72	202.47
91–100	23.26	19.37	15.59	14.71	13.69	12.22	11.03	10.00	9.27	8.68	8.09	104.59	187.80	225.35
101–200	43.14	35.96	28.80	27.28	25.38	22.65	20.47	18.55	17.19	16.10	15.02	214.37	385.99[25]	463.19
201–300	63.75	53.06	42.50	40.36	37.53	33.50	30.26	27.45	25.42	23.80	22.20	324.16	584.19	701.02

Source: Georgian Railway

Annex 4: Georgian product balance

Table A3: Wheat balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	80	54	48	97
Imports	613	624	797	677
Exports	14	16	36	20

Table A4: Corn balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	328	291	141	270
Imports	16	32	16	25
Exports	7	5	10	2

25 The transport of a 30- or 40-foot container at a distance of up to 200 km costs US$385.99.

Table A5: Potato balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	193	217	229	274
Imports	32	18	2	51
Exports	–	1	8	1

Table A6: Vegetable balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	165	170	176	186
Imports	58	59	67	76
Exports	5	5	6	7

Table A7: Meat balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	57.3	54.3	56.4	49.3
Imports	62.1	61.9	61.9	71.3
Exports	0.8	0.2	0.7	1.2

Table A8: Milk balance (thousand tons)

Indicators	2008	2009	2010	2011
Local production	695	551	588	582
Imports	51	50	48	43
Exports	2	1	6	2

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