August 2017

Project: 1520mm Broad Gauge-Connection Košice-Vienna

Executive Summary

Results of the Feasibility Studies as of August 2017

- **Up-date of the traffic forecasts (Prognos AG)**
- **Technical Feasibility Study (JV BVO)**
- **Elaboration of Business Models and Economic Study (Deloitte)**

Table of Contents

1. Objectives

This report summarises the most essential results (as of August 2017) elaborated in the course of the feasibility studies for the project. Basis for this report are the following documents:

- "*Management Summary - Up-date of the traffic forecasts for the broad gauge railway line between Košice and Vienna*" by Prognos AG, as of 20.12.2016
- "*REPORT – Management decision paper*" by JV BVO, as of 12.06.2017
- "*Summary Report - Elaboration of Business Models and Economic Analysis for Broad Gauge Connection Košice-Vienna*" by Deloitte, as of 28.06.2017

2. Up-date of the traffic forecasts (Prognos AG)

The purpose of this study is an up-date of the traffic forecasts for the Broad Gauge Project, elaborated in 2011. The new study maintains the methodology and considers updated economic and transport data and revised assumptions.

The updated traffic forecasts are the current basis for all consequent studies and have been considered in the technical feasibility study by JV BVO and in the economic study by Deloitte.

Transport forecasts are prepared for a Base, a Best and a Worst Case as well as for a Without Case being the reference for any comparisons. Also a Base Case Plus scenario has been elaborated as a sensitivity of the Base Case including trade flows with low volumes which were omitted in all other cases. The Base Case Plus is seen as the relevant business case for all subsequent technical studies. It was also retained in the preceding pre-feasibility study.

The new Broad Gauge Line is expected to carry 18.2 million tonnes in 2030 and 22.9 million tonnes in 2050 on the Eastern section between the terminal close to Bratislava and the existing terminal for US Steel near Košice. The overall driver for the transport is growing trade flows but also significant shifts from standard gauge railways, road and inland waterway and seaborne transport. Rail transport will increase its market share also due to a railway friendly policy by the EU and its member states.

A common characteristic is that the majority of all transports on the Broad Gauge Project are long distance transports involving the EU on the one side and the Ukraine, Russia and primarily China on the eastern side.

Table 1: Base Case Plus total rail transport volumes 2014 - 2050 – Sectional data, all commodities, and both directions

section no.	from / to	to / from	unit	2014	2030	14 / 30 p.a.	2050	14 / 50 p.a.
1	Austria West	Vienna	m t	3.9	12.4	7.5 %	19.5	4.6 %
2	Vienna	Bratislava	m t	4.6	4.6	0.0 %	7.1	1.2 %
3a	Bratislava	Košice	m t	4.9	4.5	-0.6 %	6.7	0.9 %
3b	Czech Republic	Košice	m t	1.9	2.3	1.1 %	2.9	1.1 %
4a	Košice	Slovak Republic / Ukraine	m t	4.4	3.8	-0.9 %	4.6	0.1 %
4b	US-Steel	Slovak Republic / Ukraine	m t	7.4	27.8	8.7 %	34.3	4.4 %
4c	Hungary	Slovak Republic / Ukraine	m t	2.9	3.9	1.8 %	5.3	1.7 %
5	Slovak Republic / Ukraine	Moscow	m t	14.7	35.5	5.7 %	44.2	3.1 %
BGP West	**Vienna**	**Bratislava**	**m t**	**-**	**17.0**	**-**	**21.5**	**-**
BGP East	**Bratislava**	**Košice**	**m t**	**-**	**18.2**	**-**	**22.9**	**-**

Source: Prognos.

When looking on the impact of the Broad Gauge Project and other modes of transport in 2050, it becomes obvious that 40% of the total transport volumes for the Broad Gauge Project will be shifted from sea transport, 34% from road and inland waterway and 26% from standard gauge railway. The strong impact on sea transport will be caused by shorter transport times, less transhipments, better security and reliability. It is expected that time sensitive goods will gain importance resulting in an increasing willingness-to-pay for transport on rail. This level of costs could range above the costs for sea transport but will remain clearly below air transport.

The majority of the transhipments between broad gauge and standard gauge as well as road are expected at the end-terminal in the Twin City Region Vienna-Bratislava: Following the Base Case Plus, 21.5 m tons will be handled in 2050. The long distance terminal hinterland transports will be shipped by rail amounting to an average share of 63% in 2050. Road transport cannot be replaced by rail for local and regional distribution in a catchment area of approx. 200 km.

The terminal in Western Slovakia is dedicated to domestic regional hinterland transport, mainly carried by trucks.

The range of transport volumes for the Broad Gauge Project considering the Best and Worst Case scenarios is between 16.4 and 25.5 million tonnes in 2050.

A detailed analysis of selected Origin / Destination (O/D) pairs led to the result that BPG can offer significant advantages compared to existing sea transport on various key destinations: Rail transport between China and Europe offers shorter distances and time. The number of transhipments is reduced and the transport by rail generates less CO_2 emissions per tonne. Transport by sea offers more capacity and lower prices. The longer the transport distance of the selected O/D pairs, the higher the benefits generated by Broad Gauge Project.

Based on a positive economic outlook the Broad Gauge Project is a huge transport infrastructure projects with manageable risks. The main challenge will be a homogeneous offer and operation of the trains across all countries and stakeholder involved – from Far East to Vienna and beyond. Main issues are customs procedures, security, tariffs and reliability. A one-stop-shop will certainly facilitate the contact to clients. The growing overall global trade and the strong advantages of long distance railway transport justify investments to rail infrastructure for a railway land bridge between Europe and Asia.

3. Technical Feasibility Study (JV BVO)

3.1. Corridor Selection

The currently selected route is based on an extensive selection procedure. The methodology for this procedure was discussed in detail with the technical experts of the shareholders. In the first step reasonable corridors were selected based on operational, approval, costs and technical criteria.

As a result of the selection procedure and in coordination with the experts from the shareholders corridor 1-A was clearly selected as the best corridor considering a number of criteria, such as operation and transport efficiency, space and environment, economic and social aspects, construction costs, sustainability and operation costs, etc.

Consequently an optimised reference route including local route variants was developed within the selected corridor, considering local conditions such as existing infrastructure, geological conditions, topography, urban und nature protection areas (Natura 2000) etc. Also the best terminal locations were selected based on a systematic evaluated procedure.

Figure 1: Route selection - refined alignment and 2 terminal locations

3.2. Characteristics of current alignment

Alignment

- Single track railway system with passing loops and crossing stations for freight transport only
- No level crossings
- Eastern end of project: Full integration with the 1 520mm broad-gauge network (Haniska/ Maťovské)
- The Western end of the project: One major transhipment area (terminal) in the Twin-City region Vienna-Bratislava in Austria. Connection to the standard gauge network 1 435mm.
- Approx. 400 km with 3 crossing stations (double track with 1.5 km length) and 12 passing loops (double track with 7 km length).
- 377 bridges in total (234 single-track bridges, 142 double-track bridges). Large bridges are envisaged over the river Danube. Total length of tunnels 42.8 km. Number of tunnels is 19.

Transhipment areas

- Terminal in western Slovakia with a size of approx. 50 ha
- Terminal in the Twin-City region Vienna-Bratislava in Austria with a size of approx. 150 ha

3.3. Operational Concept

The total transport volume corresponds to the Base Case Plus scenario of the updated traffic forecasts in 2016:

- Year 2030: 18.2 million tonnes (Košice ‑Terminal in western Slovakia)
- Year 2050: 22.9 million tonnes (Košice ‑Terminal in western Slovakia)

Container technology

- Use of multi system locomotives AC and DC Maťovské – Vienna
- Container trains (up to 3 500 t):
  - 2 locomotives per train
- Heavy container trains for bulk and liquid (up to 4 800 t):
  - 2 locomotives per train during night-time on average days
  - 3 locomotives per train on peak days and during daytime on average days

Operating hours per day

- 20 hours on normal days and peak days (2030)
- 20 hours on normal days and 24 hours on peak days (2050)

The calculation of the number of trains is determined by the above-mentioned base parameters. The determining direction for the calculation of the number of trains is east to west because of the higher transport volumes according to the updated traffic forecasts. The estimated number of trains depicts a peak day utilisation. The total number of trains per peak day and direction is 31 trains in 2030 and 38 trains for 2050.

The travel time on the new broad gauge line is approximately 4:30 to 5:30 hours depending on the total train weight, number of locomotives, direction and time of day.

3.4. Project Time Frame

The whole period until the completion of the Broad Gauge Project can be divided in two main phases, the time for authority procedures and for construction work in both countries (Figure 2). Possible overlapping of procedures is considered as far as this upholds a realistic timeline.

The authority procedures in Austria will continue until 12/2022 and Slovakia until 11/2023. This implies a time shift of approximately a year. The required timeline for Slovakia is longer than in Austria due to extended track length. (e.g. 180 communities potentially affected).

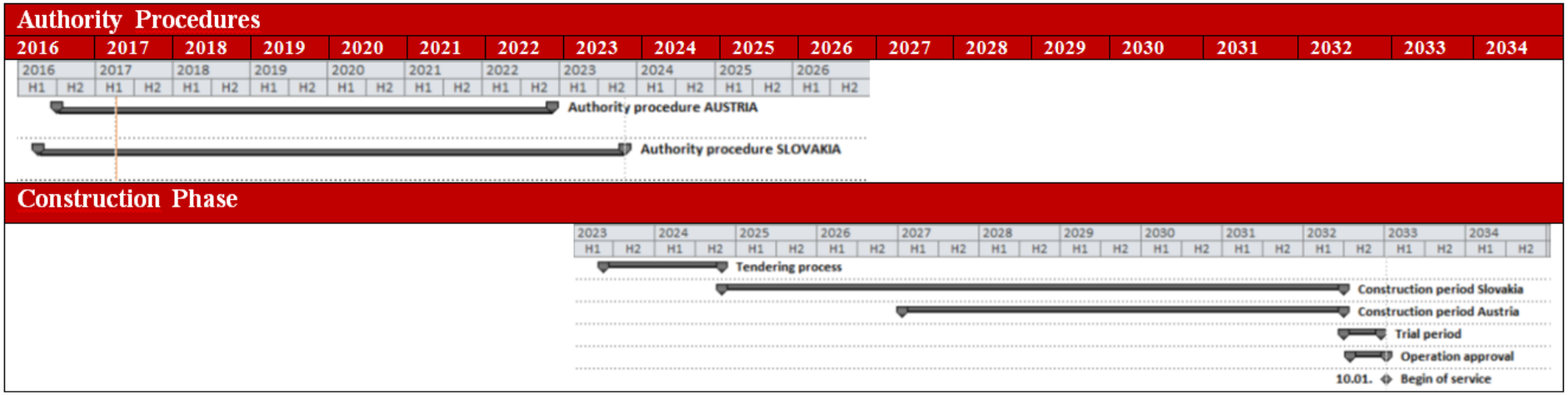
The construction period starts with the tendering process. At this stage of the project the construction period is determined by the estimated time for construction of open track, crossing of river Danube and the construction of tunnels. Construction work starts in the End of 2024 and continues 100 months.

After the construction work has been finalized and all technical equipment has been set into operation an additional phase should be considered for testing of the railway systems (trial period). By experiences from other large realized infrastructure projects this phase will last about 6 months and overlaps with the period for gaining the operation authority approval. The operation starts in the Beginning of 2033.

3.5. Cost estimation

The current cost estimation (dated 27.02.2017) ends with a total sum of **6 489 077 164 €** (price basis 2016) including factors for unconsidered and unknown aspects as well as surcharges for risks at various levels. The costs for operation and maintenance currently result in **214 811 288 €/Year**. This cost estimation is an intermediate status, as the current study phase has not been finalized yet. Revision and optimisation might be necessary after completion of the authority procedures in Austria (SEA) and in Slovakia (PES).

Figure 2: Project time frame - general overview



4. Elaboration of Business Models and Economic Study (Deloitte)

The main framework assumptions of the Project encompass the following: The broad gauge extension will attract significant traffic. For 2033 a total volume of 19.1 million tonnes per year is expected (without the ramp-up adjustment). Volumes are gradually built up to 22.9 million tonnes per year in 2050 and remain stable afterwards. With the current model assumptions the utilization of track has reached the technical capacity limit. CAPEX was identified as a main driver of the Project, with a total investment of EUR 6.49 billion in 2016 prices. Revenues are driven by two main charges, namely being the shipment charge with 57 EUR/thousand net-tonne-km and the transhipment charge of 38.5 EUR/container.

Throughout a transparent and structured analysis of numerous alternatives the following two options have been selected which replicate the commitments of the four project countries, i.e. Austria, Slovakia, Russia and Ukraine:

- Option 1a: One integrated holding company with combined cash flows of three business sectors (Infrastructure, Railway Undertaking and Terminal). The Railway Undertaking has a predominant market share in terms of volumes transported on the newly built infrastructure.
- Option 3: One holding company with combined cash flows of terminals in Austria and Slovakia. The infrastructure sector seeks different solutions in each country and Railway Undertaking is run by third parties.

From a legal perspective both options require open access. In case of higher level of access charges two potential exemptions within the current legislation have been identified, namely being the third country connection exemption and the specific future investment exemption.

The financial assessment of both options reveals that Option 1a has the potential to achieve an overall equity IRR (after financing) of 7.0%. The main profitability drivers are shipment charges by RU to logistic providers/industrial clients and transhipment charges from the terminals. Option 3 only encompasses the terminal sector and creates equity IRR (after financing) of 2.1%. The main profitability driver is the terminal transhipment charge.

The project will create within the period under consideration of 45 years (construction from 2018 till 2033, operation from 2033 till 2062) 642 thousand additional (direct and indirect) employment years, thereof about 131 thousand in Russia, 45 thousand in Ukraine, 338 thousand in Slovakia and 128 thousand in Austria. The employments generated lead to value added of 28.6 bn (billion) in total in the four project countries, thereof about 2.0 bn in Russia, 0.3 bn in Ukraine, 10.8 bn in Slovakia and 15.5 bn in Austria. The broad gauge extension will also generate a tax income of EUR 9.6 billion in total.

The investment of EUR 6.49 billion (in 2016 prices) is expected to create positive monetary effects on total value added (GDP) and rise in tax income, and therefore will generate considerable macroeconomic benefits for all project countries.

5. Conclusion

The present results of all three studies in the current project phase confirm the technical, legal and the economic feasibility of the Broad Gauge Connection Košice-Vienna. With the realisation of the project positive returns to potential investors (equity IRR after financing) can be achieved and all project countries can have considerable macroeconomic benefits. The currently available study results substantiate the option to continue the project into the next phase.

Vienna, August 2017 BPG-PM / Kulczycki