Project application form under the Instrument for Recovery and Sustainability

1. Project title.

Digitalisation for Complex Management, Control and Effective Use of Waters

2. Project description (objectives, main activities).

Objective concerned:
Improving water quantity management through digitization of the process and improving water use control, to ensure the minimum allowable runoff and improving information on water resources by automating measurements. An additional goal of the project is to promote good practices for the use of water saving technologies and water reuse in all sectors, as well as reducing water losses in order to improve adaptation to climate change.

The work on the project is planned to be organized in two stages - preparatory activities and actual implementation.

Stage 1 Preparatory activities
Organization and coordination between the beneficiary partners for the implementation of the project activities is envisaged. At the end of this stage, it is planned to sign a Partnership Agreement, which will define the roles and obligations for the implementation of the project and for the sustainability of the results after its completion. It is also envisaged to form a coordination group with all partners and thematic working groups on specialized issues, to identify the participants in these groups, to form a project management team, etc.

Stage 2 Implementation
Activity 1: Design of an integrated water quantity management system (IWQMS)
1.1. Analysis of the available and developed systems by the partners and preparation of a concept forIWQMS
This activity includes a data analysis and an analysis of the possibilities for integration between the existing and the developed information systems (IS) by the project partners and IWQMS, identification of the necessary additional data; developing a comprehensive concept for building an integrated information system, and for data exchange, necessary telecommunication connections and location of system modules. 1.1.1. Development of a concept for the connection of IWQMS with other established systems and the organization for data transmission (EEA):
When implementing this activity analysis of the existing IS performed and assessed needs of the partners for the development of the individual modules of IWQMS should be taken into consideration:

A) MoEW and EEA:
Exhisting systems

- "Geographic information system for water management and reporting (GISWMR)" administered by EEA (implemented)
- "Creating a Water Management System in the Iskar River Basin (WMS-IRB) as the first phase of a National Real-Time Water Management System (NRTWMS)" (in progress)

- "Developing a floods risk management information system (internet platform) to be accessed by the different competent authorities, stakeholders and the public, including provisioning the necessary licences, software and hardware" (in progress)

Planned new systems under the project:

- Systems for measuring the level in the dams in real time: It is envisaged to install level measuring systems on all complex dams, in which there is no available or paid for information on the volume of the dam in real time.
- Systems for measurement and monitoring of the ecological outflow: it is envisaged to install measuring devices of significant water users and to introduce video surveillance with the possibility for remote reading and transmission of the information for real-time monitoring.
- Systems for control of the water quantities abstracted: it is envisaged to install measuring devices of significant water users, other than facilities of WSS, IS EAD and NEC EAD for remote reading and transmission of the information about the measured water quantities to IWQMS.
- Integrated water quantity management system - the system will receive data from the systems listed above, as well as from the planned measuring devices from water supply facilities, facilities of NEC EAD and IS EAD and from meteorological and hydro stations of NIMH.

At this stage it is also necessary to make an analysis of the possibilities for water balances through the data from the existing and envisaged IS in IWQMS and plan the necessary activities for this purpose.

B) WSS holding:

- Unified information system for WSS services and register of WSS operators and WSS associations (UIS of WSSS) (in progress)
- Information system of aquaculture systems and facilities (IS of ASF) (in progress)

It is planned to create a local system and collect and systematize the measurement data.

C) MAFF (IS):

An additional module for the purposes of IS EAD is envisaged in which data on irrigation contracts, etc is to be organised and feeded into.. This information shall be of use and respectively shall be kept / updated by IS EAD.

It is necessary to build a platform which shall contain detailed information on irrigation contracts, fish farming ponds contracts, contracts for consumer and commercial needs, HPP contracts, statements of findings, real estates, sites, rent contracts, duct network and a map where to draw and visualise everything that has been entered. It is necessary that the duct network is connected to the measuring devices in order to receive real-time data on the levels in dams and the water volumes in the irrigation ducts network. In order to be possible to carry out a real-time monitoring, it is necessary to build a local network of "Irrigation Systems" EAD close to every spot with measuring device through a Point to Point device which shall provide a direct route from one stationary point to another, and this to be integrated into the comprehensive system.

The results that will be achieved:

- The duct network will be synchronized through the installed and commissioned measuring devices and will transmit data to the Water Masses Control and Monitoring Software.
- A network built through Point to Point device (a form of communication which provides a direct

route from one stationary point to another) providing the possibility to carry out a real-time monitoring.
- A platform built - the Water Masses Control and Monitoring Software which will contain detailed information regarding irrigation contracts, fish farming ponds contracts, contracts for consumer and commercial needs, HPP contracts, statements of findings, real estates, sites, rent contracts, duct network and a map where to draw and visualise everything that has been entered.
The effects that will be achieved by carrying out the envisaged activities are as follows:
- improved management and control of water usage;
- increasing the efficiency (efficiency index) of the system by planning the water supply;
- preserving the agricultural land waters from negative impact and limiting the risks of flooding adjacent areas and infrastructures;
- real-time reporting of the available water volumes and the discharged ones;
- receiving real-time data on the levels of dams and on the movement of water masses in the duct network;
- constant monitoring of flowing water volumes and control of the MoEW schedule implementation.

D) NEC EAD

NEC EAD possesses management systems in 15 HPPs and 4 PSs and the information from them is collected, processed and analysed manually at the central station. The levels of dams operated by NEC EAD are reported each hour during working hours and the information is entered manually. NEC EAD possessed automatic meteorological stations only at designated spots but the information from them is also processed manually.

Within the project for building theIWQMS , as part of the comprehensive integrated system, it is envisaged to develop a module serving the needs of NEC EAD. In the module should be entered real-time information from the NEC EAD sites, it will be stored, processed automatically, analysed and archived - data on the levels in the dams and the equalizers; the available water volumes in the dams and equalizers; data on the inflows to the dams and the equalizers; performance of the monthly schedules of the MoEW; real-time data on the consumption of water volumes, including the water volume consumption for producing electrical energy, the consumption for ecological purposes, water consumption for other water users and/or purposes.

The module should be integrated with the existing management systems and automatic stations of NEC, collecting and storing the data in real time. The real-time data will allow effective management of the available water resources in accordance with the legal requirements. The module should be integrated with the the IWQMS.

The module should collect real-time data also from the additional infrastructure (measuring devices and systems) which is planned to be built within this project and which is intended for surveillance and monitoring of the water levels, water consumption, inflows and ecological flows. The module should allow in it to be included information from the NIMH systems on the actual hydrological and meteorological situation as well as a forecast on the expected inflows in bodies of water for 10 days ahead at a minimum. The module should be open for additional integration with other official sources in terms of meteorology and water management.

The system should secure real-time aggregation of the information from different sources, storage, automatic processing, analysis and archiving of data.

The system should possess indicative user interface. The system should visualise the collected

data in analytical form – through dynamic and side graphics and tables, with the possibility to create separate dashboards where easily and indicatively can be added graphics and tables according to different criteria and types of data. The system should also allow quick and easy access to the comprehensive database, with the option to export to an electronic table which is external for the system.

The system should posses the necessary high level of easy integration of cyber protection and additional reservation.

The IWQMS system should provide the possibility for easy integration and transmission of data with existing and future information systems of NEC EAD.

E) MES (NIMH):

At NIMH there is a built national telecommunication centre where part of the data from the meteorological and hydrological monitoring networks in the country enters in real time.

Provided the majority of the measurements are automated, it is envisaged the center can be upgraded with a Hydrological and Meteorological Monitoring Centre for the purposes of water management. The Centre should be equipped with modern computing and communication technology, digital databases and digital meteorological and hydrological models. The main task of this Centre shall be real-time servicing of the state managerial authorities in the field of waters with quality and up to date hydrological and meteorological information and analysis. This Centre shall be integrated in terms of information to with the integrated water quality management system developed under the project.

1.2. Selection of points for measuring and data transmission to IWQMS setting specification of devices

It is envisaged the survey and selection of: suitable points to install measuring and monitoring devices, securing connectivity of the devices with the IWQMS with a view to transmit data in real time, determining the type and specifics of the devices which should be installed according to their application (for instance, for pressure/non-pressure pipelines, surface water intakes, drilling wells, meteorological radars etc.), preparation for specification of the equipment, study of telecommunication connections and needs assessment and determining the necessary construction and repair works.

It is envisaged to carry out these activities for the WSS sector (WSS holding) for the energy sector (the facilities operated by NEC), for irrigation (the facilities operated by IS) and for all other water users (energy, irrigation, industry etc. (MoEW).

It is also envisaged the selection and designating spots for measurement and video surveillance of the minimum acceptable river flow as well as the technical solution for securing the latter (devices, connectivity, etc.).

1.3. Designing an integrated water volume management system (MoEW – EEA)

Based on the analyses and surveys carried out within sub-activity 1.1 and 1.2, a concept for building the IWQMS and for the data exchange between the existing information systems, the identified equipment for telecommunication connections, construction and repair activities, etc.should be elaborated.

As a result of this activity it is expected that a conceptual design for the development of the IWQMS, technical specification for elaborating and integration of IWQMS; technical

specifications for the necessary equipment, construction and repair works, telecommunication connections and others for the construction of the complete system are developed.

Activity 2: Building an Integrated Water Volume Management System

2.1. Designing the IWQMS

It is envisaged to design the local networks and connections at the measuring points and to prepare a technical design for IWQMS.

Planning of the Center for Hydrometeorological Monitoring at NIMH for the purposes of water management and the necessary preparatory activities.

Developing the technical design for IWQMS based on the analysis carried out and the elaborated technical specifications under activity 1 which is envisaged to collect the data from the measurements of the used water volumes in a single system, to integrate the data on water resources incoming at the NIMH and to make a connection with already developed IS concerning water volume and water infrastructure management as well as data from surveillance for providing the minimum acceptable river flow after the water intake.

The data feeded into the system shall originate from facilities in the WSS sector, irrigation facilities operated by IS EAD, electrical energy producing facilities operated by NEC and other facilities fro water withdrawal from surface and ground water according to information of the MoEW.

IWQMS should be executed as a distribution module information system realized with standard technologies and to maintain conventional communication standards which shall guarantee consistency with future developments and new functionalities. The interactions between the separate modules within the information system and the integrations with external information systems should be executed in the form of Web Services. For each of the separate modules/functionalities of the information system Application Programming Interfaces (API) should be executed.

2.1.1.Local WSS systems and facilities

- Executing the integration with the existing IS
- Complementing the IWQMS with data needed by the WSS sector depending on the results of the analysis under activity 1

2.1.2. Specilized system for systems and facilities operated by IS EAD (MAFF – IS EAD):

Developing the part of IWQMS with the specialized data for the needs of IS EAD:

- Irrigation Water Usage Control and Monitoring System according to the contracts concluded by IS EAD with manufacturers - the irrigation and drainage systems and facilities and monitoring of the concluded contracts with water users.
  Building and commissioning a Water Usage Control and Monitoring System in terms of ownership - the irrigation and drainage systems and facilities and monitoring of the concluded contracts with water users, will contain detailed information regarding irrigation contracts, fish farming ponds contracts, contracts for consumer and commercial needs, HPP contracts, statements of findings, real estates, sites, rent contracts, duct network and a map where to draw and visualise everything that has been entered which will result in an accurate and timely monitoring of the used water volumes.
- Sustainable and efficient water monitoring systems and facilities (MAFF – IS EAD) – information to control the seized water volumes through the IS facilities

The duct network shall be connected to the measuring devices in order to achieve real-time monitoring of the levels in dams and the movement of water masses in the ducts network.

2.1.3. Specialized system and design of local electrical energy producing systems and facilities operated by NEC EAD:

Development of the part of IWQMS with the information necessary for the needs of NEC EAD. The system should receive real-time information from the sites operated by NEC EAD. In order to service the needs of NEC EAD, the following information should enter into the integrated system:

- Information on the available water resources - from the systems measuring the water levels in dams and equalizers (the existing systems and the ones envisaged to be built within this project);

- Information on the water inflows - from hydrometric facilities for measuring inflows from water intake, intended to be built within this project; the information from automatic meteorological stations, both existing and и intended to be built within this project; information on the actual hydrological and meteorological situation and a forecast by NIMH; The system should allow adding a forecast and information from other official sources (possibility for easy integration);

- Information on the consumption of water volumes in real time - the water consumption for the production of electrical energy, for ecological needs, for other water users and/or needs.

- Monthly schedules at MoEW and the imposed limitations for each facility;

- Requested water volumes by other water users;

- Digitalisation of the technical monitoring of dam walls and their adjacent facilities by provisioning digital surveillance through high-technology equipment – robotic system CCTV - self-propelled camera and portable, autonomous, remotely controlled platform fro hydrological research;

- Digitalisation of hydrological and meteorological monitoring - by providing modern level measuring equipment, portable devices for measuring the consumption in non-pressure currents and automatic meteorological stations equipped with the necessary hardware and software;

- Information from Remote Management and Surveillance of Pumping Stations Centre in the system of NEC - due to the possibility for remote management the loss from flooding waters will be avoided, while the river banks shall be prevented from their negative impact. With the improved management of work of pumping stations a bigger water volume will be preserved which will be needed to irrigate the Thracian fields and for drinking and industrial water supply of the region.

The hardware input modules of the system should be close to the source and the spot of control measurement. The system should collect, process, analyse and archive the information in a separate development environment from where the data shall be transmitted to the information system which is intended to be developed within this project. The system should allow visualisation of data in several outsources centres as well as to other information systems connected to the processes.

The system should allow visualisation of the information in real time and WEB access in accordance with predefined users and levels of access in the following sites of NEC EAD:

- The administration at the CS of the NEC;
- The administration of the HPP enterprise of NEC EAD;
- The administration of the Dams and Cascades enterprise of NEC EAD;
- The administration of the dam regions;
- The administration of the Pumping Stations Centre;
- Administrators with unlimited access (with full access to the entire database).

The system should accumulate and save historically all monitored and controlled parameters as well as to provide a possibility to process and analyse the collected data.

2.1.4. Design of systems and facilities for precipitations and flow measuring, including mobile facilities operated by NIMH

NIMH possessed archive data from meteorological measurements carried out during a 130-years period and hydrological measurements carried out during a 100-years period. This data is on hard copy and are not digitalised. At the moment less than 20% of the means for measurements are automatic, with digital information, the rest have observers and place the information on a hard copy. Part of the data are transmitted on the next day. This does not allow to have information in real time on precipitations, surface and ground water on the territory of the country as well as to digitalise that information. Improving the water management in a quality aspect is impossible if at any given moment there is no digital information on their volume in the surface and ground bodies of water. Due to ageing of the population and depopulation of mountain villages during the past 20 years, there are no candidates to be meteorological observers. Due to this reason in Bulgaria have been closed almost all mountain meteorological stations which leads to the impossibility to accurately determine the snow resources in the mountains. Without knowing them the water balance of the country cannot be determined with the accuracy needed for practical use. The only solution is installing automatic, meteorological stations equipped with sensors to measure the thickness of the snow cover.

The national hydrological and meteorological network of NIMH currently consists of 980 stations in total, 384 of which are meteorological, 573 hydrological and 23 agrometeorological. NIMH possesses one mobile laboratory for hydrological measurements. It is necessary to automate the means for measurement in at least 129 meteorological stations and 376 hydrological stations and to supply 10 units of specialised mobile meteorological radars for surface measurement of precipitations (both rain and snow). This will significantly improve the determination of the national water resources. At NIMH there is a national telecommunication centre where is received real time part of the data from meteorological and hydrological monitoring network in the country. If the majority of measurements are digitalised, it can be upgraded with a Hydrological Monitoring Centre for the purposes of water management. The Centre should be equipped with modern computing and communication technology, digital databases and digital meteorological and hydrological models. The main task of this Centre shall be real-time servicing of the state managerial authorities in the field of waters with quality and up to date hydrological and

meteorological information and analysis. This centre shall be informationally integrated to the quality aspect integrated water management system developed under this project.

2.1.5. Preparation of a technical project for Integrated water quantity management system and technical specification for the hardware and software needed.
The system is planned on a modular basis and integrates the data for control measurements of the amount of water from all facilities, the data for control and monitoring of ecological runoff, the data from the monitoring of the levels in the dams in real time, the data from the hydrometeorological center and the data from the specialized modules, provided for the needs of IS EAD and NEC EAD.

The system shall include transmission of data on the measured extracted water volumes from major water users with issued permits for water withdrawal from surface and ground water and with the possibility to periodically provide data to be other water users. On the designated spots shall be installed automatic measuring and flow metering devices with remote reading and transmission of information on the extracted water volumes.
Further to the sport for water withdrawal from surface water, it is envisaged to install metering devices measuring the minimum acceptable flow, including devices for video surveillance, recording and real-time surveillance information transmission.
It is intended that the system monitors the used water volumes and the volumes of water discharged in the rivers with a view to provide minimum acceptable flow after the sport for water withdrawal, including personnel training
On the complex and major dams enlisted in Annex No.1 of the Water Act shall be installed measuring and monitoring devices to monitor and transmit real-time hydrological information which will lead to improving the water management in the complex and major dams both in operational and in the long-term aspect.
Depending on the result of the analysis under activity 1, creation of opportunities for preparation of water balances by river basins and various analyzes for the purposes of water management.

2.2. Development and implementation of IWQMS
2.2.1. Development of specialized software, implementation of IWQMS implementation of integration with the existing systems, data migration, expert training and warranty maintenance.
The development of the specialized software is carried out.
The integration of the IWQMS and the data exchange with IS are carried out.
Digitalization and migration of data are performed.
Information integration of the Center for Hydrometeorological Monitoring in NIMH at IWQMS
Training for use of IWQMS
Trial operation of IWQMS and development of reports and analyzes
Commissioning of IWQMS
Warranty maintenance for a minimum of 24 months

2.3. Equipment of points
For the points designated under i. 1 are carried out construction and repair works, supply and installation of equipment for measuring extracted water volumes and water level, monitoring of the provision of the minimum acceptable flow and insurance of the equipment.
Supply and installation of automated hydrological and meteorological stations, installation of radars, including the necessary construction and repair works.

2.1.3. WSS systems and facilities
The majority of the measuring points have no measuring devices installed.

On the spots where such devices are present, they are old and do not posses a pulse output or such cannot be added.
Modern devices with possibilities to communicate shall be installed in accordance with the diameter of the tube and the specifications of the flow.
It is envisaged to build a safety module preventing from climate and/or physical impact on the devices with a view to minimise the risk for the devices and the modules for data transmission.

2.3.2. Irrigation systems and facilities operated by IS EAD

- Supply, installation and commissioning of flow metering devices, building automated module control and measuring systems and surveillance and monitoring systems
- Supply, installation and commissioning of control flow metering devices and stations for inflow control at the main water intake points, robotic system – self-propelled camera, devices for measuring the water level in piezometers (electrolot), devices for measuring the consumption at non-pressure currents, automatic meteorological stations, video surveillance systems, etc.

The results that will be achieved:
- The duct network will be synchronized through the installed and commissioned measuring devices and will transmit data to the Water Masses Control and Monitoring Software.
- Developed system through a Point to Point device (a form of communication which provides a direct route from one stationary point to another) for executing the possibility to monitor in real time.

2.3.3. NEC EAD facilities

- Design, supply and commissioning of Information System for Efficient Water Resources Usage within the NEC system. Includes the purchasing of software and hardware;
- Design, supply and commissioning of level metering systems to measure the water level in dams and equalizers in real time – 42;
- Design, supply and commissioning of ecological flow metering systems - 3;
- Design, supply and commissioning of water intake inflows metering systems - 27;
- Supply, installation and commissioning of flow metering devices for water consumption used for production of electrical energy – 57;
- Supply, installation and construction and assembly works for pumping stations remote management and monitoring centre. Includes one centre for 4 pumping stations;
- Supply, installation and commissioning of automated meteorological stations equipped with the necessary software – 10;
- Supply of portable non-pressure current consumption metering devices – 10;
- Supply of a self-propelled camera and a portable, autonomous, remotely controlled platform for hydrological research - 1 of each;

2.3.4. Measuring systems (MoEW)
It is envisaged to carry out the intended construction and repair works, supply and installation and commissioning of flow metering devices, water level measuring devices, video surveillance devices, developing automated module control and measuring systems and surveillance systems for the extracted water volumes on facilities outside the WSS facilities, the systems and facilities operated by IS EAD and NEC AD and installation of water intake facilities for water withdrawal from surface water with a view to provide the minimum acceptable river flow, building telecommunication connections.

2.3.5. Hydrological and meteorological real-time monitoring systems

Building points for positioning the mobile meteorological radars and pedestals, metering facilities and meteorological masts for the automatic hydrological and meteorological stations in the measuring points.
Building an infrastructure for assessing the age and resource of ground water for different hydrological regions in the country;
Supply, installation and commissioning of automatic meteorological and hydrological stations and mobile meteorological radars
Developing telecommunication channels between the metering means and the Hydrological and Meteorological Motoring Centre for the purposes of water management.
Developing telecommunication channels (a main one and a spare one) between the Hydrological and Meteorological Motoring Centre for the purposes of water management at the NIMH and the IWQMS.

2.4. Purchasing software and hardware, patents and licenses which are identified accordingly as a result of the analysis under i.1, including:
Servers, high performance calculation complex, computer peripherals, telecommunication means, backup (autonomous) power supply needed for the Hydrological and Meteorological Motoring Centre at the NIMH.
Specialised software, needed at the NIMH for processing the measurements taken by the meteorological radars, licenses for compilers and programming languages needed for the numeric meteorological and hydrological models, databases as well as software products for information integration of the Hydrological and Meteorological Motoring Centre at the NIMH to the IWQMS developed under this project.
Purchase of the necessary hardware and software for the operation of IWQMS and for the local measuring systems for data transmission.

Activity 3: Ensuring compliance and consistency of the project activities and encouraging the use of water-saving technologies
A team for implementing the project activities shall be created with the participation of all partners.
It is envisaged the creation of:
3.1. Coordination group – includes coordinators from all partners and represents an expert level coordination work group between all project partners. The goal is to provide coordination in the implementation of the project activities, to provide the necessary data for project implementation, to give recommendations regarding the requirements for the implementation of the activities, regarding the quality of implementation and the achieved results. In the event of any issues arising from the implementation of the activities the group should inform the Project Management Unit (PMU) in order to undertake the relevant solutions. Thematic work groups shall be created to this group. There are 4 thematic work groups envisaged.
3.2.Thematic work groups – they shall include experts from all partners and external experts and shall prepare the necessary data for the implementation of the activities by each partner, and also prepare specific requirements for the implementation, assess the quality of the results. There are 4 thematic work groups envisaged.
3.3. Technical unit
It is also envisaged to recruit a technical unit which shall support the beneficiary and the partners in the implementation of the activities, provide the necessary technical expertise and support the coordination between the project partners on specific issues.
3.4. Activities to promote the use of water saving technologies It is planned to collect and systematize information on good practices and new technologies for water saving and its reuse at least for the following sectors: households, irrigation, energy, industry and tourism. Preparation

and printing of information materials, organization of campaigns and a meeting to promote good practices.

Activity 4: Management and publicity of the activities envisaged to be implemented within the project.

4.1. Project management unit

A project management unit shall be created.

4.2. Technical assistance for managing the project

There are envisaged activities supporting the project management and the recruiting of external experts who shall support project management.

4.3. Publicity and information

It is envisaged to organise a kick-off and final conference to present the project and the results achived as well as the preparation of information and publicity materials, web site development for the publication of project results.

1. **Beneficiary.** EEA (MoEW)

Partners: MoEW, WSS Holding, NEC EAD, IS EAD, NIMH

It is envisaged in the preparatory stage of the project the signing of a Partnership Agreement for organization between the partners for the implementation of the project activities and sustainability of the results.

2. **Time schedule for project implementation, incl. activities, stages[1].**

-

The duration is 50 months

Time schedule is attached

a. **When can the implementation of the project start at the earliest after its approval?**

6 months

Stage 1 Preparatory activities are envisaged - with a duration of up to 6 months for the establishment of the necessary organization between the partners and the beneficiary for the implementation of project activities. This stage ends with a signed Partnership Agreement.

3. **Indicative financial resource by activities, incl. sources of funding (state budget, European funding, private funding, IFIs).**

The indicative value project is BGN 134,830 million

Budget is attached.

a. **Indicative allocation of the financial resource, depending on the type of expense:**

[1] The time schedule will be relevant for setting intermediate objectives under the Recovery and Sustainability Plan and is directly related to the release of tranches of financial support from the Recovery and Sustainability Fund.

:

- Infrastructure construction/rehabilitation (construction and assembly works) – 2 %
- Physical capital (purchase of machinery and equipment) – 72,15 %
- Human capital (skills development, retraining…) – 0,1 %
- Labour (wage costs, consulting services …) – 17,92 %
- Technology (costs for acquisition of intangible fixed assets - patents, software…) – 7,832%

4. Indicators

a. Result indicator/s

Stage 1 Preparatory activities
6m– signed Partnership Agreement

Stage 2 Implementation

Activity 1: Design of an integrated water quantity management system (IWQMS)
1.1.Analysis of the available and developed systems by the partners and preparation of a concept for IWQMS
18m – Report with developed concept for IWQMS

1.2. Selection of points for measuring and data transmission to IWQMS setting specification of devices
18m- Report with the results of the analysis and specific locations

1.3. Designing an integrated water quantity management system
22m – Developed conceptual design for IWQMS

Activity 2: Building an Integrated Water Volume Management System
2.1. Designing the IWQMS
34m – project of IWQMS

2.2. Development and implementation of IWQMS
50 m - Put into operation IWQMS
44m Hydrometeorological monitoring center for water management purposes - information integrated to the IWMS under the Project
30m- Command center for remote control and monitoring of pumping stations in the NEK system

2.3. Equipment of points

Installed water level measurement systems
34m -30
40m –72
44m –140

Installed devices for measuring intake water quantities
34m - 2210
40m –5440
44m –8761

Installed systems for measuring the inflow at the water intakes
34m – 5
40m - 8
44m- 10

Installed systems for measuring ecological flow
34m – 300
40m – 600
44m –1003

Installed automatic meteorological stations of NEK EAD
40m – 5
44m – 10

Installed automatic meteorological stations of NIMH
34m – 35.
40m – 80
44m – 129

Installed automatic hydrological stations of NIMH
34m – 50
40m – 110
44m – 242

Delivered specialized, mobile meteorological radars for area measurement of precipitation (rain and snow) of NIMH
34m – 1

2.4. Purchasing software and hardware, patents
44m - delivered hardware and software for IMSC and local systems

Activity 3: Ensuring compliance and consistency of the project activities and encouraging the use of water-saving technologies
8m – established Coordination Group and Technical Working Groups
18m – prepared information materials
24m – conducted 2 information meetings
30м – conducted 4 information meetings
36м – conducted 6 information meetings

42м - conducted 8 information meetings
48в – conducted 10 information meetings

Activity 4: Management and publicity
8m formed project management team
12m organized opening conference
12m prepared advertising materials
48m organized closing conference

b. Effect indicator/s

Effect of the project implementation:
Improving the control over the use of water, improving the management, ensuring the environmental flow and the reliability of the data and assessments as a result of automation of the monitoring, the implemented systems and the developed and put into operation IUCN.
Increasing the knowledge and qualification of those trained to work with IMSC

Indicators:
Receiving real-time data in IWQMS from the installed water level measurement systems
34m – 30
40m – 72
44m –140

Receiving real-time data in IWQMS from the installed systems for measuring seized water quantities
34м – 2210 бр.
40м – 5440 бр.
44м – 8761 бр

Real-time data acquisition in IWQMS from installed environmental runoff measuring devices
34m – 300.
40m – 600
44m–1003

Real-time data acquisition in IWQMS from the installed systems for measuring the inflow at the water intakes
34m - 7
40m – 14
44m – 27

Receive real-time meteorological measurements
34m - 35
40m - 80
44m - 129

receiving real-time hydrological measurements
34m - 50
40m - 110
44m - 242

receiving real-time area measurements of precipitation (rain and snow) for an area
30,000 sq. Km.
34m-1
Reducing the error in determining the snow reserves in the mountains compared to the current one and improving the reliability of the assessment of water reserves.

44m - Developed and created technologies for monitoring and numerical modeling of hydrometeorological processes

5. Does the implementation of the project require a procedure under the Public Procurement Act?

Yes, for most of the planned activities:
Development of a concept for IWQMS
Analysis of the locations of the equipment points
Design, development and implemem=ntation IWQMS
Equipment - delivery and installation, construction and repair activities
Delivery of hardware and software.

a. If a procedure under the Public Procurement Act is required, what part of the activities and financial resources will be the subject of the public procurement?

85% of the costs will be subject to public procurement
Costs for analysis and selection of points
Costs for drafting a IWQMS concept
Cost for design, development and implementation of IWQMS
Costs for the purchase of measuring equipment
Costs for the purchase of automatic meteorological and hydrological stations, mobile meteorological radars;
Costs for construction of an information center in NIMH;
Costs to high-performance computing, servers, peripherals, and more.
Expenses for acquisition of intangible assets - Technologies, Software
Construction costs
Costs for consulting services to support project management, coordination of activities and publicity

b. If a procedure under the Public Procurement Act is required, what is the indicative schedule for its implementation?

1. Preparation of a concept for IWQMS - 12-18m
2. Design and construction of an Integrated Water Management System in quantitative terms and implementation - from the 29th to the -50th m;
3. Construction and installation activity, equipment, delivery and installation of the necessary

equipment for the Integrated Water Management System - from 29th to -44th m;
4. Delivery of measuring equipment from 29th to -44th m
5. Delivery of hardware and software from 39th to -44th m
6. Activities to support the management and coordination in the implementation of the activities - 8th-50th m;

6. Demarcation and complementarity.

a. If similar projects have been implemented (regardless of their source of funding), describe how this project builds on/complements what has been achieved with previous projects.

In the system of the MoEW there is a developed **Geographic information system for water management and reporting (GISWMR)**, which is operated by the EEA and is publicly accessible at: http://gwms.eea.government.bg/giswmr/. The system aims to organize within the system of the MoEW the information concerning the water management and the river basin management plans (RBMP). The following interconnected modules have been developed: Administration; Catalogues and lists; Basin Management Regions; Water bodies; Water protection zones; Pressure sources; Monitoring; Marine environment; Permits; Control; Finances; Economic analyses and forecasts; Programmes from RBMP measures; Reporting; Import and export of data; References. The system contains data for the permits issued under the Water Act, including the permits for water withdrawal from surface and ground water and the control executed by the Basin Directorates and RIEW. The system has a GIS part which visualises the entire available information and is integrated with the information systems for monitoring of surface and ground water maintained at the EEA and the environment for inter-register exchange of data in SA – Regix.
For the purposes of water management, it is necessary to ensure integration of the data with the envisaged system in terms of measuring the used water volumes and the precipitations and flow data. In case measuring devices cannot be installed on all water users, it is appropriate to create a possibility for smaller water users to enter the used water volumes by themselves. The data on the actual used water volumes, the data on the measured minimum acceptable flow and the data on the available water resources shall improve the possibilities for water management in terms of quantity and consideration when issuing the permits under the Water Act, provision of the minimum acceptable river flow as well as a real assessment of the pressure at water withdrawal when developing the RBMP.

Under way is also a project for **"Creating a Water Management System in the Iskar River Basin (WMS-IRB) as the first phase of a National Real-Time Water Management System (NRTWMS)".** The aim is the system is prevention and management of the risk of floods and negative impact on human health and the environment through centralised collection, processing and analysis of the information in real time which provides a possibility to make effective decisions on managing and distributing adequately the tasks between all participants in the process of management, water monitoring and aquaculture systems operation. This system is an integrated interdepartmental instrument for operatioal management.

The basis of this system is an existing hydrological information system for receiving data in real time which will provide forecasts in a short-term, medium-term and long-term perspective of the internal water resources in the country, assess the risk of floods and perform functions related to the water management and the protection from their negative impact.

The **"Water Management System in the Iskar River Basin (WMS-IRB)"**" as the first phase of a National Real-Time Water Management System (NRTWMS)" will not aim at controlling the water volumes used by permit holders but the integration with the System Controlling the Water Volumes Seized by Legal Entities from the Water Site and Control of the Discharged Water Volumes with a view to provide the minimum acceptable river flow after the water withdrawal point will improve the real-time water management.

In terms of the **floods risk management information system (FRMIS) (internet platform)** for access of the different competent authorities, stakeholders and the public, it should be taken into consideration that it will be a web based geoinformation system with specific functional capacities, specialised tools and system means to manage the information and the activities when managing the floods risk, including reporting to the European Commission. This information system shall in no way duplicate the system which is envisaged to be built according to this project proposal.
For the purposes of the FRMIS it is appropriate that the data on the precipitation volumes and flow measured by the NIMH and MES facilities, including the mobile ones, be imported so that they can be used for the next cycles of implementing the Floods Directive.

It is also envisaged to implement a small **project „WATER – CLIMATE – DROUGHT – available information and measures"**, which will be funded by the National Trust EcoFund. The project will aim at Improving the Knowledge on the Correlation between Climate Change and National Waters and will envisage resuming the available information related to adapting the use of water resources to climatic change and identifying types of measures to adapt to the climatic change in the field of waters in order to preserve the water resources.

Under way is the implementation of project fro project BG16M1OP002-1.013 **"Completion of Water Volumes Networks"** under OPE 2014-2020 with the Water Management Directorate at the MoEW as beneficiary. It aims at completing the water volumes monitoring network for surface and ground water but does not concern the measuring of the volume of used water. The project implementation is in progress. It is also envisaged organization of data from the new points. It is recommendable to ensure coordination with the new water volume management system which will be provided by the MoEW.

The Ministry of Regional Development and Public Works, with the financial support of Operational Programme Environment 2014-2020 implements project **"Supporting the Efficiency, Management and Institutional Capacity in the WSS sector"** under Grant Contract No. D-34-11/16.03.2016. Within this project is designed, developed and introduced a **Unified Information System of WSS Services and a Register of WSS Associations and WSS Operators** in accordance with article 198r of the Water Act the implementation of which is in progress. The system is based on modern geographic information server technology, with possibilities to integrate data and generate references and analyses in table and graphic format. The system is designed with the possibility for data exchange with the information systems maintained by the MoEW, the Road Infrastructure Agency, the National Railway Infrastructure Company and the Agency for Geodesy Cartography and Cadastre as well as Information System for Aquaculture Systems and Facilities which is being developed within the same project.
Within the same project it is also designed, developed and introduced **Information System for Aquaculture Systems and Facilities (IS for ASF)** pursuant to article 178, paragraph 1, i. 2 of the Water Act, based on a contract concluded after conducting a public procurement. The Information System for Aquaculture Systems and Facilities accumulates data for extremely important aquaculture facilities - dams, derivations, irrigation systems, reservoirs, pumping and

treatment stations, supply plumbing, water supply and sewage networks and facilities etc. In the Information System for Aquaculture Systems and Facilities is kept up-to-date information on the type, location, ownership, provided rights to operate, maintain an exploit, technical parameters and others of aquaculture systems and facilities on the territory of Republic of Bulgaria from the three sectors - water supply and sanitation, hydromeliorations and hydropower. The ASF IS keeps basic and specialised data. The specialised data include information on:

- WSS infrastructure (data on supply plumbing, derivations and и water mains, water sources; permits for water intake and usage of a water site; safeguard zones, water withdrawing facility, pumping stations; reservoirs, DWTP, WWTP, supply and discharge collectors, external plumbing collectors, waste water discharge points, main WSS network of settlements, water measuring devices, HPP on water pipes (if any) etc. The data on permits and safeguard zones is provided by the MoEW.
- Hydropower systems - derivations and facilities, are provided by NEC EAD – Dams and Cascades enterprise.
- Hydromeliorative systems - safety embankments at the Danube river, corrections of internal rivers, safety embankments, discharge pumping stations, discharge fields, irrigation pumping stations; hydromeliorative plumbing, tube network, water intakes, equalizers, permits, water metering devices, HPP on water pipes (if any) - parameters, owner, user, legal ground, regulatory framework etc. are provided by Irrigation Systems AD.
- For the dams including data on a technical passport, dam wall, purpose of the dam, water intake facilities; main discharger, availability and features of Control and Measuring System (CMS), exploitation (supplementary) buildings and facilities (pumping stations, electrical substations, emergency warehouse etc.); HPP (if any), parameters, owner, user, legal ground of the ownership, operator, legal ground of operation, are presently provided by NEC EAD – dams and Cascades enterprise and Irrigation Systems AD according to their respective purpose. The MRDPW provides the technical passports fro 10 dams for drinking water and household water supply which are operated by WSS operators.

A measure supporting the rehabilitation of hydromeliorative infrastructure outside the agricultural holdings has been launched under RDP 2014-2020. As of August 2020, 26 project proposals of Irrigation Systems EAD, as beneficiary under sub-measure 4.3, are in the process of assessment by the Managing Authority of the Rural development Programme 2014-2020 (RDP 2014-2020). Code for the admission procedure BG06RDNP001-4.010 for project proposals by Irrigation Systems EAD for the rehabilitation of existing hydromeliorative facilities for irrigation under sub-measure 4.3 “Investments for Development, Modernisation or Adaptation of Agricultural and Forestry Infrastructure” within measure 4. “Tangible Assets Investments” under RDP 2014-2020 have been submitted through EUMIS 2020 projects distributed under 26 separate positions. Measuring devices are eligible costs under sub-measure 4.3 within measure 4 of RDP 2014-2020. The suggested number of flow metering devices in this application form are not duplicated with the necessary ones which will be installed in the sections of the 26 sites which are the subject of the investment under sub-measure 4.3.

At the moment a “National Geographic Information Centre” is being built under the NRRI (national funding). With part of the funds under this programme are being automated the measurements in part of the precipitation measuring points of the NIMH. The data from these points shall be included in the developing information system.

The envisaged project shall upgrade the developed and implemented information systems related to water and water infrastructure management by integrating and uniting the data in the different

information systems and complementing the missing information on the used water volumes of water sources and water resources. The information system envisaged under the project shall gather in a single system the data on the water volumes by used the major users in different sectors - WSS, irrigation, energy and economic activities, together with the data on the resources from the water volume monitoring networks which shall allow improvement of the process of planning and making decisions.
With a view to this it is necessary also to envisage the installation of metering devices (where such are missing or upgrading them with the possibility to transmit data) and transmit the data from them into a single system which shall be comprised of sub-systems for the different sectors and shall make the connection with the already developed information systems.

The activities envisaged under this project and related costs are not funded by other projects of the European Union and / or the national budget, as well as other donor programs and are not planned for future funding.

The costs of the activities envisaged under this project are complementary and do not overlap with those projects and activities that are financed from other sources.

b. If similar projects are envisaged to be implemented under the Partnership Agreement programs, the centrally managed facilities of EU or the Just Transition Fund, outline the demarcation with this project.

Under way is the implementation of project fro project BG16M1OP002-1.013 **"Completion of Water Volumes Networks"** under OPE 2014-2020 with the Water Management Directorate at the MoEW as beneficiary. It aims at completing the water volumes monitoring network for surface and ground water but does not concern the measuring of the volume of used water. The project implementation is in progress. It is also envisaged organization of data from the new points. It is envisaged to ensure coordination with the planned quality aspect water management system which will be provided by the MoEW.

OPE 2022 - 2027 is in the process of developing. The programme draft envisages **building a drought risk assessment system**. The suggested system aims to assess the water volume monitoring network from the drought risk point of view and its further upgrade with a view to forecast the droughts as well as to develop a system of risk indicators and a comprehensive early warning system in case of drought which can take into account the developed water volume management system but substantially without envisaging the same type of activities.

9. Does the project directly contribute to the implementation of any of the Council's Specific Recommendations addressed to Bulgaria in the framework of the European Semester in the period 2017-2020? Please describe how.

The programme shall contribute to the implementation of Council of the EU **Specific Recommendation 3** addressed to Bulgaria within the **European Semester for 2019**.: *"Focus investment-related economic policy on research and innovation, transport, **notably on its sustainability, water**, waste and energy infrastructure and energy efficiency, taking into account regional disparities, and improving the business environment"*"."

In paragraph 14 of the Recommendations it is stated that: "*Bulgaria has low connection and treatment rates for urban waste water, high air pollution levels and landfilling rates for*

municipal waste and a recycling rate, considerably lower than the EU average. ***Investments to promote sustainable water management, resource efficiency*** *and the transition to a circular economy are necessary. In addition, investment needs in the fields of energy and* ***climate change mitigation and adaptation are significant.***"

In the National Reform Programme 2020 to address the development deficits are outlined policy priorities such as in **table 2.1.3: Description of priorities addressing SR 3, part of Annex No. 1** in terms of "Water" e outlines the following **national strategic target**: Preventing or reducing the impact of human activity on surface and groundwater by applying the **principles of integrated management**. Integrated management of water resources and **achieving sustainable consumption of the resource** for the needs of the population and the economy of the country. Protection and improvement of the environmental status of the Black Sea marine waters.

This target is related to Policy objective/EU specific objective: Greener, low-carbon Europe by promoting a clean and fair energy transition, green and blue investments, circular economy, **adaptation to climate change** and risk prevention and management/**Promoting the sustainable water management.**

Specific Recommendation 3 to Bulgaria for 2020: "*Focus investment on the green and digital transition, in particular on clean and efficient production and* ***use of energy and resources****, environmental infrastructure and sustainable transport, contributing to a progressive decarbonisation of the economy, including in the coal regions*".

The project also contributes for **achieving the targets for an initiative adopted by the Green Deal *General Union Environment Action Programme to 2030*** (COM (2020) 652 final), which includes "*increasing the adaption capacity,* ***strengthening the sustainability and reducing the vulnerability to climate change***" and "protecting, preserving and restoring biodiversity and **enhancing natural capital** (notably air, water, soil, and forest, freshwater, wetland and marine ecosystems)

The ex-ante conditionalities for achieving the targets of the Programme are:

„*Integrating* ***environmental and climate sustainability*** *in the European Semester of economic governance, including in the National Reform* Programmes and National Recovery and Resilience plans "

"***Harnessing the potential of digital and data technologies***".

The project shall also contribute to the **initiative planned within the Green Deal *Strategy on Adaptation to Climate Change*.**

10. Does the project contribute to the implementation of reform in a given sector? Please describe how.

The project is not related to a new reform but contributes to improving the water volume management in accordance with the adopted Strategy on Adaptation to Climate Change and the Action Plan to it.

The project is in accordance with planned actions to increase the efficiency of water usage and reducing the water losses:

In the RDP and according to the Recovery and Sustainability Plan are envisaged projects to improve the hydromeliorative network and reduce the water losses.

In OPE 2014-2020 as well as in the OPE 2021- 2027 draft are planned measures and

investments in the WSS sector which include also the repair and reconstruction of water supply networks and reducing water losses.

This project aims to support the implementation of the measures related to improving the control of water usage and the introduction of smart technologies to measure the used water volumes - remote and digital methods of measuring and digitalisation of water management - building an information system which will unite the data on water usage from different sectors with the data of the resource in order to improve including providing real-time reporting possibilities, the reliability of information and improve the objectivity in decision-making. This system is intended to make the connection with already developed or being in the process of developing systems related to the water and water infrastructure management.

11. Does the project contribute to the development of any aspect of sustainable economic development? Please describe how.

The project will contribute to achieve target 6 of the UN Sustainable Development Goals to 2030 "Clean Water and Sanitation" for ensuring availability of water resource and sustainable management of water and sanitation services for all by preserving the water resource and improving the control, the effective water usage and providing access to water for all.

The project implementation shall contribute also to achieve sub-goal 6.4 "By 2030, substantially increase water-use efficiency across all sectors and ensure **sustainable withdrawals** and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity" and sub-goal 6.5 "By 2030, implement **integrated water resources management** at all levels, including through transboundary cooperation as appropriate".

The project shall contribute also to achieve goal 13.2 "Integration of climate change measures into national policies, strategies and planning".

12. Does the project contribute to the implementation of the objectives of the National Development Program BULGARIA 2030? Please describe how.

The project shall contribute for the goals of the National Development Programme BULGARIA 2030 – development axis 3: "Connected and Integrated Bulgaria", Priority 9 "Local Development"Goal 6 ""Ensure availability and sustainable management of water and sanitation for all".

The main goal of sub-priority 9.3 is achieving an **integrated and sustainable water management**: preserving and improving the status of the waters, achieving and maintaining a **good quality**, chemical and ecological status of the bodies of water on the territory of Bulgaria. In impact area 9.3.in Water Resources and Ecosystems, the main goal is **integrated surface, ground**, coastal and marine waters management and the ecosystems related to them, **by reducing the effect of climate change** – **reducing the consequences** of floods and **drought**.

13. Does the project contribute to the implementation of the objectives and priorities set out in the Integrated National Energy and Climate Plan? If yes, please describe how.

The project is compliant with the Integrated National Energy and Climate Plan. Increasing the control on water usage will reduce the water losses which shall contribute also to improve the water efficiency and the energy efficiency by reducing the consumption of electrical energy to extract and process bigger water volumes than needed.