

ANNEX II: TERMS OF REFERENCE

Contract Title: Supply of Services for the implementation of an Intelligent Billing and a NRW (Non-Revenue Water) Reduction Systems on a Reference DMA, within the Water Supply Service of the municipality of Edineț (supplies and services).

Contracting Authority: Municipality of Edineț
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1. BACKGROUND INFORMATION

1.1. Partner country

Republic of Moldova

1.2. Contracting authority

Edineț municipality city hall

1.3. Edineț municipality general description

The city of Edineț is the center of one of the 33 administrative districts of the Republic of Moldova, located in the Northern Development Region of the country, in an area with increased development potential, at the intersection of important national transport corridors. Alexandreni and Gordineștii Noi are parts of Edineț municipality and has a population of about 20 000 inhabitants.

The total surface of the land resources of the municipality is of 6 874 ha, constituting at the same time the surface of the urban land. The afferent agricultural lands constitute 3 218 ha, the water surface 96 ha, roads, and communication ways - 134 ha, reserves destined for constructions - 504 ha, forests 921 ha and others 27 ha.

The housing fund of the municipality on 31.12.2019 was 598.2 thousand m², 69% of the total housing fund is represented by private houses (381,4 thousand m²), the remaining 31% representing apartment blocks (216,8 thousand m²). The average surface is 56,7 sqm / dwelling, and the average living area per capita is 15,0 m². There are 126 streets in the city, with a length of 84 km.

The city of Edineț, in the national and regional context is found as a potential growth pole in within the Northern Development Region (RDN). In this sense, the city of Edineț needs to identify and support the key competencies he must become a major player in regional and national level, so that by implementing various projects to achieve their vision of the European city.

The existence of an economic, administrative, tourist and associative potential and of an infrastructure advantageous (the intersection of important transport corridors), can contribute to becoming of a dynamic and competitive city.

2. OBJECTIVES & EXPECTED RESULTS

2.1. Overall and specific objectives

The Edineț municipality has entered into an agreement with the European Delegation in December 2020 for the implementation of “Edineț - Insights into tomorrow cities” project aiming to develop and implement a smart urban development concept in Edineț municipality.

The **overall objective** of the project is to improve quality of urban development, citizens' satisfaction, and public services in Edineț.

The **specific objective** is to offer to the municipality of Edineț access to Smart Solutions for enhancing the city's urban development through:

- A participatory and collaborative approach of territorial planning to ensure smart governance is implemented.
- Public urban services optimized using innovative smart solutions tailored to the specific needs in Edineț.
- Promoted smart living in urban area for better assimilation of innovations and future city infrastructure for sustainable usage of urban space in Edineț municipality.
- Smart solutions implemented for 2 schools and 2 kindergartens.

The global project is implemented by Edineț municipality, RM in partnership with Alba Iulia municipality, Romania and associated partner Smart City Council, USA.

2.2. Results to be achieved under this Investment Project

- Achievement, within the Contract period, of a 41% sustainable reduction of the current level of water losses over the Reference DMA perimeter.
- Modernization, within the Contract period, of Apă-Canal Edineț's existing Billing System to Smart Billing, with expected substantial performance improvement within the Reference DMA on 3 main indicators :
Operational Cost, Billing Cycle Time, and Data Collect/Data Accuracy (up to 99%).

This Investment Project is intended to be used as a replicable model for future DMAs to be implemented on Apă-Canal Edineț water supply network.

3. SCOPE OF WORK

3.1. General

3.1.1. Context of the municipality of Edineț and Apă-Canal Edineț

Water for urban consumption is pumped from the environment, treated, and then injected into the water supply network. The water is then distributed and billed to end Customers (Subscribers to Apă-Canal Edineț). However, some of this "produced" water is lost, the quantities varying from case to case.

Many water companies in charge of this activity use tools developed by the IWA (International Water Association). IWA is the largest international network of water professionals. Its members are spread across 140 countries.

This international cooperation, recognized worldwide, has established a methodology and terminology that enable a Water Balance (balance between the volume of water introduced into the water supply network and the volume of water sold/not sold).

IWA Water Balance

Volume of water injected into the system	Authorized Consumption	Authorized Billed Consumption	Metered Billed Consumption	Water Billed
			Unmetered Billed Consumption	
		Authorized Consumption not Billed	Unbilled Metered Consumption	Water not Billed
			Unmetered Unbilled Consumption	
	Water Losses	Commercial Losses (Apparent)	Unauthorized Consumption	
			Meter Under Metered and Data Manipulation Errors	
		Physical Losses (Real)	Leaks in Distribution Pipes	
			Water Tank Leaks & Overflows	
	Connection Leaks			

In line with the Smart City strategy, the municipality of Edineț and Apă-Canal Edineț, have decided to take up the challenge with several major objectives in the field of energy efficiency, water resources saving in the Republic of Moldova and improvement of relations with Customers to communal Services:

- Progressive optimization of network efficiency.
- Improve and foster operational efficiency within the utility promoting sustainable resource management through accurate billing process.

3.1.2. Glossary

Smart Billing System: Digital and automated system for generating and managing bills, based on real-time data, enhancing accuracy, efficiency, and providing insights into consumption patterns.

NRW: Non-Revenue Water is water that has been produced and is "lost" before reaching the Customer or not billed. Losses can be Real or Apparent. High levels of NRW undermine the financial viability of water utilities, as well as the quality of the water itself.

DMA: A District Metered Area is a segment of the hydraulic network with one or more well-defined inlets, each of which is equipped with a sectorization/inlet meter.

Reference DMA: The "Reference DMA" is the first DMA, implemented on the Apă-Canal Edineț water supply network, equipped with the most advanced metering technologies, automatic data collection, communication, and associated services, enabling, among other things, a drastic reduction of NRW and improvement of the utility Billing System. This DMA must have the capacity to be integrated into the Smart City/IoT environment when operational.

Water Losses: Water losses made up of both Real and Apparent Losses.

Apparent Losses: Water losses corresponding to metering errors, data manipulation errors and/or unauthorized consumption.

Real Losses: Water losses arising from leaks on the transport system, as well as leaks and overflows from reservoirs.

IoT: The Internet of Things is the interconnection between the Internet and physical objects, places, and environments. The term refers to the growing number of objects connected to the Internet, enabling communication between our so-called physical assets and their digital existences.

LoRaWAN: Radio communication protocol based on Lora technology. As part of the IoT, it enables the structuring of a low-power wide-area network, integrating low-power terminal equipment via gateways.

SaaS: Software as a Service is a commercial operating model for software, in which the software is installed on remote servers rather than on the user's machine.

3.1.3. Goals and benefits of the Project

Through this Contract, the municipality of Edineț and Apă-Canal Edineț are seeking to acquire the most advanced technological solutions for simultaneously and innovatively addressing the reduction of Apparent and Real Losses as well as setting-up a Smart Billing system to transition from traditional billing methods to an automated, data-driven system. In today's digital age, efficient and transparent water management is crucial. By leveraging advanced metering and digital platforms, this initiative promises accurate billing, real-time consumption insights, and enhanced operational efficiency. This shift not only reduces costs and improves revenue for utility but also empowers consumers with better control over their water usage.

For this specific Project, Apă-Canal Edineț drew on the experience of numerous water companies around the world and the proven positive results obtained after implementing DMA on their water supply networks.

The implementation of the first DMA (Reference DMA) will enable the provision of essential services in this predefined sector and guarantee efficient, sustainable, and equitable use of this vital water resource, while offering Customers a reliable, high-quality water supply.

The implementation of further DMAs across the entire Apă-Canal Edineț water supply network will significantly improve water management and distribution.

The DMA will be equipped with smart meters, sensors and remote management systems that will collect real-time data on water consumption.

The benefits of this approach for water resources:

- Smart Billing: Smart billing expectations are to enhance data accuracy, get faster in leakages detection in properties, to improve utility operation efficiency, to make the utility ready for future and smart city roll out.
- Equitable management: By dividing the city into specific zones, it becomes possible to allocate water resources more equitably. This ensures that each district and sector receive an adequate supply of water, while avoiding wastage or shortages.

- Rapid leak detection: Smart meters and associated systems enable continuous monitoring of water consumption. As a result, leaks, wastage, and distribution problems can be detected quickly, reducing water losses, the costs associated with repairing them and the inherent financial damage.
- Water conservation incentives: Smart meters and associated systems provide accurate, detailed information on users' water consumption. This information can be used to sensitize consumers to adopt more water-efficient behaviors.
- Data-driven decision-making: The data collected provides valuable information for water planning and management. Decisions on infrastructure investments, pricing policies and conservation initiatives can be based on reliable, up-to-date data.

A comprehensive training program, aimed primarily at Apă-Canal Edineț's employees directly or indirectly involved in the Project, must play a key role to enhance skills and experience of the water utility's staff.

A better understanding of new services/technologies, as well as the transfer of essential know-how, will ensure greater autonomy for employees.

This training program should enable the water company to remain at the forefront of technology and keep providing quality service.

- Improved operational efficiency: New technologies can automate many repetitive, time-consuming tasks, enabling employees to concentrate on specific tasks.
- Process optimization: Advanced data analysis tools enable massive amounts of information to be collected, processed, and analyzed. This data can be used to optimize numerous processes and improve operations planning.
- Improved Customer Service: The mobile applications and SaaS platforms on offer, can enable Customers to report issues more quickly and receive real-time updates on work in progress. Trained staff will be able to use these tools to improve communication with Customers, respond to their needs more quickly and offer them better service.
- Cost reduction: Automation and process optimization reduce operational costs. Example: early detection of leaks, combined with the necessary actions, can reduce Water Losses. This translates into significant financial savings for the water company.
- Adapting to changes in the water sector: The water sector is constantly evolving, with the emergence of new regulations, new environmental standards, and new technologies. By training staff in new technologies, the water company will be better prepared to cope with all these changes.

3.2. Geographical area to be covered

Based on a preliminary survey carried out by Apă-Canal Edineț, the implementation of the Reference DMA was defined in downtown Edineț, adjacent to the "Vasile Alecsandri" public park.

This segment of the water supply network includes 7 residential buildings, 1 high school, 1 monastery and 10 private houses.



3.3. General description of the Project Components

The contract consists of the supply by the Contractor of 4 indivisible Components as one single lot. A general description of these Components is given below.

A more detailed description of the contractual requirements is given in “*Annex II: Technical Specifications*” & “*Annex III: Financial Offer*”.

3.3.1. Component I: “Services NRW & Billing System”

This Component consists of both one-off and monthly Service reports and must be provided by the Contractor throughout the Project period.

It must be proposed by the Contractor in the format of a comprehensive Solution for improving network efficiency and maintaining optimum performances over time.

This Solution must also leverage the smart metering to efficient billing process of the utility reaching a Smart Billing solution for the utility.

4 types of Services must be provided by the Contractor under this Contract:

- **NRW Preliminary Service:** Audit of the current NRW situation in the area covered by the Reference DMA. This should be provided at the beginning of the Project and must include an overall NRW Action Plan. This audit should be materialized by a Report.
- **Billing System Preliminary Service:** Audit of the current situation of Apă-Canal Edineț Billing at city as well as Reference DMA levels. This should be provided at the beginning of the Project and must include an overall Billing System Action Plan. This audit should be materialized by a Report.
- **NRW Monthly Service:** Monthly analysis of NRW situation and its evolution within the perimeter of the Reference DMA. This should be provided on monthly basis and must include a specific NRW Action Plan to be applied the following month. This periodical analysis should be materialized by a Report.
- **Billing System Monthly Service:** Monthly analysis of Billing System and its improvement along the Project implementation evolution. This should be provided on monthly basis and must include a specific Billing System Action Plan to be applied the following month. This periodical analysis should be materialized by a Report.

3.3.2. Component II: “Associated Technological Elements”

This component consists of all additional technological equipment and features implemented in the Reference DMA area, which are essential for the provision of the Services describe in paragraph “3.3.1. Component “*Services NRW & Billing System*”:

- Park of Smart Meters for billing and network purposes, consisting of meters equipped with various latest-generation communication modules, to be newly installed or to replace existing mechanical meters. These meters must include all associated accessories (fittings, valves, filters, etc.) required for installation and operation.
- Communicating pressure sensors with all inherent associated accessories.
- Various SaaS platforms, applications, and subscriptions for collecting and analyzing data from meters and other communicating equipment.
- Various digital Interfacings between certain elements of the DMA and existing or upcoming applications (Billing System, IoT, SCADA, etc.).

3.3.3. Component III: “Training Courses”

The benefits of the Training Courses, intended to Apă-Canal Edineț’s staff, are outlined in paragraph “3.1.3. Goals and benefits of the Project”.

The training program proposed by the Contractor in its offer must include the following modules:

- Metrology and Metering (including Smart Metering)
- New Tools and Software: Customers Data Collect
- New Tools and Software: Network Data Collect
- IoT/Smart City: Basics & Smart City for Water Management
- NRW (Non-Revenue Water): Basics & Reference DMA focus
- Smart Billing: Basics & Smart Billing for Water Management

3.3.4. Component IV: “Assistance in Specific Domains”

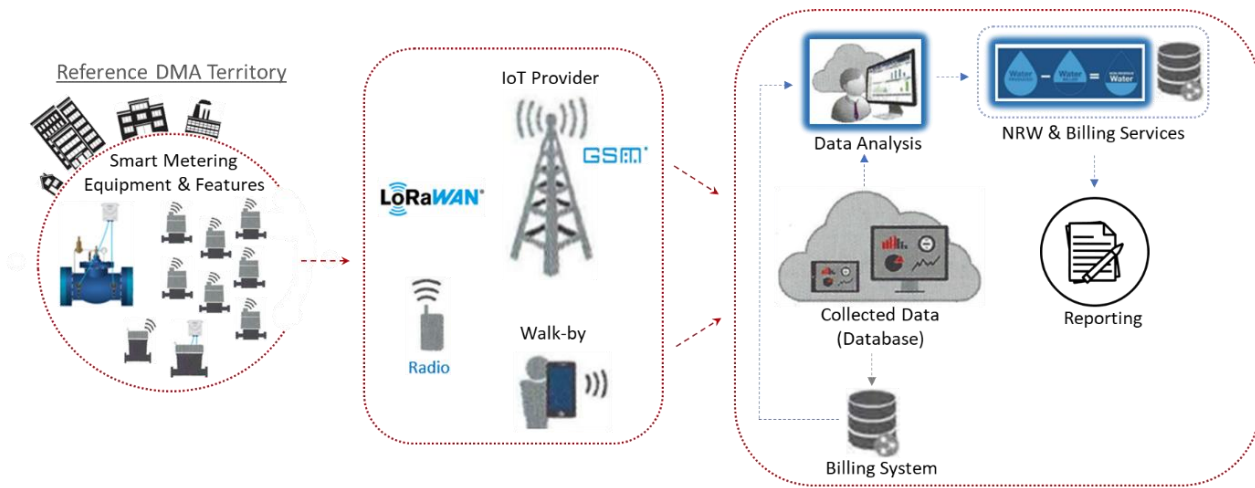
The implementation of new technologies, and their daily use, will certainly have massive and positive impacts on the operation of Apă-Canal Edineț, which is ready to embrace these changes and exploit their full potential.

During the execution of the Project, Apă-Canal Edineț staff will need the support and guidance in the field of Experts in 2 main areas, identified so far as requiring assistance.

This work shall take the form of a field Assistance Mission proposed by the Contractor. This mission is to cover the following areas:

- Supervision of the installation of all related technological hardware provided as part of the Contract.
NB: For practical reasons and legal compliance with the legislation in force in the Republic of Moldova, the above-mentioned activity will be handled by Apă-Canal Edineț.
- Support in handling M2M necessary subscriptions for Project execution.

3.4. Functional overview of the elements of the Project



The elements of the Project must be handled by the Contractor in the following manner:

3.4.1. Metering unit for DMA Inlet

Installation of a suitable meter at the DMA inlet (high-accuracy electromagnetic meter will be preferred).

This meter must be equipped with a flow and pressure monitoring system (GSM analyzer).

The meter unit must include flanges and isolation valves as well as all complementary items to ensure proper running.

3.4.2. Metering units for the water supply network

Installation of network meters at identified points (high-accuracy electromagnetic meters will be preferred).

These meters must be equipped with a flow and pressure monitoring system (GSM analyzer).

Each unit must include flanges and isolation valves as well as all complementary items to ensure proper running.

3.4.3. Metering units for residential building inlets and similar sites

Installation or replacement of meters at identified points (high-accuracy mechanical meters).

These meters must be equipped with a flow and pressure monitoring system (GSM analyzer).

Each unit must include fittings, Y-Filter, isolation valve, antifraud ring as well as all complementary items to ensure proper running.

3.4.4. Metering units for residential Customers (in residential buildings)

Installation or replacement of all meters for apartment customers in the concerned residential buildings (high-accuracy mechanical meters).

These meters must be equipped with radio communication modules.

Each unit must include fittings, Y-Filter, isolation valve, antifraud ring and NRV (Non-Return Valve) as well as all complementary items to ensure proper running.

3.4.5. Metering units for residential Customers (in residential private houses)

Installation or replacement of all meters for customers living in concerned residential private houses (high-accuracy mechanical meters).

These meters must be equipped with radio communication modules.

Each unit must include fittings, Y-Filter, isolation valve, antifraud ring and NRV (Non-Return Valve) as well as all complementary items to ensure proper running.

3.4.6. Data Collection tool processing for residential metering

Data collection from residential meters, using radio communication modules, must be carried out automatically via a dedicated SaaS platform-type tool.

These tools must include all the necessary items (tablets and accessories, applications, specific subscriptions).

Interfacing this data collection tool for residential metering with the billing tools, used by Apă-Canal Edineț, must be included in the Contractor's offer.

3.4.7. Data Collection tool processing for network metering

Data collection from network meters equipped with GSM analyzer, should be carried out automatically via a dedicated SaaS platform-type application.

Network meters include also inlet building meters equipped with both GSM analyzer and communication modules. These specific meters will require a subscription to both network and residential data collection tools.

This tool must include all the necessary items (tablets and accessories, applications, specific subscriptions).

Interfacing this data collection tool for network metering with Apă-Canal Edineț existing water supply monitoring tools (or Scada, if available), must be included in the Contractor's offer.

3.4.8. Migration process of the elements of the Reference DMA to IoT/Smart City environment

This process consists of the migration from mobile mode to fixed mode data collection for the elements of the Reference DMA, specific to the IoT/Smart City environment.

This migration will also have to integrate the entire DMA data decoding, storage, and security structure and will involve additional interfacing between the IoT tools and the residential metering data collection tool.

***NB:** In anticipation of the deployment, during the contract period, of the operator's IoT/Smart City infrastructure in Edineț, the Contractor may propose in its offer the deployment of a compatible infrastructure at the scale of the Reference DMA and carry out the necessary IoT/Smart City interfacing and migration required in the Project.*

3.4.9. DMA network area and Billing System efficiency

The supply of a comprehensive Services Solution will be required. This solution can include a data analysis platform if necessary. A more detailed description of these requirements is given in "Annex II: Technical Specifications".

3.5. Start date & period of the Project

The intended start date of the Project is the date of Contract signing by the Contracting Authority and the Contractor.

The period of the Project is 12 months from the date of Contract signing.

3.6. Project Leaders

Shortly after the Contract is signed, the 2 parties must convene a kick-off meeting.

Among other duties, they will have to designate Project Leaders and list/schedule all practical tasks required for the successful implementation of the Project.

3.7. Implementation of the Project: Milestones

From the start date of the Contract and during the period of the Project, the process must be carried out according to the following milestones:

N°	Description of the Milestones	Period/Duration
1	<p><u>Kick-off meeting between the representatives of the Contracting Authority, Apă-Canal Edineț and the Contractor in Edineț</u></p> <ul style="list-style-type: none"> ▪ Appointment of the Project Leaders for both parties (Project Manager for Apă-Canal Edineț & Senior Representative for the Contractor). ▪ Definition of Apă-Canal Edineț team involved in the Project and the Training Courses. ▪ Schedule of activities on Project duration and milestones. ▪ Definition and setting up of an effective communication plan between the parties for the period of the Contract. 	Within 2 weeks following Contract signing
2	<p><u>Component II “Associated Technological Elements”</u></p> <ul style="list-style-type: none"> ▪ Delivery of the smart metering equipment, pressure sensors, communications devices, and accessories to be installed on the network and at Customers sites covered by the Reference DMA. 	1 month after Contract signing
3	<p><u>Component II “Associated Technological Elements”</u></p> <ul style="list-style-type: none"> ▪ Interfacing of the Data Collection tool for residential metering with Apă-Canal Edineț billing tools. ▪ Interfacing of the Data Collection tool for network metering with Apă-Canal Edineț existing water supply monitoring tools (or Scada, if available). 	Within 4 months after Contract signing
4	<p><u>Component I “Services NRW & Billing System”</u></p> <ul style="list-style-type: none"> ▪ Supply of the NRW Services Preliminary Report (1 single Report) ▪ Supply of the Billing System Preliminary Report (1 single Report) 	2 months after Contract signing
5	<p><u>Component I “Services NRW & Billing System”</u></p> <ul style="list-style-type: none"> ▪ Supply of NRW Services Monthly Reports (10 monthly Reports) ▪ Supply of Billing System Monthly Reports (10 monthly Reports) 	1 st monthly Reports the 3 rd month after Contract signing, then monthly for the Contract duration
6	<p><u>Component II “Associated Technological Elements”</u></p> <ul style="list-style-type: none"> ▪ Installation* of the items as mentioned in “3.3.2. <i>Component II: Associated Technological Elements</i>” in the area covered by the Reference DMA. <p>(*) The installation will be carried out by Apă-Canal Edineț.</p>	Within 3 months from the date of delivery of the equipment in Edineț
7	<p><u>Component II “Associated Technological Elements”</u></p> <ul style="list-style-type: none"> ▪ Interfacing DMA network tools and Billing System with Edineț city IoT telecom operator. ▪ Reference DMA migration into the IoT/Smart City environment. 	Within 6 months from the date of full installation of the hardware and related items
8	<p><u>Component III “Training Courses”</u></p> <ul style="list-style-type: none"> ▪ Completion of the full program of trainings as required. 	To be agreed by the Parties, within the Contract period
9	<p><u>End-of-Contract Meeting with the Parties</u></p> <ul style="list-style-type: none"> ▪ Project evaluation/commissioning 	End of Contract Period

4. USE OF ADDITIONAL RESOURCES

If appropriate, the Contractor may use additional Personnel/Resources for certain specific tasks or activities requiring appropriate linguistic support in the Romanian language.

A justification must be submitted with the Contractor's offer and must include information about this Personnel.

5. DELIVERY OF THE CONTRACT ITEMS

The delivery schedule of the Contract items must follow the indications set out in paragraph "3.7. *Implementation of the Project: Milestones*" as closely as possible.

Delivery of hardware that requires physical installation at Customers' sites and on the segment of the water supply network covered by the "DMA Reference" remains the priority and must be completed at the earliest possible convenience after the Contract has been signed by the Parties.

These items shall be shipped by the Contractor to the delivery location specified by the Contracting Authority.

6. SIMILAR PROJECTS REFERENCES

In its offer, the Contractor must present proof of completion of at least 2 similar projects in water losses reduction and additional related services.

References from projects carried out in the Republic of Moldova or in Romania over the past 10 years will be highly appreciated.

ANNEX I to the TOR: TECHNICAL SPECIFICATIONS

1.GENERAL

REQUIREMENTS

TECHNICAL

REQUIREMENTS

Component <u>I</u> :	“Services NRW & Billing System”	132.
Component <u>II</u> :	“Associated Technological Elements”	132.1. 132.2.
Component <u>III</u> :	“Training Courses”	162.3.
Component <u>IV</u> :	“Assistance in Specific Domains”	242.4.

TABLE FOR TECHNICAL EVALUATION

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7. GENERAL REQUIREMENTS

The Contract consists of the supply of 4 main Components which are indivisible and shall be supplied by the Contractor as one single lot.

The Technical Specifications are part of the Contracting Authority's requirements which the bidder must use to draw up his offer.

This document specifies in terms of requirements and quantities Services, hardware (including all associated tools), interfacing & migration works, training modules and Experts assistance to be provided under the Contract, as well as the conditions necessary for the implementation of the Project.

The technical requirements expressed in this document represent minimum requirements relating to the functional characteristics/capabilities of the Solutions and various equipment to be offered by the bidder.

All requirements are mandatory. The submission of products whose technical characteristics are inferior or do not meet the requirements will result in automatic disqualification of the bidder.

The bidder must provide a detailed response to the requirements for the characteristics requested in its technical proposal. This response must be expressed in the form of a Clause-by-Clause Comment on Technical Specifications stating the compliance with all requirements of the Contract.

All Services and equipment offered by the Contractor shall comply with the legislation in force in the Republic of Moldova as well as in the European Union⁽¹⁾. Particular attention will be paid to water meters for residential Customers and all other devices in contact with drinking water. The necessary documents attesting to this compliance must be supplied accordingly par the bidder.

(1) *European standard MID 2014/32/EU (MID 26/02/14) and regulation 2004/22/CE*

8. TECHNICAL REQUIREMENTS

8.1. Component I: “Services NRW & Billing System”

4 types of Services shall be provided by the Contractor throughout the Contract period. The provision of these Services must be documented in reports, in both English and Romanian.

These reports (or set of reports) will be used as a base by the Project Manager appointed by Apă-Canal Edineț for acceptance of the Services delivered.

The Contractor must include in its offer templates/models of report (one per type of Service) which shall illustrate clearly all the requirements of the Services.

The Contractor shall propose a comprehensive Solution for the provision of the Services. This solution must include the involvement of experts in data analysis applied to NRW and Smart Billing. These experts will

have to generate the required reports throughout the project period and assist Apă-Canal Edineț staff in implementing some expected Action Plans.

If this comprehensive Solution includes a complementary analytic platform for monitoring and data analysis, it must be open to some selected employees of Apă-Canal Edineț upon request.

The solution described in the following paragraphs will be preferred to any other solution offering only "basic access to an analytical platform".

8.1.1.1. NRW Preliminary Service Requirements

Objective: Identification within Apă-Canal Edineț of all possible areas of improvement relative to NRW reduction measures.

The Contractor will have to collect various data and information of the utility (organizational, digital, regulatory, ...) to audit current situation and define the next steps of the Project.

This NRW Preliminary Service, together with the Smart Billing Preliminary Service, is one of the 2 backbones of the project and should be provided at the beginning of the Project.

This audit should include an overall NRW Action Plan and must be materialized by a Report.

Reporting schedule: 1 single Report to be provided 2 months after Contract signing

To ensure the outcomes expected for the Project, below are listed the minimum content of this report:

- Analysis of existing data of the utility: billing software, meter reading software, existing water supply monitoring tools (Scada, if available), or others concerned elements.
- Define KPIs on NRW for the utility so they can be used in periodical (monthly) reporting.
- Analysis of the utility process to highlight areas of improvement relative to NRW reduction.
- Provide global statistics on the meter reading.
- Make the segmentation of the Customers in size groups for priority definition.
- Identify the connections with data issues (such as duplicated Serial Number...).
- Provide missing information impacting NRW per connection (such as meter types, size...)
- Make the ranking of connections with highest volume loss and impacting NRW.
- For the Reference DMA, provide a first dashboard with the following information:
 - Average NRW level to define NRW reference level
 - Average injected volume in the DMA
 - Average monthly consumption (m³/month)
 - Average water balance used by utility
 - Number of connections in the DMA
- Details and consolidate impact on NRW of all connections with the following issues:
 - Meters not read or not accessible
 - Meters with incorrect readings
 - Meters ageing impact
 - Connections with no consumption and their duration
 - Connections with backflow volume
 - Connections with metering inefficiency
 - Connections with leakage after the meter
 - Connections with decreasing consumption
 - Connections with sizing issues (oversize, undersize)
 - Connections with fraud attempt
- Formalize the overall NRW Action Plan and draw up a list the priorities for the Project execution.

8.1.1.2. NRW Periodical (Monthly) Services Requirements

Objective: On a monthly basis, the Contractor shall provide the necessary service to help the Utility make progress in reducing NRW. Based on the specific NRW action plan drawn up the previous month, the status of the current month must be extensive to facilitate the understanding of the Apă-Canal Edineț staff. This periodical analysis must be materialized in a report.

Reporting schedule: 10 Reports in total (1st Report the 3rd month after Contract signing, then monthly for the Contract duration).

Apă-Canal Edineț has listed below the minimum content expected of the monthly reports:

- Status update on the data quality impacting NRW.

- List of data quality issues in the month impacting NRW.
 - Update of NRW KPIs (at the date of report).
 - Follow up of the injected volume of the Reference DMA.
 - A Water Balance for the DMA as well as for each residential building vs apartments.
 - Computed volume lost due to Apparent Losses.
 - Computed volume lost due to Real Losses.
 - Measure the gain on the NRW over the selected perimeter.
 - For the Reference DMA provide a dashboard update with the following information:
 - NRW level evolution compared to NRW reference level
 - Injected volume of the month
 - Number of connections
 - Number of replaced meters
 - Number of leakages found and associated volumes
 - Number of leakages found on the water supply network segment and associated volume
 - Specific Action Plan focus on NRW level improvement:
 - Consolidation of last month specific actions impact on NRW
 - Definition of the coming month specific actions to implement by the Utility staff.
- Apparent Losses actions:
- List of connections to investigate for all issues found
- Real Losses actions:
- Detection of new leakages (if any) not yet visible in the streets
 - Map with found leakages position using Contractor's technology

8.1.1.3. Smart Billing Preliminary Service Requirements

Objective: Apă-Canal Edineț has agreed to carry out a full audit of the Billing activity to gain a better understanding of it and to improve its efficiency. It shall be provided by the Contractor at the beginning of the Project and shall include an overall Action Plan for the Billing system improvement. This audit should be materialized by a Report.

Reporting schedule: 1 single Report to be provided 2 months after Contract signing.

To ensure the outcomes expected for the Project, below are listed the minimum content of the report:

- Diagnostic of the current Billing process
- Analysis of the data quality impacting the Billing
- Define KPIs on the Billing process for Apă-Canal Edineț to be used in the monthly report:
 - Analysis of the last month number of reads and time to read the meters
 - Analysis of the last month consumption evolution over the selected area (m³/month)
- Global statistics on the meter reading and Billing over Reference DMA
- Segmentation of the Customers by groups and types
- Customers and connections with administrative issue
- Connections with duplicated Id or Serial Number
- Missing information impacting Billing per connection (Customer Tarif group, ...)
- Ranking of connections with highest volume loss and financial valuation
- Detail and consolidate financial impact of all connections with the following issues:
 - Meters not read or not accessible
 - Connections with no consumption and their duration
 - Connections with backflow volume
 - Connections with metering inefficiency
 - Connections with leakage after the meter
 - Connections with decreasing consumption
 - Connections with fraud attempt
- Formalize the overall Billing System Action Plan and draw up a list the priorities for the Project execution.

8.1.1.4. Smart Billing Periodical (Monthly) Services Requirements

Objective: After each billing campaign, Apă-Canal Edineț is expecting to have a grounded progression measurement of improvement areas defined by the Contractor in a specific Billing Action Plan. The periodical status should be provided on monthly basis and should be materialized by a Report.

Reporting schedule: 10 Reports in total (1st Report the 3rd month after Contract signing, then monthly for the Contract duration).

To help the bidder, Apă-Canal Edineț has listed below the minimum content expected of the monthly report:

- Status update on the data quality impacting Billing.
- List of data quality issues of the month impacting Billing.
- Update of global billing KPIs (Volume, duration, ...):
 - Analysis of the last month number of reads and time to read the meters
 - Analysis of the last month consumption evolution over the area (m3/month)
- Dashboard on the alarms collected with smart metering and linked to Billing.
- Dashboard of meter reading efficiency per route and meter reader.
- The ranking of connections with highest volume loss and financial valuation.
- Details and consolidated financial impact of all connections with the following alarms:
 - Meters not read or not accessible.
 - Connections with no consumption and their duration
 - Connections with backflow volume
 - Connections with metering inefficiency
 - Connections with leakage after the meter
 - Connections with decreasing consumption
 - Connections with fraud attempt
- Consumption/Volume invoiced analysis per residential building:
 - Volume consolidation between building inlet and apartment meters
 - Volume and revenue loss per collective residential building
- Specific Action Plan focus on Billing improvement:
 - Consolidation of last month specific actions impact on billing
 - Definition of the coming month specific actions to implement for Apă-Canal Edineț staff

8.1.1.5. Deliverables: Acceptance requirements for invoicing purpose

After successful completion and delivery of the items of Component I, the following document(s) shall be provided by the Contractor to the Contracting Authority for approval/acceptance & invoicing purposes:

Component I / Deliverable	Document to be supplied by the Contractor (attached to the invoice)	Quantity
NRW Preliminary Service	NRW Preliminary Report	1
Smart Billing Preliminary Service	Smart Billing Preliminary Report	1
NRW Monthly Service	NRW Monthly Report	10
Smart Billing Monthly Service	Smart Billing Monthly Report	10

8.2. Component II: “Associated Technological Elements”

8.2.1.1. Metering unit for DMA Inlet

The unit must include:

- 1 pc. Electromagnetic water meter Dn 100mm
- 2 pcs Isolation valves Dn 100mm
- 6 pcs Flanges Dn 100mm
- 1 pc. GSM analyzer (including M2M SIM card)
- 1 pc. Connector (GSM analyzer to Electromagnetic meters)
- 1 pc. Pressure sensor
- 1 pc. Saddle clamp (for pressure sensor fixing)

- 1 pc. Isolation valve (for pressure sensor fixing)
- 1 pc. SaaS subscription bundle to provider's dedicated platform for data collection tool for network metering, after installation of GSM Analyzer and until the Contract ends:
 - 1 pc. Subscription: per device/per month (for 10 months)
 - 1 pc. Account creation/Configuration & Set-up (Network Data Collection)

8.2.1.2. Metering units for identified locations on Water Supply Network

Each unit must include:

- 2 pcs Electromagnetic water meters Dn 50mm
- 4 pcs Isolation valves Dn 50mm
- 12 pcs Flanges Dn 50mm
- 2 pcs GSM analyzers (including M2M SIM card and connector)
- 2 pcs Pressure sensors
- 2 pcs Saddle clamps (for pressure sensors fixing)
- 2 pcs Isolation valves (for pressure sensors fixing)
- 1 pc SaaS subscription bundle to provider's dedicated platform for data collection tool for network metering, after installation of GSM Analyzers and until the Contract ends:
 - 2 pcs Subscriptions: per device/per month (for 10 months)
 - Account creation/Configuration & Set-up (N/A, as already done in 2.2.1)

8.2.1.3. Metering units for buildings inlets or similar sites (12 units)

Each unit must include:

- 12 pcs Mechanical Water Meter Dn 40mm (Single Jet type). The meter must be supplied as one single item with the following feature:
 - 1 pc. Pre-equipped and programmed Radio Communication Module
- 12 pcs Isolation valves Dn 40mm
- 24 pcs Fittings Dn 40mm (1 linear 1½", 1 nut 2", 1 gasket)
- 12 pcs Filters Dn 40mm (Y-type)
- 24 pcs Anti-fraud sealing rings Dn 40mm
- 12 pcs GSM analyzers including M2M card and operator package for the contract period
- 12 pcs Pressure sensors
- 12 pcs Saddle clamps (for pressure sensors fixing)
- 12 pcs Isolation valves (for pressure sensors fixing)
- 1 pc SaaS subscription bundle to provider's dedicated platform for data collection tool for network metering, after installation of GSM Analyzers and until the Contract ends:
 - 12 pcs Subscriptions: per device/per month (for 10 months)
 - Account creation/Configuration & Set-up (N/A as already done in 2.2.1)
- 1 pc SaaS subscription bundle to provider's dedicated platform for data collection tool for residential metering until the Contract ends:
 - 12 pcs Subscriptions: per device/per month (for 11 months)
 - 1 pc. Account creation/Configuration & Set-up

8.2.1.4. Metering units for Customers in residential buildings and private houses (450 units)

Each unit must include:

- 450 pcs Mechanical water meters Dn 15mm (Single Jet type). Each meter must be fitted with the following features:
 - 1 pc. Pre-equipped and programmed radio communication module
 - 1 pc. Outlet-type Non-Return Valve Dn 15mm (inserted in water meter outlet)
- 450 pcs Isolation valves Dn 15mm
- 450 pcs Fittings Dn 15mm (1 linear ½", 1 nut ¾", 1 gasket)
- 450 pcs Fittings Dn 15mm (1 linear ¾", 1 nut ¾", 1 gasket)

- 450 pcs Filters Dn 15mm (Y-type)
- 950 pcs Antifraud rings Dn 15mm
- 1 pc SaaS subscription bundle to provider's dedicated platform for data collection tool for residential metering until the Contract ends:
 - 450 pcs Subscriptions: per device/per month (for 11 months)
 - Account creation/Configuration & Set-up (N/A as already done in 2.2.3)

8.2.1.5. Tablets for data collect, programming and setting up

Tablets are required for mobile collect of Customer and Network data (before switching to fixed IoT/Smart City network data collect). These tablets will also be used for programming and setting up the equipment involved (communication modules and GSM analyzers).

The tablets must be "robust" for use in the field and must be equipped with NFC (Near-Field Communication) technology.

Quantity: 3 pcs

8.2.1.6. Radio frequency gateways for tablets

These devices are required to bridge between the communication modules and the tablets.

Radio frequency required features:

- Protocol Wireless MBus (wM-Bus)
- Communication layer: Bluetooth v.2.2.
- Modulation Frequency: Shift Keying
- Frequency carrier: 868 MHz
- Radiated power: ≤ 25 mW

Quantity: 3 pcs

8.2.1.7. Communication modules activation tools

These tools are required "to activate" the communication modules when a reprogramming is needed on field. The modules must be easy to activate. A "magnetic activation" type tool will be preferred.

Quantity: 5 pcs

8.2.1.8. Digital security keys for communication modules

The security of communications modules used for Customer data reading should be compliant, at least, with the following 2 reading modes: "Mode 5" in Wireless MBus & "AppKey" in LoRaWan.

These modes require a specific digital security key for each module and this key. Each digital security key is unique and all of them shall be provided by the Contractor to Apă-Canal Edineț to be stored on its server in a secure way.

Quantity: 462 pcs

8.2.1.9. Interfacings and Migration

As we move to a more connected and IoT-enabled infrastructure, it's imperative that this transition goes smooth, secure, and minimally disruptive to ongoing operations for the Apă-Canal Edineț.

In the perimeter of this project, 2 interfaces and 1 migration are required and will have to be carried out by the Contractor:

a. Interfacing the data collection tool for residential metering with Apă-Canal Edineț Billing tools

Objective: To ensure seamless integration between the new Data Collection solution for residential metering and Apă-Canal Edineț current Billing software.

Quantity: 1 pc.

Expected minimum Actions:

- Assess the current Billing software to identify its capabilities and limitations in terms of data integration.
- Define use cases, including the data fields, formats, and utility processes, to fulfil in this interface between the data collection solution and the billing software (invoicing, meter reading, Customers move, ...).
- Develop the interfacing mechanisms to enable the data transfer between systems and to address listed uses cases.
- Test the interface ensure data accuracy and integrity.
- Document the interfacing solution implemented with details including files format definition and examples.
- Provide detailed documentation in line with all running and passing the validation tests to fulfil utility needs.

b. Interfacing the data collection tool for network metering Apă-Canal Edineț existing water supply monitoring tools

Objective: To ensure seamless integration between the new Data Collection solution for network metering and the existing water supply monitoring tool.

Quantity: 1 pc.

Expected minimum Actions:

- Assess the current water supply monitoring tool to identify its capabilities and limitations in terms of data integration.
- Define use cases, including the data fields, formats, and utility processes, to fulfil in this interface between the network metering with existing water supply monitoring tools (Reference DMA inlet meter, pressure sensors, collective residential building meters, ...).
- Develop the interfacing mechanisms to enable the data transfer between systems and to address listed uses cases.
- Test the interface ensure data accuracy and integrity.
- Document the interfacing solution implemented with details including files format definition and examples.
- Provide detailed documentation in line with all running and passing the validation tests to fulfil utility needs.

c. Migration of the Reference DMA elements to IoT/Smart City environment

Objective: When the IoT/Smart City Environment is available, the migration is to define expectation from Apă-Canal Edineț to avoid a disruption on ongoing operations. This migration will also involve additional interfacing between the IoT operator and the residential metering data collection tool.

Quantity: (1 pc. Migration + 1 pc. Interfacing)

Expected minimum Actions :

Migration requirements

- The data collection mode used to collect meters indexes for billing is changed from mobile data collection solution to IoT-operator based solution. Instead of going in the field to read the meters, data will be collected by the IoT/Smart City solution.
- The data processed, including security keys and storage, must evolve to the selected new IoT/Smart City solution needs to be operational. Old type and newly available data, such as hourly consumptions, shall be available and stored in the Data Collection Tool for residential metering.
- The contractor shall plan and execute this migration for the utility.

IoT operator interface requirements:

- IoT operator will collect and make available the data for the Data Collection Tool for residential metering. To get these data usable for the utility, an interface is necessary between the IoT operator servers and the Solution of the Contractor for the Data Collection of residential meters.
- Assess the IoT Integrator tools to identify its capabilities and limitations in terms of data integration.

- Define use cases, including the data fields, formats, and utility processes, to fulfil in this interface between the IoT Integrator tool and the Data Collection tool for residential metering then to billing software (invoicing, meter reading, Customers move...).
- Develop the interfacing mechanisms to enable the data transfer between systems and to address listed uses cases.
- Test the interface ensure data accuracy and integrity
- Document the interfacing solution implemented with details including files format definition and example.

***NB:** During the migration process, the entire billing cycle, using the IoT operator interface, will have to run without any interruption and all customers will have to be correctly billed based on their real consumption.*

8.2.1.10. Additional technical requirements to specific items of the Component II

Electromagnetic water meters Dn 50mm & Dn 100mm

	DN50	D100
Length (mm)	200	250
Connections	Flanges	Flanges
Q3 m3/h	16	63
R=Q3/Q1	40 ⁽²⁾	40 ⁽²⁾

⁽²⁾ Minimum Q3/Q1 ratio. Ratios above this value will be highly appreciated.

- The meter must be approved "all-position".
- The meter shall not require a straight length upstream and downstream.
- PN: 10 bars.
- Maximum water T°: 50°C.
- The meter body must be protected against corrosion and abrasion.
- The measuring part must be electromagnetic, with no moving components and will allow particles to pass through during network accidents.
- Electrodes must be made of stainless steel.
- The meter must be of compact design with the electronic part mounted directly on the measuring part.
- The electronic volume display must have a minimum of 8 digits
- IP68.
- The meter must be pre-equipped with a pulse output for connection to radio or GSM analyzers.
- The meter must be powered by a battery with a minimum life of 10 years.

Mechanical water meters Dn 15mm & Dn 40mm

	DN15	DN40
Length (mm)	110	300
Connections	G ¾ "	G 2" B
Q3 m3/h	2,5	16
R=Q3/Q1	160 (H)	160 (H)

- PN: 16 bars.
- Maximum water T°: 50°C.
- Meter body must be made of copper alloy (brass or bronze).
- Magnetic transmission between turbine and register.
- The measuring part is of the single-jet type, allowing the occasional passage of micro-particles without blocking during network accidents.
- The design of the measuring part must allow the hydrodynamic balance of the turbine to guarantee a long service life.
- The meter must not be fitted with an external calibration system.
- The meter must be of the dry dial type.

- The totalizer must have an 8-roll display.
- The totalizer is in a glass-metal casing to prevent any tampering by hot needles or clamps.
- The register is waterproof to IP68.
- The register can be rotated 360° for better visibility.
- The register must be pre-equipped with a reliable interface system that is not sensitive to magnetic tampering for connection to radio communication modules or GSM analyzers.
- The cover must be clipped onto the meter body: it cannot be removed without destroying it. Any tampering with the cover to gain access to the totalizer, or even its normal removal, must automatically damage the cover so that it becomes unusable, and the damage should be visible and apparent.

Filters

- Dn 15mm & Dn 40mm:
 - CW617N-4MS brass body Y-filter with removable stainless-steel strainer
 - F/F or M/F type
 - Mesh 850 μ
 - Min/Max T°: -10 °C to 120 °C
 - Max Pressure : 16 bars
 - Plumbing hole on free nut for sealing purpose (for Dn 15mm filters)

Isolation valves

- Dn 50mm & Dn 100mm:
 - Wafer butterfly type valve
 - Ductile iron EN GJS-400-15 body and disc, EPDM ACS seat
 - Between flanges PN10, PN16, Class 150 or JIS10K according to Dn
 - Min/Max T°: -10 °C to 110 °C
 - Max Pressure : 16 bars
- Dn 15mm & Dn 40mm:
 - Preferably straight ball type valve with turn handle
 - CW617N-4MS brass
 - Min/Max T°: -10 °C to 120 °C
 - Max Pressure : 16 bars
 - Plumbing hole on free nut for sealing purpose (for Dn 15mm valves)

Flanges

- Dn 50mm & Dn 100mm:
 - Weld neck flange stainless steel 304L Type 11/B1 PN10/40 according to EN 1092-1
 - Connection: PN10/40
 - Max T°: > 120°C
 - Max Pressure : 16 to 40 bars depending on Dn

Fittings

- Dn 15mm & Dn 40mm:
 - CW617N brass fittings set: 1 linear, 1 nut, 1 EPDM gasket
 - Min/Max T°: -10 °C to 120 °C
 - Max Pressure: 16 bars
 - Plumbing hole on free nut for sealing purpose (for Dn 15mm fittings)

NRV (Non-Return Valves)

- Dn 15mm:
 - Internal membrane type NRV for mechanical single jet water meters Dn 15mm
 - Must be supplied pre-inserted in the meter outlet

Anti-fraud sealing ring

- Dn 15mm & Dn 40mm:
 - Standard tamper-proof plastic water meter rings. The ring must protect the water meter nut against disassembly

Saddle clamps

- Dn 15mm to Dn 40mm:

- Multi-material saddle clamp for water supply and distribution networks with EPDM gaskets
- Forged steel body & anti-corrosion bolts
- Max Pressure: 16 bars

Drilling machine for Saddle clamps

- Drilling machine for multi-material saddle clamp intended to water supply and distribution networks with EPDM.
- This machine should be able to drill holes to connect isolation valves for pressure sensors.
- This machine must be able to drill cast-iron, steel and PVC pipes.

Radio communication module specifications

The radio communication modules offered by the bidder must strongly comply with the following specifications:

- The transmitting units must be compact and fitted directly to the water meter without any additional electrical wiring.
- The modules must fit onto the meter register to enable remote reading. The module must not interfere with manual index reading.
- The "meter and module" unit must be easy to use, with no need for prior setting.
- The radio module fitted and paired with its meter must be reprogrammable on site without any physical intervention on the module (so as not to inconvenience the Customer).
- The module must be wireless to avoid installation obstruction and interruption of data transmission.
- The communication module must be certified IP68 waterproof.
- The module must allow simultaneous radio reading and remote reading without re-setting in the field.
- The module must communicate via non-proprietary protocols to ensure the fullest possible interoperability with public and private networks that could be deployed in Edineț city. As a minimum, the module must use LoRaWAN protocol for radio reading and remote reading respectively. Any other additional protocol will be a plus and must be described by the bidder.
- The module must be able to switch from a private or public IoT network without any physical intervention.
- The data transmitted must be identical to the meter index.
- The communication module must transmit at least the following data: hourly data on consumption and alarms.
- Data-logging of the following data will be a plus: current index, index for the last 12 months, detection of backflow, current and yearly leak alarms, leak volumes and leak start and end dates, peak flow, management of threshold volumes (over and under consumption), functional alarms (mechanical fraud, dismantling of the communication module, magnetic fraud, blocked meter). Any additional functions will be appreciated and must be described by the bidder.
- The lifetime of the module must be at least 10 years. A longer lifetime is highly appreciated.
- The radio communication frequency used by the communication modules offered by bidder must be a free frequency, which does not require the payment of fees or licenses, both for mobile reading and fixed network communication.
- The connection between the communication module and the meter must be inductive; optical connection is not allowed.
- Battery level

GSM analyzer

The GSM Analyzer must enable water flow and pressure monitoring and work over licensed bands in NB-IoT/LTE Cat.M1/2G uses existing GSM infrastructure.

This device must work in conditions of full submersion. It can be installed directly on the water meter using inductive coupling and be equipped with 2 configurable inputs which can work as: pulse input from water meter, pressure sensors connection, binary NO/NC inputs.

In his offer, the bidder must propose suitable Pressure Sensors for all water meters Dn 40, 50 and 100mm as well as specific Connectors for electromagnetic meters Dn 50 and Dn 100mm.

He should also propose Isolation Valves for all saddle clamps & a Drilling Machine for screwing the isolation valves the saddle clamps.

Required functions and features:

- Geolocation functions
- Power supply: 3.6 V lithium-thionyl chloride (Li-SOCl₂) high current, D-size spiral cell (complies with IEC 60086-1 standards), capacity: 14 Ah
- Battery: 5-year lifetime on average
- IP68, complies with EN 60529 standard
- Battery and SIM card replacement without loss of IP68 protection
- Ambient operating T°: -25°C to +50°C
- Dimensions (HxWxD): 109,3 mm x 109,02 mm x 44,7 mm
- Inputs :
 - Inductive sensor for direct installation on water meter
 - 2 inputs for cable connection of water meters
 - Pressure sensor 0-10 bar
 - Operating temperature 0°C to 30°C
- Data logging period: 1 to 60 minutes
- Data transmission
 - Local data readout and configuration through NFC and mobile app
 - Inbuilt NB-IoT/LTE Cat.M1/2G modem
 - Transmission protocols support: HTTP, TCP, UDP, FTP
- Time synchronization: via NTP/ GSM

Residential meter data collection tool

This tool will be used by Apă-Canal Edineț services with the following objectives:

- Optimize meter reading in the field.
- Participate in meter data analysis as part of a network efficiency improvement initiative.

The solution for residential meter data collection must consist of a radio reading solution (via Android tablet or Smartphone) and Data Management Software in SaaS mode.

It must be capable of handling and analyzing radio, manual and remote meter readings, the data from which can be transmitted via LoRaWAN networks in a Smart City environment.

The proposed solution should include portable reading devices with all related equipment. It should also include the installation of the various software modules with associated licenses, as well as the parameterization required for the application to operate correctly.

The bidder must offer specific training covering all the software's functionalities, based on real-life cases. It should include among other things:

- Use of the software from mobile phones/tablets
- Reading water meters
- Uploading and downloading mobile phones/tablets.

Interfacing with the Apă-Canal Edineț billing software should be feasible.

The collection solution application must be user-friendly and easy to use.

- It must enable manual meter reading and/or point-by-point radio reading, or automatic reading for radio meters.
- It must enable meter readers to quickly consult information specific to the Customer and the meter to be read, in particular by means of multi-criteria searches.
- Data must be encrypted to protect against theft or loss of portable devices.
- Operating software must be able to store photos taken during meter reading.
- Meter geolocation is performed automatically when the meter reading is recorded, whatever the meter brand and reading mode. Meter GPS coordinates can be exported to other GIS software via a .csv export file.
- The application features a map that shows where meters are located around the agent, whether they are read on foot or automatically. It can be used to create and manage geolocated reading routes (meter reading routes).
- It should be possible to upload and download several reading tours at the same time on the application, without destroying or merging the tours.

- The tool must enable radio modules to be programmed and meter radio modules to be read point by point outside the reading tour, from the programming tool and directly from the reading tool.
- Meter readers will be able to download meter readings remotely via a Wi-Fi/ 3G/4G connection, while storing the downloaded information on the application.
- The meter reading solution will be able to set and read modules in monthly, daily, and hourly steps for meters equipped with adapted radio modules.

On the tablets, the following information from the billing software must be displayed:

- Installation point reference
- Installation point address (n°, street, etc.)
- Customer name
- Customer address
- Meter location on site
- Geographical coordinates
- Meter installation date
- Meter number, brand, diameter
- Radio module identification number, brand, and group,
- Connection characteristics
- New index to be read or entered by radio (when entering the index, the date and time of the reading must be systematically recorded),
- Type of reading (manual or radio)
- Reason for impossible reading
- Anomaly alarms
- Pre-programmed and customizable comments (e.g., notification of visit, leaks, etc.)
- The solution must enable all actions, whatever their nature, to be recorded in the SaaS platform.

8.2.1.11. Deliverables: Acceptance requirements for invoicing purpose

After successful completion and delivery of the items of Component II, the following document(s) shall be provided by the Contractor to the Contracting Authority for approval/acceptance & invoicing purposes:

Component II / Deliverable	Document to be supplied by the Contractor (attached to the invoice)	Quantity
Equipment/Hardware installed	Document attesting receipt of equipment by the Contracting Authority	1
Subscription bundle to Residential Data Collection Platform	Subscription Bundle Invoice (issued by the Contractor)	1 ⁽¹⁾
Subscription bundle to Network Data Collection Platform	Subscription Bundle Invoice (issued by the Contractor)	1 ⁽¹⁾
Interfacing	Certificate of completion (issued by Apă-Canal Edineț)	3
Migration	Certificate of completion (issued by Apă-Canal Edineț)	1

(1) For this specific case, only 1 single invoice covering the Contract period will be required

8.3. Component III: “Training Courses”

As part of its offer, the bidder will have to propose the organization a comprehensive training program for Apă-Canal Edineț staff in line with the below requirements.

The bidder should describe all the training courses included in its offer. They must be organized in Edineț city, in classroom-training sessions.

For each single session, the duration, content, objectives, level, and maximum number of staff taking part should be indicated.

***NB:** To ensure a quality result, Apă-Canal Edineț considers that the total cumulative duration of these training sessions should be 15 working days spread over the Contract period. This training program should be addressed at the kick-off meeting (see “Annex I: Terms of Reference / 3. Scope of Work / 3.7. Implementation of the Project: Milestones”) and approved by APA to avoid affecting the water company's operations.*

8.3.1.1. Training on Metrology and Metering (including Smart Metering)

Objective: Understand the metrology related to standard and smart water metering solutions, as well as their application in water utilities.

Minimum expected content:

- Basics of metrology.
- Key role of metrology in water supply.
- Metering standards, calibration, and metrological verification.
- Tools and equipment used in water metrology.
- Metrology applied to the products, technologies, and solutions proposed by the bidder.

8.3.1.2. Training on new tools and software: Customers Data Collect

Objective: Ensure that Apă-Canal Edineț staff can understand and use the supplied applications, software, and SaaS for residential/Customers data collection.

Minimum expected Content:

- New tools, applications, software/SaaS introduction.
- Configuration and use of the equipment.
- Data Collection & Communication.
- Security management.
- Meter reading solution.
- Reading campaigns management.
- Customers information update (field and office).
- Data collection type usage vs utility staff profiles (field workers, office, ...).

8.3.1.3. Training on new tools and software : Network Data Collect

Objective: Train utility staff to use new network data logging equipment (GPS analyzers) including applications for installation and maintenance.

Minimum expected Content:

- New tools, applications, software, or SaaS introduction.
- Configuration and uses of the provided equipment.
- Data Collection & Communication.
- Use of products and solution supplied by the Contractor.

8.3.1.4. Training on IoT/Smart City

Objective: Learn about the concept of IoT technology applied to water utilities, in the context of a Smart City.

Minimum expected Content:

- Internet of Things (IoT) & Smart City: basics.
- IoT protocols: LoRaWAN, NB-IoT, ... for public utilities.
- Case studies, experience sharing, feedback of equivalent projects already carried out by the Contractor.
- Products, technologies, and solutions supplied by the Contractor.

8.3.1.5. Training on NRW (Non-Revenue Water)

Objective: Understand the concept of NRW with specific focus on the Reference DMA Project.

Minimum expected Content:

- Definition and types of NRW KPIs according to IWA (Water Balance, ILI, ALI, ...).
- NRW activities segmentation.

- DMA (concepts, implementation, set up)
- Apparent Losses: Definition and solutions.
- Real Losses: Definition and solutions.
- NRW data analysis and utilization.
- Spotlight on NRW Services provided by the Contractor (including Action Plans).

8.3.1.6. Training on Smart Billing

Objective: Help Apă-Canal Edineț staff in making the most of Smart Billing in their day-to-day work.

Minimum expected Content:

- General KPIs for Billing monitoring.
- Consumptions analysis.
- Added value of Smart Metering for Billing applications.
- Invoicing cycle analysis (duration, revenue, ...).
- Customers and Billing processes updates.
- Spotlight on Smart Billing Services provided by the Contractor (including Action Plans).

NB: All additional costs (transport, accommodation, etc.) related to the delivery of the Training Courses by the Contractor must be included in his offer.

8.3.1.7. Deliverables: Acceptance requirements for invoicing purpose

After successful completion and delivery of the items of Component III, the following document(s) shall be provided by the Contractor to the Contracting Authority for approval/acceptance & invoicing purposes:

Component III / Deliverable	Document to be supplied by the Contractor (attached to the invoice)	Quantity
Training Course	Certificate of completion (issued by Apă-Canal Edineț), list of participants and training materials produced	6

8.4. Component IV: “Assistance in Specific Domains”

A mentioned in “*Annex I: Terms of Reference / 3.3.4. Component IV: “Assistance in Specific Domains”*”, Apă-Canal Edineț staff will need the support in the field from Experts in areas identified as requiring assistance.

To fulfil this, Apă-Canal Edineț requires the Contractor to include a suitable Assistance Mission in his offer.

The Contractor shall structure his proposal in the following format:

- Description of the proposal of Assistance Mission and its integration in the existing Project schedule.
- Estimation of the total number of expert(s)/day who will be involved in this mission.

Apă-Canal Edineț’s requirements/expectations on this topic are the following:

- Assistance in the organization of the hardware installation (Smart Meters, Pressure Sensors, Accessories, ...) in the segment of the water supply network and Customers sites in the territory covered by the Reference DMA.
- Assistance in handling the M2M subscriptions related discussions with Edineț city main telecom operator on selecting the most appropriate solution for the Project and take this opportunity to address the particular and innovative topic of IoT, with a view to future deployment on the Reference DMA.

NB: All additional costs (transport, accommodation, etc.) related to the provision of Assistance Mission by the Contractor must be included in his offer.

8.4.1.1. Deliverables: Acceptance requirements for invoicing purpose

After successful completion and delivery of the items of Component IV, the following document(s) shall be provided by the Contractor to the Contracting Authority for approval/acceptance & invoicing purposes:

Component IV / Deliverable	Document to be supplied by the Contractor (attached to the invoice)	Quantity
Assistance Mission	Report on completed missions and Certificate of completion (Signed by manager assigned by Apă-Canal Edineț),	1

9. TABLE FOR TECHNICAL EVALUATION

This table, briefly describing all the items of the Project by Component and their respective quantities, will be used by the Contracting Authority's Evaluation Committee as a base for Technical Evaluation of the Bidder's Technical Offer.

Item Nº	Component	Specifications Required	Quantity (Pcs)	Specifications Offered	Notes, Remarks, References to documentation (Producer, Country of origin)	Evaluation Committee Note
1	I	NRW Preliminary Service Report	1			
2	I	Smart Billing Preliminary Service Report	1			
3	I	NRW Periodical (Monthly) Services Reports	10			
4	I	Smart Billing Periodical (Monthly) Services Reports	10			
5	II	Electromagnetic water meter DN100	1			
6	II	Isolation valves DN100	2			
7	II	Flanges DN100	6			
8	II	Electromagnetic water meter DN50	2			
9	II	Isolation valves DN50	4			
10	II	Flanges DN50	12			
11	II	Mechanical water meters Dn 40mm (single jet type), pre-equipped with communication module	12			
12	II	Fittings DN40	24			
13	II	Y-filters DN40	12			
14	II	Isolation valves DN40	12			
15	II	Anti-fraud sealing rings DN40	24			
16	II	Mechanical water meter DN15 (single jet type), pre-equipped with communication module & inserted NRV	450			
17	II	Fittings DN15 (1 linear 1/2", 1 nut 3/4" and 1 gasket)	450			
18	II	Fittings DN15 (1 linear 3/4", 1 nut 3/4", 1 gasket)	450			
19	II	Y-Filters Dn 15 (with sealing hole)	450			

20	II	Isolation valves DN15 (with sealing hole)	450			
21	II	Anti-fraud sealing rings DN15	900			
22	II	GSM analyzers	15			
23	II	Connectors (GSM analyzer to Electromagnetic meter)	3			
24	II	Pressure sensors	15			
25	II	Saddle clamps DN100	1			
26	II	Saddle clamps DN50	2			
27	II	Saddle clamps DN40	12			
28	II	Isolation valves for saddle clamp Dn 100mm	1			
29	II	Isolation valves for saddle clamp DN50	2			
30	II	Isolation valves for saddle clamp DN40	12			
31	II	Drilling set for saddle clamps	1			
32	II	Tablet Android (robust type) for meter Installation, configuration and reading	3			
33	II	Radio frequency gateways for Android tablets	3			
34	II	Communication modules activation tools	5			
35	II	Digital security keys for communication modules	462			
36	II	Subscription fees to Residential data collection tool dedicated SaaS platform (device x number of months)	5082			
37	II	Account creation to Residential data collection tool dedicated SaaS platform	1			
38	II	Configuration/Set-up of Residential data collection tool dedicated SaaS platform	1			
39	II	Subscription to Network and Building Inlets data collection tool dedicated SaaS platform (device x number of months)	180			
40	II	Account creation to Network and Building Inlets data collection tool dedicated SaaS platform	1			

41	II	Configuration/Set-up of Network and Building Inlets data collection tool dedicated SaaS platform	1			
42	II	Interfacing data collection tool for residential metering with the billing tools used by Apă-Canal Edineț	1			
43	II	Interfacing data collection tool for network metering with Apă-Canal Edineț existing water supply monitoring tools	1			
44	II	Migration process of the elements of the Reference DMA to IoT/Smart City environment	1			
45	II	Interfacing between the IoT tools and data collection tool for residential metering (Migration process related)	1			
46	III	Training course: Metrology and Metering (including Smart Metering)	1			
47	III	Training course: New Tools and Software for Customers Data Collect	1			
48	III	Training course: New Tools and Software for Network Data Collect	1			
49	III	Training course: IoT/Smart City, Basics & Smart City for Water Management)	1			
50	III	Training course: NRW (Non-Revenue Water), Basics & Reference DMA focus	1			
51	III	Training course: Smart Billing, Basics & Smart Billing for Water Management	1			
52	IV	Assistance Mission: Hardware installation & M2M/IoT thematic	1			