TERMS OF REFERENCE

Pre-Feasibility Study for commercialization, upgrade and energy efficiency at Azerbaijan Railways closed Joint Stock Company (ADY)

1. BACKGROUND

The Assignment
The European Bank for Reconstruction and Development (The ‘EBRD’ or the ‘Bank’) has signed a Memorandum of Understanding (“MoU”) with Azerbaijan Railways closed Joint Stock Company (the ‘Company’ or ‘ADY’) in order to corporate together in improving the Company’s energy efficiency, renewable energy generation and scope investments for upgrade and commercialisation of its railway operations. In relation to this MoU, the EBRD is considering mobilizing technical cooperation funds (‘Technical Cooperation Funds’) to assist the Company in formulating its Energy Efficiency and Commercialisation strategy and link it to its methodology for prioritising its investment needs, while ADY is considering borrowing from the Bank to fulfil certain investments resulting from the aforementioned strategic assessment.

ADY
ADY is the national state-owned rail transport operator in the Republic of Azerbaijan. It was founded in 2009 with 100% state capital and the assets of Azerbaijan State Railways (Azərbaycan Dövlət Dəmir Yollar) created in 1991 with the independence of the Azerbaijan. ADY operates in both passenger and freight sectors.

ADY operates 2,944 km of 1520mm gauge railway track. 60%-70% of track is electrified at 3kV DC. The intention of ADY is to continue with its track electrification plans (to reach 100%) and the purchase of electric rolling stock (double-deck EMU and electric freight locomotives) in order to become a greener operator and reduce fuel expenses. ADY is also keen to generate its own renewable electricity for power usage both for track and stations. Further, the strategy of ADY contemplates also a transition from Direct Current supply (DC) to Alternate supply (AC) aiming to take advantage of the use of power electronics in the railway sector.

EBRD and the Transport Team
The EBRD under the Green Economy Transition approach seeks to increase its level of financing in low carbon systems and enhanced innovation thus ensuring that investments do not lock economies of the Bank’s countries of operation into inefficient solutions. Technical cooperation plays an important role to deliver this approach: the Bank works with clients from project identification through to project implementation and monitoring. Through this assignment, the EBRD intends to support the Company by providing technical assistance to conduct an energy efficiency audit and produce a priority investment plan in an effort to improve costs and revenues, reduce Co2 emissions and upgrade certain infrastructure and rolling assets. The investment plan should also show how more freight (Ton/Kilometre) could be transported via the railways and show positive NPV/IRR’s.

The Transport team has over 30 dedicated sector coverage bankers in London HQ and EBRD resident offices. It includes dedicated in-team specialists to support project needs including procurement, sustainable strategies and monitoring. Since inception the team has deployed 15.0 billion euros in investments with a total project value of 58.4 billion euros across more than 300 projects.
OBJECTIVES AND SCOPE OF WORK

Pre-feasibility for Strategy for Electricity Management Commercialization and Energy Efficiency

Electricity Management and Commercialisation

ADY is exploring electricity commercialization and sale of low-voltage electricity. ADY purchases electricity from Azerishiq OJSC and supplies this electricity via its 6 power supply units under its Infrastructure department. Apart from high-voltage electricity supply to ADY infrastructure, ADY also supplies low-voltage electricity to other internal entities and also has the right to sell low-voltage electricity to external organizations and households at a certain margin. Currently the share of sales to external customers is about 6% and there is a potential to increase revenue to ADY through further commercialization of electricity. This is expected to require creating a dedicated unit to oversee this responsibility, build a strategy, improve the procedures and operational efficiency and grow the business. This unit is also expected to be mandated to be the centre for tracking and reporting electricity consumption and efficiency related issues across ADY.

A.1) Analyse the current structure and processes of low-voltage power supply and electricity commercialization in ADY
   - Analysis of the electricity utilisation of ADY and third parties being supplied by ADY
   - Description of controlling procedures and tools used by ADY in energy supply and consumption
   - Identify key performance indicators relating to financial (revenues, costs, profitability etc) and operating (GWh sold etc) metrics.

A.2) Benchmark current ADY practice with other leading but similar companies (preferably from railway sector) internationally and regionally who are also involved in low energy supply.

A.3) Create a commercialisation strategy to grow the energy commercialisation business
   - Build a Cost Benefit Analysis of purchasing electricity with wholesale prices and prepare a sound document for ADY management to be introduced to the Government
   - Prepare strategy for electricity commercialisation and customer relations, including possible expansion of the number of customers
   - Analyse inefficiencies in measuring energy consumption (of traction especially) and billing of customers
   - Prepare a strategy to improve energy loss control during transition form Azerishiq infrastructure to ADY's
   - Conduct the cost-benefit analysis on the commercialization strategy to assess its feasibility.
   - Conduct market research, including identification of additional clients.
   - Provide recommendations on setting the Electricity Commercialization Unit in ADY, its operation model and positioning in organizational structure and staff requirements (internal
regulatory documents of the Unit and job descriptions of the staff) and develop controlling procedures and tools.

- Propose additional infrastructure/power supply units and other capex to be procured to deliver the strategy, including but not limited to potential of integration of in-house energy generation using alternative and renewable sources.
- Propose improvements of control procedures and IT solutions to deliver this strategy.

**Energy Efficiency and Renewable Energy Generation**

B.1) A review of energy audit methodologies developed by the Company (if any) in order to provide a brief assessment and recommendations for improvements in key areas; The consultant will also calculate an average emission factor for the railways (electric and diesel taking into account upstream energy costs) and Road freight transport in Azerbaijan.

B.2) Completion of a series of pilot energy audits based on the new and upgraded methodology for deployment across the different areas of the Company to allow for a focused feedback on areas in B1) above:

- The consultant will analyse the efficiency of energy consumption in ADY activities: electric locomotive running and stalling times, maintenance workshops, administration buildings etc.
- The consultant will calculate the energy cost for standard freight and passenger train and propose optimal load per train for energy efficiency.
- The consultant will analyse location of current AC substations and make proposal for potential substations along the network.
- The consultant will prepare utilization plan for the equipment of DC substations.
- The consultant will undertake an indicative number of energy audits in assets of different characteristics (stations, depots, rolling stock, electric substations, etc.) aiming to confirm the technical and economic fit for the new procedures for energy audits proposed.
- The consultant will develop necessary template for a toolkit to coordinate the deployment of the Energy Audits across the Company, including questionnaires, forms and sampling forms and will provide best effort assessment of human, equipment and financial resources required to perform the energy audits of the Company’s assets.
- The consultant will review information and decision-making processes in the Company in terms of energy efficiency management, including energy efficiency audit follow up procedures. The consultant will propose relevant modification to ensure that an appropriate number of measures identified in energy audits are actually implemented. These modifications might include for example the introduction of a budget allocation for an Energy Efficiency Investment Plan in the Investment Strategy for the coming years, a yearly allocation budget for energy efficiency investment or the mandatory integration of energy audit recommendations prior to the approval of any detailed design of the relevant investment.

B.3) A review of energy efficiency and renewable energy investment areas which have already been or could be investigated by the Company and form part of their investment plan, ensuring the integration of best available technologies. This will effectively be a high-level “long list” of key investment areas.
• Review the list of measures proposed in the company audits and assess their applicability and technical viability in other locations.
• Work in coordination with Azerbaijan Renewable Energy Agency for possible cooperation in the field
• Propose any other measure that may be suitable for the assets and assess their technical viability. For each sub-system, the Consultant should list the technologies and equipment which would realise energy saving and GHG emission reduction (or similar KPI for waste and circular economy) compared to the Baseline.

B.4) Preparation of a high level priority investment plan (‘short list’). High level recommendation for top priority investments (including alternative sources of heat and power).

- The measures will be prioritised on the basis of considerations such as
  - Cost
  - Energy Savings
  - GHG emission reduction
  - Cost savings
  - Investment return
  - Maintenance requirement and lifespan of the equipment
  - Implementation time and means of implementation

- Classify the measures / investments for the immediate (1 year), medium (2 years) and long term (2 years plus).

**Priority Investment Plan**

The Consultant will undertake the review of the priority investment plans for the Company in the key operational areas of rolling stock and railway track network with a view of preparing a high level priority investment list, taking into account – where relevant - results of the energy efficiency analysis and investment priority areas described in Tasks B above.

C.1) Develop a high level set of base-line Projections incapsulating the current status of the infrastructure and freight transport. Historical and Projected figures should include a breakdown of major (North/South, East/West) and other routes and should include volumetric KPI’s such as Tons, Km, and financial KPI’s up to EBITDA. It should be noted that the company produces IFRS statements. The consultant should also endeavour to collect data such as number of stations, Track km (electrified/non-electrified), rolling stock figures etc.

C.2) Review of existing Rolling Stock and rolling stock maintenance management in use by the Company taking into account safety, integrity and efficiency.

- With regards to the Rolling stock, the consultant will collect data on model type, years in service, lifespan, power source, and energy consumption among other KPI’s that the consultant might consider necessary.
- The consultant will review the current rolling stock maintenance standards and procedures and propose summary of investments to bolster the Company’s maintenance capacity either via investments in new depots, proposals for merging of depots, and other efficiency gains from improving ADY’s maintenance strategy. The investment proposals will carry
considerations for costing, savings, renewable energy, resource efficiency and recycling (water, materials, circular economy etc) and other financial and operational considerations.

- Based on the above, the consultant will identify main areas where investment of rolling stock may be suitable (either new rolling stock or upgrade/retrofits of existing assets to among others also consider use of new technologies such as energy recuperation). Rolling stock must be technically compatible with the general requirement and strategy of ADY and based on the Company’s freight and passenger traffic forecast. This will be effectively a ‘long list’ of possible investments in rolling stock. From the high level list above, the consultant will shortlist a series of priority investments, assessing the reasonableness of the cost estimates and the economic benefits of the new assets compared to the existing fleet in terms of expected:
  - Cost
  - Energy Savings
  - GHG emission reduction
  - Cost savings
  - Maintenance requirement and lifespan of the equipment
  - Implementation time and means of implementation

- Classify the investment for the immediate (1 year), medium (2 years) and long term (2 years plus).
- Compare the investments and build scenarios within the Baseline Model of the financial effects of these investments.

C.3) Review of existing track status and existing investment plans for track electrification. The consultant will provide high level information of the networks status quo and provide capex investment information currently planned by ADY across its track infrastructure.

C.4) High Level Proposal of investment in track electrification:
- The consultant will produce a set of recommendations for further electrification across its corridors, keeping in mind the existing network plans of ADY and the Company’s freight and passenger traffic forecasts;
- The consultant will also take into consideration the general, technical and strategic requirement of ADY (i.e. transition from DC to AC).
- From both lists, ADY investments and Proposed Investments, the consultant will shortlist a series of investments, assessing the reasonableness of the cost estimates and the economic benefits of the new assets compared to the existing track in terms of:
  - Cost
  - Energy Savings
  - GHG emission reduction
  - Cost savings
  - Maintenance requirement and lifespan of the equipment
  - Implementation time and means of implementation

- Classify the investments for the immediate (1 year), medium (2 years) and long term (2 years plus).
• Compare the investments and build scenarios within the Baseline Model of the financial effects of these investments.

2. IMPLEMENTATION ARRANGEMENTS

The Consultant will report to Rafael Rashid (Principal Banker in the Transport Team) and Elena Gordeeva (Senior Banker in the Transport Team), as well as to Sanjar Usmanov (Senior Banker in Baku Resident Office in Azerbaijan).

The Consultant will ensure that appropriately qualified experts are available, as required, for each of the different tasks outlines above. It is expected that the assignment will be led by an appropriately qualified project manager, accompanied by both key and supporting experts.

The Consultant will take responsibility to collect all information regarding the assignment and generate the appropriate deliverables.

It is expected that the team will include a resident team leader, who will spend a sufficient portion of the assignment working on site. The team should have extensive experience working on similar assignments in the region.

The team of consultants should have a background in economics, environmental engineering, energy efficiency, transport science, transport economics, railway engineering, or other advanced technology fields. The following experts should be part of the Consultant’s team:

• Resident Project manager / team leader
• Expert in electricity commercialization and/or distribution, including the development of analysis, technical studies and publications. At least 10 years professional working experience in that field. Prior experience working with an international organization is an added advantage.
• Energy Efficiency Specialist with a particular expertise in buildings and utilities (electricity, Water, heat, waste water, etc.). Prior experience running Energy Efficiency audits is an advantage especially in railways.
• Rail technology specialist with particular expertise in rolling stock
• Rail technology specialist with particular expertise in track electrification

3. DELIVERABLES

The Assignment will have duration of not more than 4 months.

The Consultant will be requested to produce the following outputs and reports:

• Within 4 weeks from the start of the assignment, an inception report shall be submitted by email to the Company and the Bank. The inception report shall provide preliminary findings in relation to the two sections of the strategy (Electricity Management/Energy Efficiency as well as Priority Investments in Rolling Stock and Railtrack Network) and shall confirm the work plan for meeting the requirement and tasks of this ToR
The consultant will submit a draft report for the first section (Electricity Management/Energy Efficiency) and the historical and Baseline projections for volumes and EBITDA within 8 weeks from the start of the assignment.

The consultant will submit a draft report for the second section (Priority Investment Plan) within 10 weeks from the start of the assignment.

The Consultant should submit a draft long list of investment proposals within 11 weeks from the start of the assignment. Excel format is preferred and all pertinent information such as reasoning, capex cost, cost savings, energy savings, Co2 savings etc should be detailed in key areas of: electricity management, energy efficiency, rolling stock and rail track network;

After consultation with the Bank and the Client, the Consultant will prepare a short list of investment proposals 12 weeks from the start of the assignment.

A draft final report, covering all aspects of the assignment will be sent to the Bank 14 weeks from the start of the assignment.

The consultant will incorporate comments and changes in the following two weeks and submit a final report by week 16.

Unless otherwise agreed with the Bank, all reports will be both in English and Russian and delivered to EBRD and ADY in electronic format (Word for Windows and Excel for Windows).

The Consultant will use the existing studies and their expert judgement and experience to deliver this study.

The Consultant will liaise closely with the EBRD project team in London to whom they will also report. To this end the Consultant will appoint a Project Manager/Team Leader to be the main contact with EBRD. The estimated budget for this assignment is not expected to be more than EUR 200,000.