

TERMS OF REFERENCE FOR CONSULTANTS

A. Background and Objective

1. Natural gas is the most important indigenous source of energy in Uzbekistan and regarded as one of the key driving forces of the country's economy. Natural gas comprises 85% of the country's energy mix, and 75% of electricity generated in Uzbekistan. Uzbekistan's aging gas infrastructure and network underinvestment have led to supply shortages, inefficiency, high losses and low reliability. Built more than 50 years ago, the gas transmission system consists of a complex network of high- and medium-pressure pipelines equipped with physically degraded compressors and lacks any centralized functions to measure, monitor, and control the system.

2. As part of Uzbekistan's effort to modernize the national gas infrastructure, the implementation of a modern supervisory control and data acquisition (SCADA) system on Uzbekistan's gas transportation system should be assessed and prepared in line with international standards.

3. The objective of the assignment is to prepare a design study for SCADA implementation on the entire gas transportation system of Uzbekistan and produce a detailed study preparing the installment and running of SCADA in a designated pilot area.

B. Scope of Work

4. The consultants are required to deliver:

a. **Technical assessment study of SCADA system installation on national gas transmission network.** This study should assess the requirements for establishing a national gas SCADA system in Uzbekistan including hardware, software, communication infrastructure and network/gas infrastructure needs. It should also lay out the functions, responsibilities and interplay between the National Central Control Room and local control and dispatch centers and other involved parties. In addition, the study should propose a plan on how to optimally roll out SCADA on Uzbekistan's gas transportation system in line with international standards considering the specificities, planned modernization and condition of the national gas transportation system. The proposal should pay particular attention to delivering a design that will allow Uzbekistan to introduce SCADA gradually and ensure interoperability, compatibility and technical possibility to smoothly incorporate various parts of the network at different times to eventually form one integrated system without encountering compatibility issues.

b. **Detailed technical design study for SCADA pilot installation between Yangier and Khodjaabad.** Based on the national implementation design study (a), a detailed design proposal for the installation of SCADA connecting the network area between Yangier and Khodjaabad compressor stations (in the east of the country) should be delivered. This area is among the first to perform significant modernization of gas infrastructure (compressors, pipelines) and shall be equipped with a modern SCADA system as a first pilot region. The study should

provide a detailed assessment of hardware, software, technical, communication and network/infrastructure needs and provide a detailed roll-out plan for SCADA in the defined area. In addition, the study should contain a solid and well-founded cost estimate for installing a modern SCADA system in the pilot area and provide the technical specifications of the equipment needed.

5. The consultants shall work closely with Uztransgaz (UTG), Uzbekistan's gas transmission company, as well as with other suggested institutions in Uzbekistan and ADB to effectively perform the tasks. Field days in Uzbekistan will be required to accomplish the task.

6. The team of consultants shall be committed and available during the entire duration of the assignment. The following expertise should be covered by the team:

7. **Project Team Lead/Gas Transmission (international, 3.5 person-months).** At least 10 years of project team lead and engineering background; solid experience in gas network operation, gas transmission projects, gas dispatch and/or other relevant gas utility experience. The Project Team Leader will oversee and contribute to the reports through his/her expertise and be responsible for managing the team of experts, delivering the results and act as a focal point to ADB on all issues related to the project.

8. **SCADA Expert (international, 3.5 person-months).** At least 8 years of experience in design, implementation and operation of SCADA systems for a national gas transmission system operator, network company, gas utility. The SCADA Expert will be responsible for delivering the SCADA design for roll-out in the designated pilot region and draw up the country wide SCADA study as specified in paragraph 4 in collaboration with the Project Team Leader.

9. **Telecommunications Specialist (international, 2 person-months).** At least 8 years of experience in designing and implementing telecommunication infrastructure/systems for the effective use of SCADA in the energy sector. The Telecommunication Specialist will be responsible to contribute the relevant aspects related to telecommunications for a well-functioning SCADA system in Uzbekistan and ensure that all telecommunication requirements are fully covered and reflected in the TA results.

C. Contractual Arrangements

The consultants will receive output-based contracts with lump sum compensation that covers all remuneration, costs, and expenses to deliver the entire scope of work. It includes all airfares, accommodation, subsistence, in-country transport, and other miscellaneous costs and expenses. Payment will follow delivery and acceptance of key milestones. Person months indicated above are only indicative.