



NATIONAL INVESTMENTS AUTHORITY
UNDER THE PRESIDENT
OF THE KYRGYZ REPUBLIC



Organization for Security and
Co-operation in Europe
Programme Office in Bishkek

ELECTRIFICATION OF THE LUGOVAYA-BALYKCHY RAILWAY SECTION

SE NC “KYRGYZ TEMIR JOLU”



KYRGYZSTAN



Name of the company:

SE NC “Kyrgyz Temir Jolu”

Brief description of the Project:

The project involves the electrification of the Lugovaya-Balykchy railway section. With the conversion to electric traction of the Lugovaya-Balykchy section, the fleet of diesel locomotives in freight, passenger and suburban traffic will be replaced by electric locomotives. The Lugovaya-Balykchy railway section is the main transport artery linking Kyrgyzstan with Kazakhstan and other countries. The section has one track, with a 321.5 km usable length, of which 60.3 km are in Kazakhstan and 261.2 km in Kyrgyzstan. The 60.3 km section located in Kazakhstan belongs to Kyrgyzstan. Electric traction will make it possible to improve travel speeds, increase line capacity and working conditions and eliminate diesel engines’ harmful emissions into the atmosphere.

Electrification of the Lugovaya-Balykchy section will open access to other electrified railway sections in directions of almost all Kazakhstan, with about 5,000 km of the 16,000 km railway electrified, and towards Russia. Access will open to western, eastern and northern directions of Kazakhstan and further to Russia.

Description of the Project Initiator:

The Project Initiator is the State Enterprise “National Company “Kyrgyz Temir Jolu”. SE “NC KTJ” transports passengers and cargo by rail. Kyrgyz railways transport more than 7 million tons of cargo each year.

General Director of the SE “NC Kyrgyz Temir Jolu”

Azamat Sakiev

More than 12 years of experience in management positions

Project cost - \$297,670,000

- ✓ Electrification of the area - \$274,520,000
- ✓ Construction of supply power lines - \$15,700,000
- ✓ Repair depot in Bishkek, Balykchy - \$5,150,000
- ✓ Others - \$2,300,000

Amount of investments - \$297,670,000

Payback period - 4.75 years

DESCRIPTION OF THE PROJECT

The Lugovaya-Balykchy railway section is the main transport artery linking Kyrgyzstan with Kazakhstan and other countries. The section has one track, with a 321.5 km usable length, of which 60.3 km are in Kazakhstan and 261.2 km in Kyrgyzstan. The 60.3 km section located in Kazakhstan belongs to Kyrgyzstan.

The Lugovaya-Balykchy railway section, including the section located in Kazakhstan, requires electrification.

In general, the route of the Lugovaya-Tokmok railway line runs through a plain, densely populated area, and starting in Tokmok the terrain gradually becomes mountainous and the density of settlements decreases.

The start of the route, Lugovaya Station, is located on the Chu-Arys two-track railway line electrified through a 2x25 kV system. The end point of the route is Balykchy, Issyk-Kul Region. The section of Lugovaya-Balykchy railway line located in Kazakhstan requires electrification.

Electrification of the Lugovaya-Balykchy section will open access to other electrified railway sections in directions of almost all Kazakhstan, with about 5,000 km of the 16,000 km railway electrified, and towards Russia. Access will open to western, eastern and northern directions of Kazakhstan and further to Russia.

In engineering-geological terms, the site is composed mainly of loam soils and sandy loams in its plain part and of clastic and solid rocks in the mountainous part. The seismicity of the section is 7-9 points.

A large number of highways, power lines, communication lines and other utilities run parallel to or cross the railway section all along the route.

The section is equipped with a centralized traffic control (CTC) system from Lugovaya to Bishkek-1, and with a semi-automatic blocking system for the rest of the section. The Lugovaya-Bishkek section is provided with cable communication, and for the remaining part, air communication is available.

There are two 10 kV single-circuit lines in the CTC section and a 10 kV single-circuit line in the Bishkek-Balykchy section. Traction service is provided by locomotives from the Bishkek-1 depot.

At present, the Kyrgyz Republic does not have its own stock of diesel fuel and its own base for diesel locomotives fleet, which is why there is now a need to convert the railway to electric traction.





The investment in the electrification of the Lugovaya-Balykchy section will pay back due to annual savings on operating costs thanks to the use of electric energy instead of expensive diesel fuel, and utilization of higher speeds of electric traction trains, increased capacity of electric locomotives and reduced repair and depreciation costs for rolling stock, as well as reduced pollution damage.

With the conversion to electric traction of the Lugovaya-Balykchy section, the fleet of diesel locomotives in freight, passenger and suburban traffic will be replaced by electric locomotives. As a result, the weight of air emissions of harmful substances containing carbon monoxide, nitrogen oxides, sulphur dioxide, lamp black and so on will be reduced by 100%. Water consumption by train locomotives will be reduced by 4,400 m³/year and water disposal by 1,900 m³/year. Oil contamination of the track superstructure and right-of-way will be reduced. Noise from diesel locomotives is a significant environmental and health hazard. After conversion to electric traction noise levels will go down as well.

TECHNICAL CHARACTERISTICS OF THE RAILWAY

Number of trunk lines	One-track
Track width (mm)	1,520
Limited slope %	10%, in one section 19%
Minimum curve radius (m)	600
Type of traction	Diesel
Traction load (tons)	3,000-4,000
Axle load (tons)	23
Effective length of receiving-and-departure tracks (m)	850
Blocking system	Automatic - (Lugovaya – Bishkek-1) Semi-automatic - (Bishkek-1 - Balykchy)
Rails	P-65, P50
Cross ties	Wood, reinforced concrete
Track switches	P-65, P50, 1/11, 1/9
Stations (pcs.)	18
Crossing loops (pcs.)	3

GEOGRAPHICAL LOCATION OF THE PROJECT



At the Lugovaya station, located in Ryskulov district of Jambyl Region in Kazakhstan, a site has been allocated for an electrical substation to electrify the section.

ELECTRIFIED SECTIONS OF KAZAKHSTAN RAILWAYS

Kazakhstan has an extensive, 16,614.3 km railway network, including 6,000 km of two-track lines and about 5,000 km of electrified lines. Kazakhstan's electrified railways link the western and eastern, southern and northern parts of Kazakhstan:

- ✓ The southern part from east to west - Almaty - Shu - Lugovaya - Shymkent - Arys - Turkestan - Kyzyl-Orda - Saksaulskaya
- ✓ From south to north - Lugovaya - Shu - Mointy - Karaganda - Nur-Sultan - Kokchetal - Presnogorkovskaya
- ✓ The northern part from east to west - Pavlodar - Nur-Sultan - Yesil - Tobol

From Kazakhstan's electrified railways further transition can be made to the southern regions of Russia and to the Tashkent in Uzbekistan.



SUSTAINABLE COMPETITIVE ADVANTAGES

- ✓ Electric traction has a significantly higher efficiency than all other types of traction, and is cost-effective. An analysis of railway statistics shows that the cost of transportation with electric traction is 1.5-2 times lower than on diesel traction. This cost reduction integrally reflects a 1.4-1.6 times higher energy efficiency of electric traction, and 1.2-1.3 times higher tonnage rating, sectional speeds and average daily mileage of locomotives.
- ✓ Maintenance-and-running costs of diesel locomotives are 2-2.5 times higher than those of electric locomotives (especially when the wear of the locomotives is high). This significant difference in transport costs is not only sustainable over the entire period of electrification, but also tends to grow over time.
- ✓ Kyrgyzstan has a large hydroelectric potential and a sufficient stock of relatively inexpensive electric energy;
- ✓ The cost of diesel fuel tends to grow faster than electric energy prices;
- ✓ Electric traction will make it possible to improve travel speeds, increase line capacity and working conditions and eliminate diesel engines' harmful emissions into the atmosphere.



DESCRIPTION OF THE PROJECT INITIATOR

The Project Initiator is the State Enterprise “National Company “Kyrgyz Temir Jolu”. The Ministry of Transport and Communication of the Kyrgyz Republic, as the authorized body, oversees the implementation of state policy in the field of railway transport, and coordination, regulation and controls the activities of the transport complex of the Kyrgyz Republic.

SE “NC KTZh” transports passengers and cargo by rail. These activities are regulated by the laws of the Kyrgyz Republic.

Kyrgyz railways transport more than 7 million tons of cargo each year. The company is one of the top taxpayers in the country.

Kyrgyzstan’s railway network consists of 21 stations.

The structure of the “Kyrgyz Temir Zholu”:

- ✓ Locomotive branch of SE “NC Kyrgyz Temir Zholu”
- ✓ Bridge construction crew
- ✓ Trackside branch
- ✓ Electric energy, signaling and communications branch
- ✓ Material and technical support branch
- ✓ Rolling stock branch
- ✓ Loading and unloading works branch
- ✓ Passenger service branch
- ✓ Information and computer support branch
- ✓ Paramilitary security services of railway facilities and cargos branch
- ✓ Southern Branch of the SE “NC Kyrgyz Temir Zholu”



MANAGEMENT TEAM



Azamat Sakiev
General Director

- ✓ University degree. International Academy of Management, Law, Finance and Business, with a degree in finance and credit. Nottingham University UK International Business with a degree in management
- ✓ General Director of the SE “NC Kyrgyz Temir Zholu” since June 2021
- ✓ More than 12 years of experience in management positions



Abdes Anarbekov
Deputy General Director

- ✓ University degree. Kyrgyz National University Named After J. Balasagyn with a degree in accounting, analysis and audit
- ✓ Deputy General Director of the SE “NC Kyrgyz Temir Zholu” since June 2021
- ✓ More than 12 years of experience in management positions
- ✓ More than 8 years of experience in Bishkek Mayor’s Office

PROJECTED FINANCIAL INDICATORS

The methodology for calculating project efficiency and payback is based on annual savings on operating costs thanks to the use of electric energy instead of expensive diesel fuel, and utilization of higher speeds of electric traction trains, increased capacity of electric locomotives and reduced repair and depreciation costs for rolling stock, as well as reduced pollution damage.

Nº	Description of costs, million USD	Without electrification	After electrification of the section
1	Capital investment	109,26	297,67
2	Operating expenses	70,62	30,87

- ✓ These calculations are preliminary and based on a 1992 feasibility study. Payback period is 4.75 years.

SOURCES OF FINANCING AND APPLICATION OF FUNDS

Source of financing	Amount, million USD
Financial investor	297,67
Total:	297,67

Application of funds	Amount, million USD
Electrification 2x25 kV	274,52
Section from the Lugovoye station to the border with Kyrgyzstan	50,16
Section from border with Kyrgyzstan to Bishkek station	77,6
Section from Bishkek station to the Kemin station	69,76
Section from Kemin station to the Balykchy station	77
Construction of 110 kV supply power lines	15,7
Repair depot, Bishkek	3,15
Repair depot, Balykchy	2
Service equipment and machinery	1
Modification of the heat supply pipe	0,3
Renovation of existing and construction of new buildings	1
Total:	297,67



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A BRIEF OVERVIEW OF THE RAILWAY SECTOR IN KYRGYZSTAN

When the Kyrgyz Republic gained independence, the railway network of the young republic consisted of several unconnected sections inherited from the USSR. These are extremely short stretches of tracks: Fergana - Kyzyl-Kiya, Kara-Suu - Osh, Khanabad - Jalal-Abad - Kok-Yangak, Uchkurgan - Tash-Kumyr connecting southern Kyrgyzstan with the Uzbek cities of the Fergana Valley, and the Chaldovar - Bishkek - Balykchy (Issyk-Kul) section which connected the northern cities of Kyrgyzstan with southern Kazakhstan.

In 1994, a decision was made to start the Trans-Kyrgyz Railway Balykchy - Kochkor - Jalal-Abad project in order to eliminate the discontinuity of the railway network. Construction, which began in 1998, soon stopped. The project was ultimately abandoned in 2000.

A plan for a possible China-Kyrgyzstan-Uzbekistan ("CKU") railway (via the southern section of the Kyrgyz railways) has been under discussion since 1996.

Kyrgyz railways are an essential link in the country's economy, whose most important advantages are the efficiency of long-distance freight transportation, high carrying capacity and regularity of operations all year round.

Kyrgyz railways are represented by the State Enterprise "National Company "Kyrgyz Temir Jolu" under the Ministry of Transport and Communications of the Kyrgyz Republic (hereinafter referred to as the SE "NC "KTZh").

Kyrgyzstan's railway network consists of scattered, unconnected lines, geographically divided into two sections - northern (323.4 km) and southern (101.2 km), providing access from Kyrgyzstan to the railway network of neighboring states - Kazakhstan and Uzbekistan. Kyrgyz railways includes 424.6 km of main tracks, 220 km of station tracks and 66.4 km of rail sidings.



Cargo shipments

Cargo shipments by rail, especially transportation of bulky goods or large volumes of goods, are the preferred type of cargo shipments because they make it possible to transport goods at lower costs and on schedule.

Volume of cargo shipments by rail	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue from cargo shipments, million KGS	1 680,1	2 383,1	2 665,5	3 009,6	3 816,3	3 372,2	3 135,9	3 763,9	4 010,1	3 833,4	4 646,5
Volume of cargo shipments, thousand tons	1032,1	1033,7	1119,3	1360,6	1493,7	1278,6	1699,5	1935,7	2257,9	2242,5	2014,5
Volume of cargo shipments, thousand km	714,8	772,3	824,4	736,2	676,2	717,8	474,8	484,2	421,1	388,1	465,4



Passenger transportation

Volume of passenger transportation by rail	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue from passenger transportation, million KGS	664,0	646,1	607,7	514,7	403,3	249,4	178,1	206,4	223,6	235,1	25,6
Volume of passengers transported, thousand people	711,3	596,9	549,2	407,0	318,2	286,6	283,6	313,9	326,1	360,5	72,0
Passenger traffic, million passenger-kilometers	98,7	82,8	75,8	55,5	42,9	40,8	40,8	43,4	35,0	37,1	6,8



OFFER FOR INVESTOR

LEGAL MECHANISM	✓ State Enterprise
TYPE OF FINANCING	✓ Direct investment in capital
AMOUNT	✓ USD 297,670,000
FINANCING TERM	✓ Up to 10 years
NUMBER OF TRANCHES	✓ Tranches will be determined once the calculations are updated
FINANCIAL SUPPORT	✓ 100% of the Company's share



