

2014-2020 Operational Programme for the European Union Funds Investments in Lithuania

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I.	Project description and objectives
Title:	**Vilnius Railway Node Electrification**
Number:	**06.1.1-TID-V-503-01-0005**
Owner:	AB LTG Infra
Brief presentation:	The project has been included in the list of state projects by Order No 3-110 of 09-03-2017 of the Minister of Transport and Communications of the Republic of Lithuania of 9 March 2017 approving List No 1 of state projects proposed for co-financing from the European Union Structural Funds under Measure 06.1.1-TIDV-503 "Upgrading and improvement of TEN-T Railway Network and enhancement of the interoperability of different modes of transport" for the implementation of the Operational Programme for European Union Structural Funds Investments for 2014-2020. In accordance with the stated objectives, the project is in line with: the guidelines of EU Regulations No 1315/2013 and No 1316/2013; Specific objective 6.1.1 "Improve interoperability between national multimodal transport system and trans-European transport networks" of Priority Axis 6 "Developing Sustainable Transport and Key Network Infrastructures" under the Operational Programme for European Union Structural Funds Investments for 2014-2020. Objective 1 and Task 1 of the National Transport Development Programme for 2014-2022, approved by Resolution No 1253 of the Government of the Republic of Lithuania of 18 December 2013 approving the National Transport Development Programme for 2014-2022. *Operational Programme*: Operational Programme for European Union Structural Funds Investments for 2014-2020; *Priority*: Priority 6 "Developing Sustainable Transport and Key Network Infrastructures". *Objective*: Specific objective 6.1.1 "Improve interoperability between national multimodal transport system and trans-European transport networks".

	Measure: 06.1.1-TIDV-503 "Upgrading and improvement of TEN-T Railway Network and enhancement of the interoperability of different modes of transport". *Situation before project implementation*: The number of electrified railway tracks in the Lithuanian rail network is very low, accounting for a mere 9% of all railway tracks. This is the lowest rate among the EU Member States. This compares with an average of 54.3% of electrified railway tracks in other EU Member States. Railway electrification is one of the tasks provided for in the TEN-T development guidelines. The electrification of the railway sections Kyviškės-Valčiūnai-Vaidotai-Paneriai and Vilnius-Kirtimai-Valčiūnai, which form the Vilnius bypass, will increase the attractiveness of rail transport for passengers and freight, and reduce environmental pollution. The implementation of the project will significantly contribute to the integration of the country's rail transport system into the TEN-T transport networks. The electrification of the rail network would pave the way for a shift from fossil fuels to renewable energy sources in rail transport, reduce the environmental impact and increase the attractiveness of rail freight transport by using environmentally friendly means. Rail transport is currently not environmentally efficient enough, due to the low electrification of the rail network and the old rolling stock mentioned above. Due to the low electrification rate of railways, most trips are made on diesel trains, which are much more polluting than electric trains. The electrification of the line from the border with Belarus to Klaipėda will reduce the amount of diesel used in the rail network by around 25,000 tonnes per year. This will prevent the release of about 150,000 tonnes of carbon dioxide (CO2), which contributes to the greenhouse effect. Electrification will also reduce train noise, as electric trains have 8-10 dBA lower noise levels than diesel trains, which have noise levels of 55-56 dBA.
Objective and results:	*Objective*: To modernise the Vilnius railway bypass sections Kyviškės-Valčiūnai-Vaidotai-Paneriai and Vilnius-Kirtimai-Valčiūnai by adapting them to zero emission rolling stock, to ensure the possibility of future train traffic at a speed of 160 km/h by the



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	parameters of the overhead contact network and to increase the attractiveness of rail transport. *Results to be achieved*: Electrification of the Vilnius bypass (42 km long) by installing a 25 kV overhead line (114 km long), reconstruction of the Lentvaris traction substation in order to supply electricity to the newly built overhead line, and expansion of the traffic control centre.
Benefits for society:	This project will develop the TEN-T network in Lithuania, which will improve traffic safety, reduce transport costs, environmental pollution by reducing pollutants and noise levels, while improving the functioning of local businesses and labour mobility. An improved (electrified) railway node will enable freight to be transported in less time. In this way, the project will contribute to reducing damage to the environment and human health.
II. Project phases and implementation plan	
Estimated implementation period:	2019-2026
Implementing measures and phases:	The project has no negative impact on gender equality and non-discrimination. There will be equal opportunities for men and women, and for people of any race or ethnic origin, religion or belief, age, disability, sexual orientation, to participate in the project and to benefit from the project results. *Project activities*: 1. Electrification of Vilnius railway node, contract works. 2. Electrification and maintenance of Vilnius railway node. 3. Electrification of Vilnius railway node, project supervision. 4. Other activities: expansion of microprocessor-based centralised (MPC) signalling equipment, Traffic Management Centre, Litgrid lines and substations. *Project implementation measures:* Construction of the contact network covers the 42 km bypass section of the Kyviškės-Valčiūnai-Vaidotai-Paneriai. The upgrade will include the installation of a 2x25 kV 50 Hz overhead contact line system. In order to supply the section with electricity, the project scope includes the reconstruction of the existing Lentvaris traction transformer substation by installing 2x4 MVA transformers and a 45 MVA static frequency converter (the total

installed capacity of all the connected electrical equipment to be connected to the transmission network is 53 MW) and the technological adaptation of the interaction of the Naujoji Vilnia traction transformer substation with the Lentvaris traction transformer substation. The call for tenders for the construction of the contact network was launched on 22 December 2017 and the contract for works (including design works) was awarded on 20 December 2019 to Elecnor Servicios y Proyectos, S.A.U., a group of companies acting on the basis of a Joint Venture Agreement, and to Instalaciones Inabensa, S.A., represented by Elecnor Servicios y Proyectos, S.A.U. Planned completion of the works: 2024 Q4.

Overhead contact line power supply system in detail:

The railway electrification system from Vilnius to Klaipėda consists of a metallic overhead contact network and equipment, based on 8 traction substations: newly built traction substations with overhead lines in Žeimiai, Linkačiai, Tarvainiai, Kretinga, under renovation in Žasliai and Lentvaris (within the scope of the Vilnius railway node), and the already existing ones in Naujoji Vilnia and Palemonas. There are also 8 newly built autotransformer centres to ensure system stability.

The 6 traction substations under construction and renovation will be equipped with traction groups up to 60 MVA (as peak power), while the autotransformer centres will be equipped with 15 MVA autotransformers. In addition, these traction substations will have Static Frequency Converters (SFCs), which ensure more efficient power transmission (fewer traction substations are needed on the section to be electrified) and eliminate imbalances in the network under different loads. The electricity supply system is connected via overhead lines to the 110 kV Litgrid transmission grid.

In order to minimise the environmental impact of the construction of high-voltage lines, each solution has been subject to a detailed study with regard to the conservation of Natura 2000 and national forest areas. The aim is to connect traction substations to 110 kV lines as close as possible to the traction substation site.

The SFCs are the devices that will distribute the energy from the LITGRID transmission network to the railway electrification system and will therefore only be installed in traction substations. Based on a modelling study of traction substations, the SFCs will have a

	maximum capacity of up to 60 MVA. The electrification system in the renovated traction substations in Lentvaris and Žasliai will be 1x25 kV, while the electrification system in the new traction substations will be 2x25 kV. The traction substations will collectively consist of a 110 kV outdoor distribution station (distribution apparatus), an IED system (including power transformers), medium voltage distribution equipment, a TPS autotransformer (if required), control buildings and output feeder platforms. The autotransformation centres will consist of a 15 MVA autotransformer, medium voltage distribution equipment and an output feeder platform. During the construction in Žasliai, the existing electrification system will operate in N-1 operation mode, where the power supply system operates without a single dedicated traction substation. In the subsequent operation of the electrified section, the N-1 system will be of particular use in the event of a power outage, planned disconnection of the traction substation, unforeseen failure or other situations. The project "Electrification of the Vilnius-Klaipėda (Draugystė Station) section" analyses scenarios where one traction substation is not working: in the case of a contingency where one traction substation is not working (n-1 situation), the relevant section of the isolation in place of the non-functioning traction substation will be bypassed by means of 25 kV busbars or pole switches. This power supply architecture will allow for an uninterrupted supply of electricity to the overhead line along the entire planned section.
Progress status:	Completion procedures under way

III. Project financial information and costs

Sources of financing:	The project is co-financed by the Cohesion Fund. EU financing is secured by Order No 3-437 of the Minister of Transport and Communications of the Republic of Lithuania of 29 July 2020 amending Order No 3-423 of 22 July 2020 on the allocation of financing for Project No 06.1.1-TID-V-503-01-0004 "Electrification of Vilnius Railway Node". Up to EUR 39,742,000 from the European Union (EU) Cohesion Fund have been allocated for the implementation of the project.



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	On 24 August 2020, the contract for the project "Electrification of Vilnius Railway Node", co-financed by the EU Cohesion Fund from the European Union Structural Funds, was signed. Project value: EUR 58,726,000. Of this, the EU Cohesion Fund financed EUR 39,742,000, and the state budget paid EUR 10,128,000. The remaining costs are covered by AB LTG Infra.
Budget changes:	-
Actual costs:	EUR 58,150,000.

IV. Project risks and their management

Risks, their assessment and management tools:

Risks	Causes and assessment	Risk-mitigation measures
1. Conformity assessment and certification of the newly built contact line network (CLN)	The CLN is built in accordance with the mandatory Technical Specification for Interoperability (TSI) which is regulated by EU documents. This certification procedure is carried out in the absence of standardised tools and methodologies adapted to the railway infrastructure currently in use.	In preparation for certification, the technical adaptation of the existing electric train, including special rolling stock, to perform the planned CLN tests and to ensure compliance with the operation of trains on the certified railway infrastructure.
2. Risks to the performance of the works due to delays by the contractor	Delays in project activities due to delays in contractual works (failure to carry out design and construction works on time, delays in the supply of materials/equipment).	Mediation of the customer in negotiating project issues with third parties (VIA Lietuva, municipalities, LITGRID, ESO), periodic meetings with the contractor/suppliers, application of preventive measures, penalties (late payment interest, fines).