

## **REQUIRED DETAILS**

### **Objective:**

The primary requirement of the proposed online fuel stock monitoring system is to automatically measure fuel tank level and amount of fuel deliveries to locomotive engines and electronically measure and display the remaining fuel stock for operational and planning needs of Sri Lanka Railways. The real time level, delivery and balance stock data shall be available for fuel delivery operator, along with facility to enter details of locomotive engine, operator detail and journey details before previous fuelling on a HMI (Human Machine Interface) LCD touch panel before authorities the fuel fulling. All delivery information and stock shall be available for online monitoring via mobile app with user name and password control. Facility shall be available to download fuel stock management reports in MS Excel format or as .pdf files for printing and sharing.

### **Scope of work**

1. The work involves supply and installation of level sensor, fuel flow meter, HMI, GSM modem/datalogger and custom developed software.
2. The maintenance shall include repair or replacement of sensors, battery backup, solar panels, communication modem, data logger, payment of data bills, cloud server hosting, other related items and be free of charge during first three years of operation (warranty period).
3. All measured parameters (fuel level, fuel flow meter reading, battery voltage, GSM data signal strength) shall be available on web based online platform. The work shall include design and development of necessary monitoring and communication and display software, down load and summery data reporting, mobile app and user levels access controls. The display screen, charts, tables and web pages etc. in both desktop and mobile app shall be customized to the operational requirement of engineer.
4. All equipment supplied under the contract shall be brand new and free of any defects. The contactor's responsibility is to design and install the gauging station and equipment that can withstand lightning, flood, wind, rain, high temperature and humidity. The warranty and free maintenance shall cover any damages or malfunctions arising from above environmental factors.
5. All repair work shall be attended by competent technical staff within 48 hours of fault reporting.
6. All measured parameters shall be hosted in a cloud-based server and maintained on behalf Sri Lanka Railways and shall have the facility to transfer all data, software and functions to dedicated server provided by the department when requested to do so.
7. The contractor shall provide onsite, class room and online training for not less than 5 participants for the equipment maintenance, trouble shooting, data verification procedures, usage and facilities of the online monitoring software.

## General Specifications

- 10 All items supplied under this contract shall be unused and brand new. Reconditioned or used items shall not be used. The system shall be complete with all required hardware, software and civil work for the proper and reliable online monitoring of fuel level and deliveries. The bidders are strongly advised to inspect each location and get clarifications if any before pricing the tender. All tenderers are required to fill the questionnaire in Annexure 1 and provide supporting printed documents such as test reports, manufactures data sheets and catalogues.

## 11 Hardware and Software specifications

- i. **Level Gauge:** The immersion type level sensor shall be high accuracy and sensor and its cable be suitable for long term submerge in auto diesel, Marine grade diesel and Gasoline. The cables, junction boxes and signal conversation or interface units shall withstand, high humidity, fuel vapor, dust and extreme temperature conditions. The accuracy of level shall be +/- 1mm or better over 0.000m to 2.500m range and the offered sensor shall be an internationally reputed brand with a 20-year or more track records for quality and durability. The CE certificate and Quality Assurance certificates shall be submitted. A detailed specification of the immersion type level sensor is listed in Annexure I.
- ii. **Fuel flow meter:** The flow meter shall be turbine type with stainless steels housing and local display. The flow meter shall have pressure rating of 25bar and accuracy 0.5%FS in the 66 l/m ~ 666 l/m. The offered sensor shall be an internationally reputed brand with a 20-year or more track record for quality and durability. The CE certificate and Quality Assurance certificates shall be submitted. A detailed specification of the flowmeter is listed in Annexure I.
- iii. **Solar Panel & Power backup:** The level gauge, flow meter and data logger shall be powered with solar power with adequate capacity battery. The station shall function normally for a minimum of 3 days period from the power backup with complete loss of solar power. The solar panels shall be mounted at a height not less than 4 meters from ground level.
- iv. **Data logger:** The data logger shall consist of a real-time clock, nonvolatile memory for data storage, a 3G/4G data modem, a battery management system, and a rechargeable battery, all housed in a rugged, environmentally sealed enclosure. The internal nonvolatile memory capacity shall be sufficient to store 1 year of level and flow data at 15-minute intervals along with the system battery voltage. The internal battery pack shall be sufficient for 14 days of normal operation with complete loss of power from the solar panel. All signal and power connections with the logger shall be via military-grade aviation connectors. A factory test report shall be provided along with one sample unit. A detailed specification of the data logger is listed in Annexure I.
- v. **Human Machine Interface LCD panel.** The contactor shall supply and install HMI panel of at least 10inch diagonal sized and touch sensitive screen. The display shall indicate the present fuel tank level, estimated fuel quantity in liters, and facility to key in the Locomotive engine and driver/operator details and quantity of fuel to be pumped. Also faculty to enter amount of fuel unloaded/deposited to the tank along with bowser number and delivery note number should be available. Once the above detailed entered and START soft key pressed, HMI shall display the fuel flow rate and the amount of fuel delivered to the engine. The HMI shall send

a pump stop signal when the required amount is delivered or when the STOP soft key pressed by the operator. Its expected the tank level, fuel flow meter and pump operation is graphically shown on the HMI display. A print option shall print fuel delivery details along with date and time for the engine operator.

- vi. **Dot Matrix Printer.** A high reliability thermal printer with cutting shall be supplied. The paper width shall not be less than 75mm.
- vii. The mobile app and browser-based desk top monitoring system shall enable the authorized user to view the daily tank level and stock variation in chart format, daily fuel delivery with engine details on a tabular format. The access to the system shall be username and password based. The following reports shall be available for download
  - Daily report of Hourly tank level and estimated stock
  - Daily report of fuel deliveries to locomotive engines (Engine and driver details, fuel delivered, time of issue)
  - Monthly or user selected time report of Fuel delivery by engine
  - Monthly or user selected time report fuel unloading with bowser number
  - Fuel reconciliation report for selected month / time period
- 12 If the bidder is not the manufacture the equipment and instrument offered, its mandatory to provide a written authorization letter from equipment manufacture letter head as per the specimen
- 13 All signal acquiring circuits, GPRS/4G modem, power supply, level and battery voltage display unit, shall be housed inside protected metal enclosure. The enclosure and the battery backup system shall be housed in a well-ventilated outdoor metal enclosure
- 14 The system and all its components shall carry a minimum of five years comprehensive warranty against defects arising from lightning, flood, wind, rain, high temperature and humidity. All regular maintenance and repair work that may become necessary during warranty period shall be attended by the contractor free of charge.
- 15 Bidder/Manufacture shall furnish documentary evidence of previous experience in two projects with level sensor based remote monitoring projects with value exceeding 5 million rupees within last 5 years. Name and contact details of client of such work shall be provided.
- 16 The tenderer shall indicate the cost of maintenance work following the initial warranty and maintenance period. The total operational cost for additional 5 years will be one of the key evaluation criteria.

**QUOTATION FOR SUPPLY, INSTALLATION AND MAINTENANCE OF ONLINE FUEL STOCK MONITORING AND MANAGEMENT SYSTEM FOR SRI LANKA RAILWAYS.**

**BOQ 1:**

No	Description	Unit	Qty	Unit Price (Rs)	Amount (Rs)
1.1	Supply and installation of fuel level sensor as per the specification	Nos	02		
1.2	Supply and installation of fuel flow meter as per the specification	Nos	02		
1.3	Supply and installation of data logger as per the specification	Nos	02		
1.4	Supply and installation of HMI LCD panel as per the specification	Nos	02		
1.5	Supply and installation of Dot matrix printer as per the specification	Nos	02		
1.6	Supply of Solar panel and battery backup as per the specification	Nos	02		
1.7	Development of software as per the requirement in the tender document	Item	02		
Total amount for BOQ No 1 carried to summery of bills					

**SUMMERY OF BILLS**

Bill No	Description	Amount (Rs)
1	Bill No 1	
	Total of Bills	
	Less discount if any	
	Total (Without VAT)	

Total amount (in words) excluding VAT

Rupees.....excluding VAT

VAT Rs. ....

VAT registration No. ....

Signature of Tenderer

In the capacity of .....

Seal

Witnesses :

1.0 Signature :..... 2.0 Signature :.....  
 Name Name  
 Address Address