



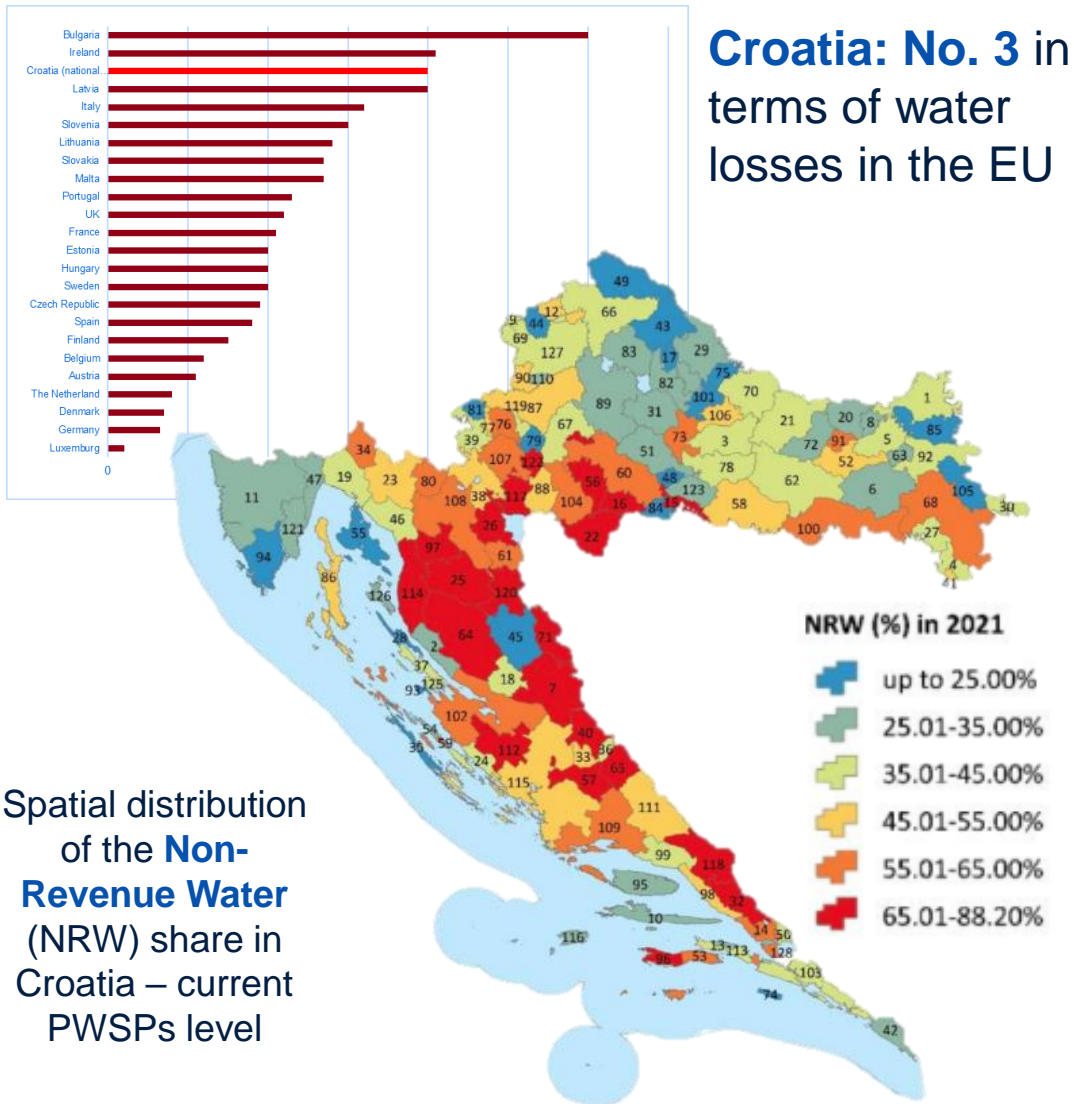
22HR06 CROATIA SUPPORT TO REDUCE WATER LOSS WITHIN THE REFORM OF THE WATER SECTOR

June 01, 2023

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Public water utility sector in Croatia



- **Connection rate** to water supply systems ~ **90%**
- Current service areas: **160 Public Water Service Providers (PWSPs)**; 128 dealing with water supply
- Ongoing (politically challenging) reform process for the **aggregation of 160 PWSPs to 41**
- Total water delivered to final users (**billed**) **244 mill. m³/year**, total water **supplied** amounted to **478 mill. m³/year**,
- Average rate of **Non-revenue Water (NRW)** around **50%**, varying between ~ 25% up to around ~ 80% per PWSP
- Impacts of **climate change** on water availability and demand
- Requirements **new EU Drinking Water Directive**
- Obligations from EU **National Recovery and Resilience Plan (NRRP)** for Croatia

Croatia Water Loss Reduction ASA (P178797)



- Financed by **European Commission**, DG REFORM
- **Main beneficiary:** Ministry of Economy and Sustainable Development
- **Objective:** *Improve the institutional capacity of relevant public authorities and PWSPs to reduce excessive losses from water supply systems. This will contribute to increased operational efficiency and financial sustainability of the Croatian water services sector and enhance water security and resilience of service provision more broadly.*
- **Project period:** April 2022 – November 2023
- **Project team** established in May 2022: World Bank team, 5 interdisciplinary local experts, 1 additional international water loss expert

Overview project activities (completed activities blue; ongoing green)

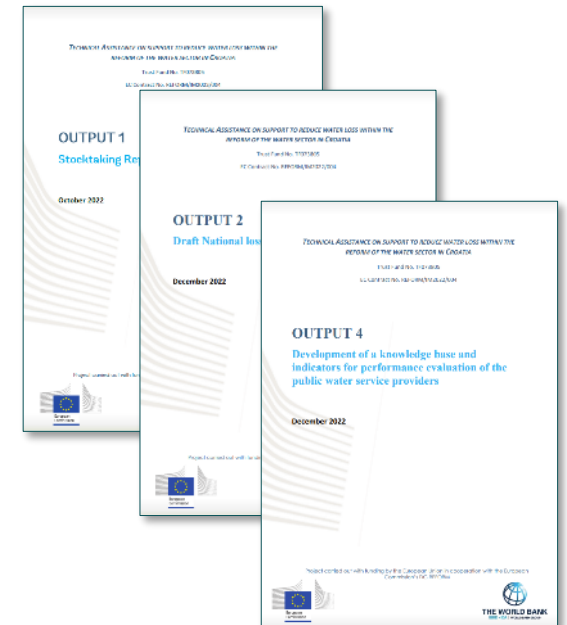
- Activity 1: Stocktaking exercise
- Activity 2: Preparation of a draft National Loss Reduction Action Plan (NLRAP)
- Activity 3: Building the capacity of PWSPs for the implementation of the NLRAP
- Activity 4: Development of a knowledge base and indicators for utility performance evaluation
- Activity 5: Development of recommendations for establishment of a national monitoring body on water loss reduction
- Activity 6: Preparation of a final draft National Loss Reduction Action Plan (NLRAP)

ACTIVITY	Q2 - 22			Q3 - 22			Q4 - 22			Q1 - 23			Q2 - 23			Q3 - 23			Q4 - 23		
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Activity 1 - Stocktaking exercise		■	■	■	■	■															
Activity 2 - Draft NLRAP		■	■	■	■	■	■	■													
Activity 3 - Capacity building and p2p exchange									■	■	■	■	■	■	■						
Activity 4 - Utility performance evaluation		■	■	■	■	■	■	■	■												
Activity 5 - National Monitoring Body									■	■	■	■	■	■	■						
Activity 6 - Final proposed NLRAP									■	■	■	■	■	■	■	■	■	■	■	■	■


Individual project activities and overall project implementation are **on track** according to schedule

Overview project activities

- Stocktaking report: **Comprehensive data collection** from centrally available sources and via questionnaire (130 questions) to PWSPs
- **12 consultation workshops** with PWSPs and additional consultative meetings with water authorities delivered (under Activities 2 and 4 for drafting NLRAP and indicators for utility performance evaluation)
- **6 capacity building workshops** with PWSPs and additional consultative meetings with water authorities delivered (under Activity 3)
- Integration of **international best practice**: Global expertise from international expert and IWA Water Loss Specialist Group (Water Loss Conference, Prague 2022)
- Three deliverables **finalized and adopted** according to schedule (Stocktaking Report, Indicators for Utility Performance Evaluation, ***Draft National Loss Reduction Action Plan***)



Draft National Loss Reduction Action Plan



**Funded by
the European Union**

**ACTIVITY 2:
DRAFT NATIONAL LOSS REDUCTION
ACTION PLAN**

i. Background analysis and collection of relevant and available data on water resources, water supply systems and operators that enabled the preparation of a draft NLRAP. This includes a stakeholder analysis, collection of data and information including data derived from installed measuring devices and real-time measurements of the quantity of abstracted water, water balance sheets and an assessment of water losses utilizing an Infrastructure Leakage Index according to IWA methodology.

ii. Review of existing water losses reduction plans/documents/reports in Croatia, and international best practice examples in the preparation of water losses reduction plans (with focus on EU countries).

iii. Support to the Croatian authorities in the preparation of a first draft NLRAP, which includes: Introduction and purpose; Implementation objectives; Development of the methodology for water losses reduction and balance sheet of waters; Descriptions of measures and priority setting for the reduction of water losses; Risk assessment; Timeline for implementation; Assessment of the planned water usage fee method/calculation its effect on water prices and affordability of the measures and activities; Implementation mechanisms at national level and PWSPs level; Total estimated implementation costs; Potential sources of funding and co-financing ratios; Establishment of monitoring and measurement criteria for implementation performance; Development of guarantee mechanism for the implementation of the action plan and protection of invested public funds.

NLRAP – DRAFT

November, 2022.

**22HR06 CROATIA:
SUPPORT TO REDUCE
WATER LOSS WITHIN THE
REFORM OF THE WATER
SECTOR**

OBJECTIVE

Support the economy and efficiency of operations of Croatia's water utility sector by improving capacity of the Public Water Service Providers (PWSP) to reduce excessive losses from water supply systems. This is expected to contribute to sustainability and affordability of water service provision, and to water security and resilience more broadly.

PREAMBLE

SUMMARY

1 BACKGROUND, PURPOSE AND OBJECTIVE OF THE NLRAP

2 INITIAL ASSESSMENT OF THE CURRENT STATUS

2.1 Institutional framework

2.2 Water resources

2.3 Water supply systems and water service providers

2.4 New model of calculating the water usage fee

2.5 Water Balance

2.6 Estimating water losses using water loss indicators

2.7 Existing water losses reduction plans/documents/reports

3 WATER LOSS MANAGEMENT PLAN

3.1 Establishment of a loss reduction methodology

3.2 Measures and definition of priorities for water loss reduction

3.3 Time frame to implement the Plan

3.4 Risk assessment

3.5 Analysis and proposal of potential financing sources and co-financing ratios

3.6 Effect on the price of water and affordability in the context of required measures

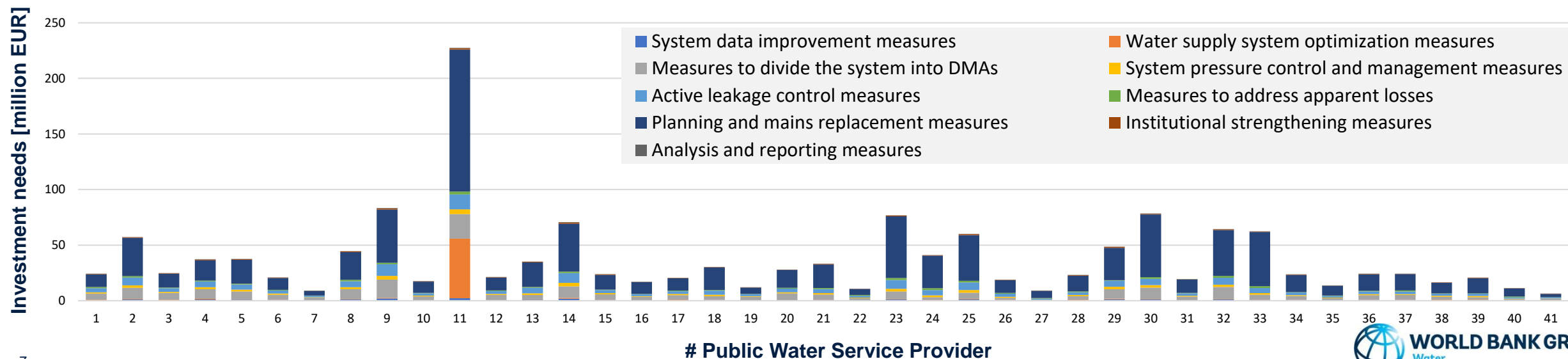
3.7 Implementation safeguards and protection of invested public funds

3.8 Establishment of indicators to monitor the implementation of the Plan

Draft National Loss Reduction Action Plan

Measures and effects

Number	Group	% of the cost of measure	% NRW reduction
I.	System data improvement measures	2,1%	4,0%
II.	Water supply system optimization measures	4,2%	5,8%
III.	Measures to divide the system into DMAs	14,6%	4,0%
IV.	System pressure control and management measures	3,6%	8,6%
V.	Active leakage control measures	10,5%	40,4%
VI.	Measures to address apparent losses	2,2%	3,2%
VII.	Planning and mains replacement measures	61,2%	33,1%
VIII.	Institutional strengthening measures	1,2%	0,7%
IX.	Analysis and reporting measures	0,4%	0,0%



Overview measures and estimated costs

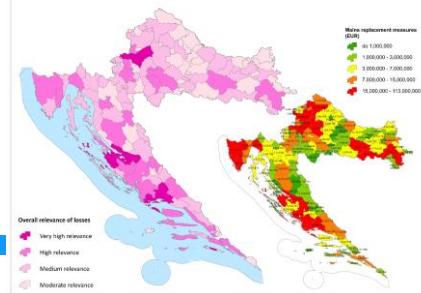
Measures

Responsibility	Number	Group
PWSP measures	I	System data improvement measures
	II	Water supply system optimization measures
	III	Measures to divide the system into DMAs
	IV	System pressure control and management measures
	V	Active leakage control measures
	VI	Measures to address apparent losses
	VII	Planning and mains replacement measures
	VIII	Institutional strengthening measures
	IX	Analysis and reporting measures
	X	Technical (external) assistance to PWSPs to implement the measures
MESD measures	XI	Establishment of the PWSP benchmarking system and performance indicators (establishment of the national database, training PWSPs to report to the Ministry)
		Costs of the national control body for the reduction of losses (expert assistance for the verification and implementation of PWSPs' action and investment plans during NLRAP implementation)

Costs

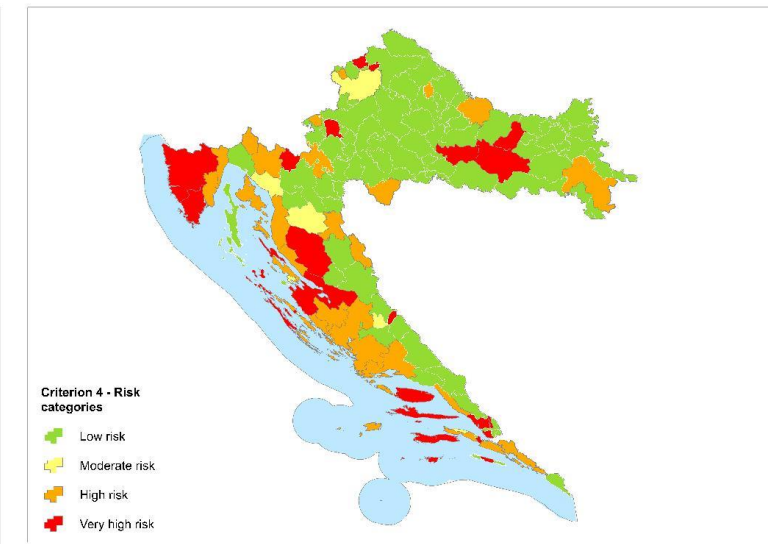
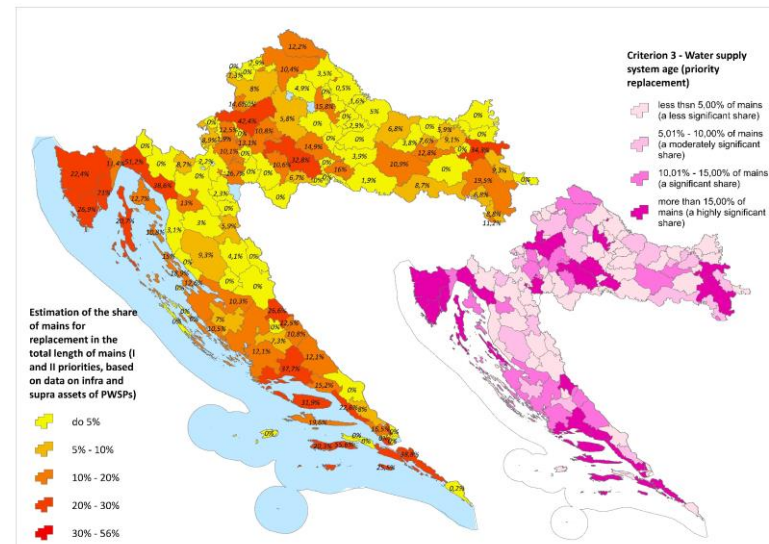
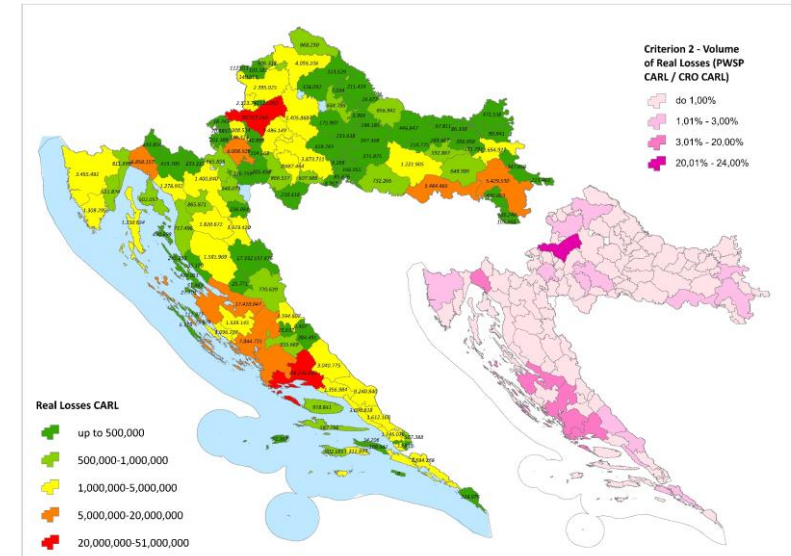
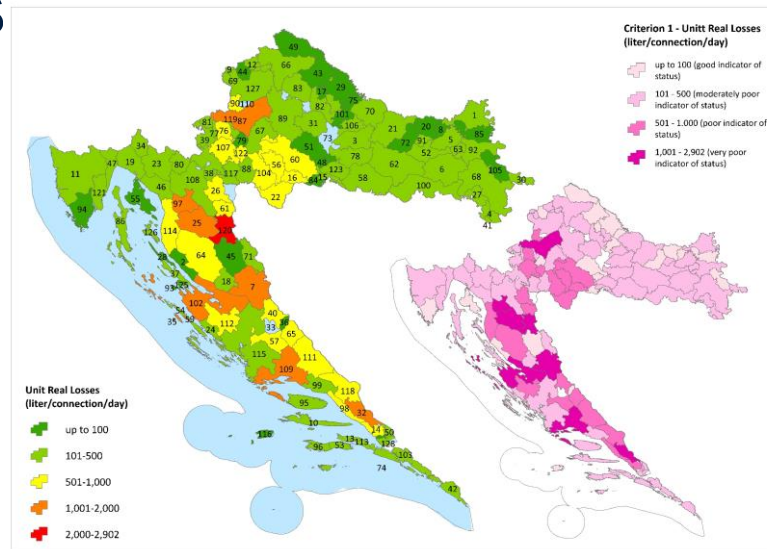
Responsibility	Number	Group	Amount (EUR)
PWSP measures	I-IX	Measures total	1,533,330,000
	X	Technical assistance to PWSPs to implement the measures (3% of the value of Measures I-IX)	45,950,000
MESD measures	XI	Establishment of the PWSP benchmarking system and KPI (establishment of the national database, training PWSPs to report to the MESD)	670,000
		Costs of the national control body for the reduction of losses (expert assistance for expert verification of PWSPs' action and investment plans during NLRAP implementation)	2,000,000
Measures total			1,581,950,000

Draft NLRAP – WATER LOSS RELEVANCE

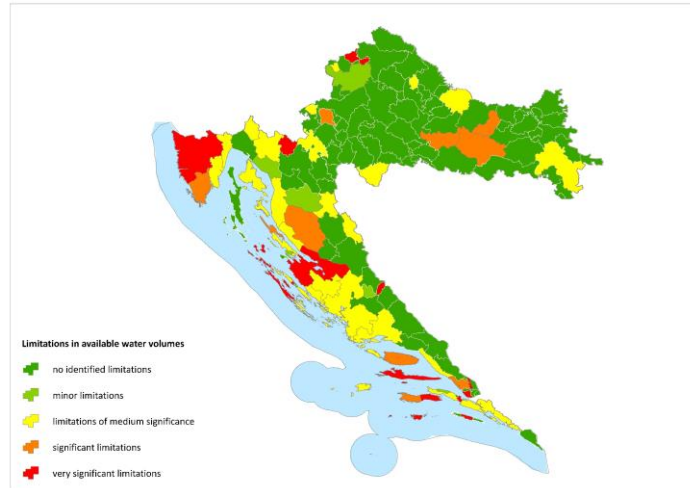


Prioritization of measures

- It is necessary to implement all the foreseen measures (in the scope/amounts adjusted to the priority on the national level, as well as to the needs of individual PWSPs or service areas).
- For financially demanding measures and investments prioritisation, **relevance of the losses** were assessed using 4 weighted criteria:
 - Criterion 1 - **Unit Real Losses**
 - Criterion 2 - **Volume of PWSPs Real Losses**
 - Criterion 3 - **Water supply system age**
 - Criterion 4 - **Risks associated with limitations in available water volumes and climate change**



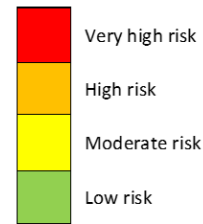
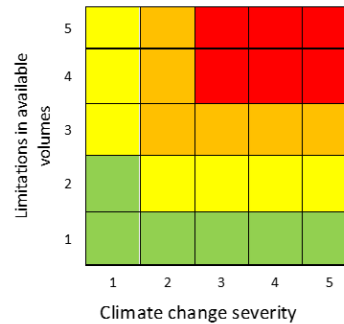
Water availability, climate change scenarios, risks



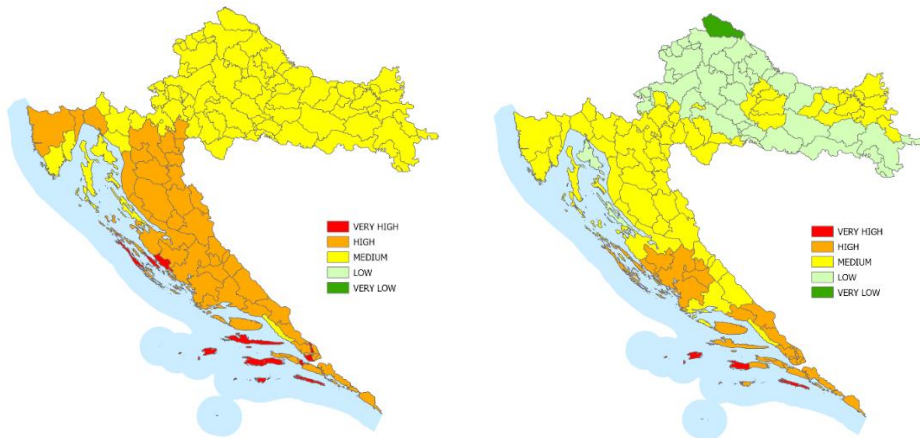
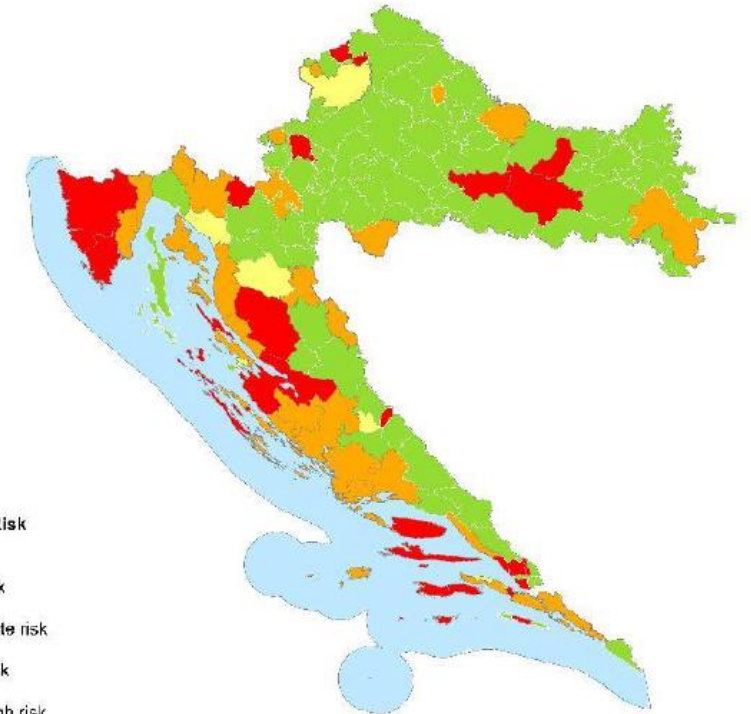
Limitations in **available water volumes**

Criterion 4 - Risks associated with limitations in available water volumes and climate change)

Risk matrix



Criterion 4 - Risk categories



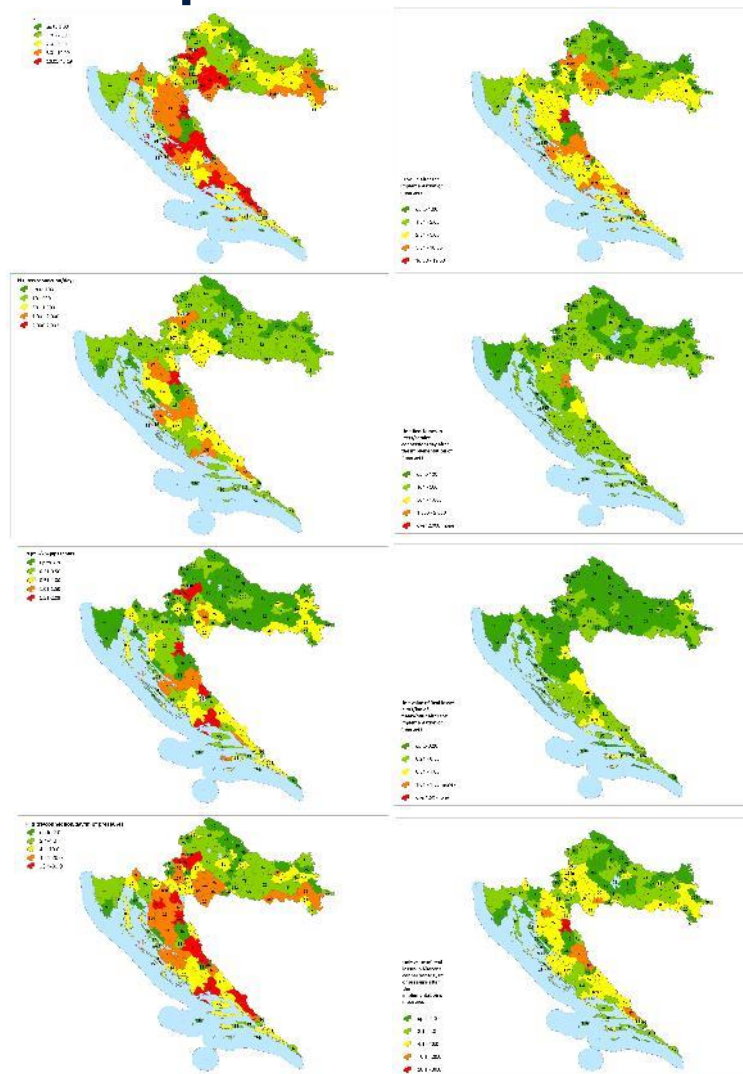
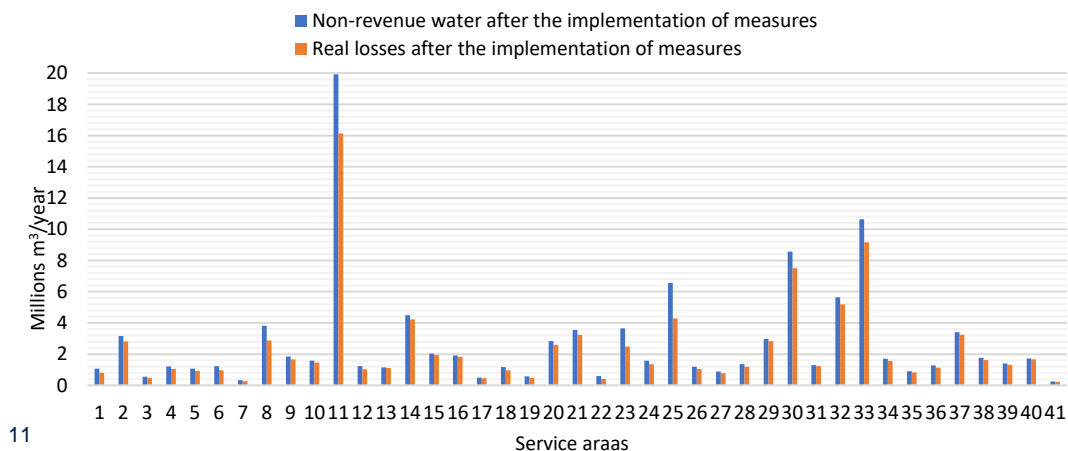
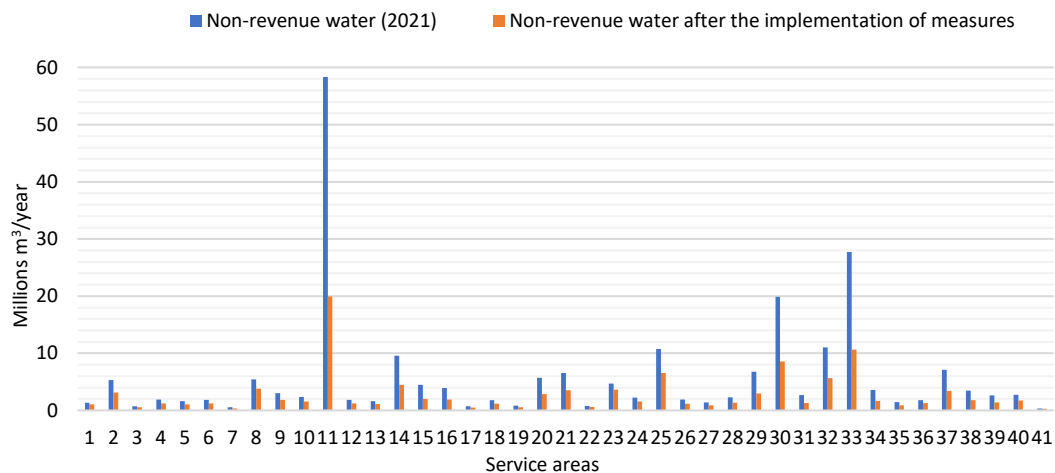
Climate change scenarios

Spatial distribution of risks according to the risk matrix, limitations in available water volumes and climate change severity

Measures and effects on water loss reduction

Estimated indicators of water losses after implementation of loss reduction measures

**Volumetric indicators of water losses
(- 122.3 million m³/year)**



**ILI value by individual PWSPs
(before/after)**

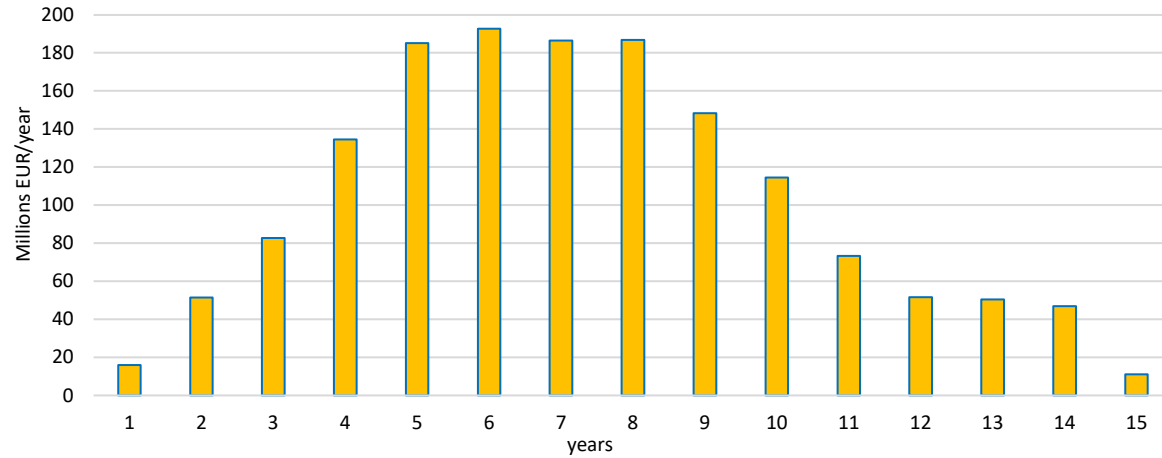
**liter/connection/day
(before/after)**

**m³/km pipe/hour
(before/after)**

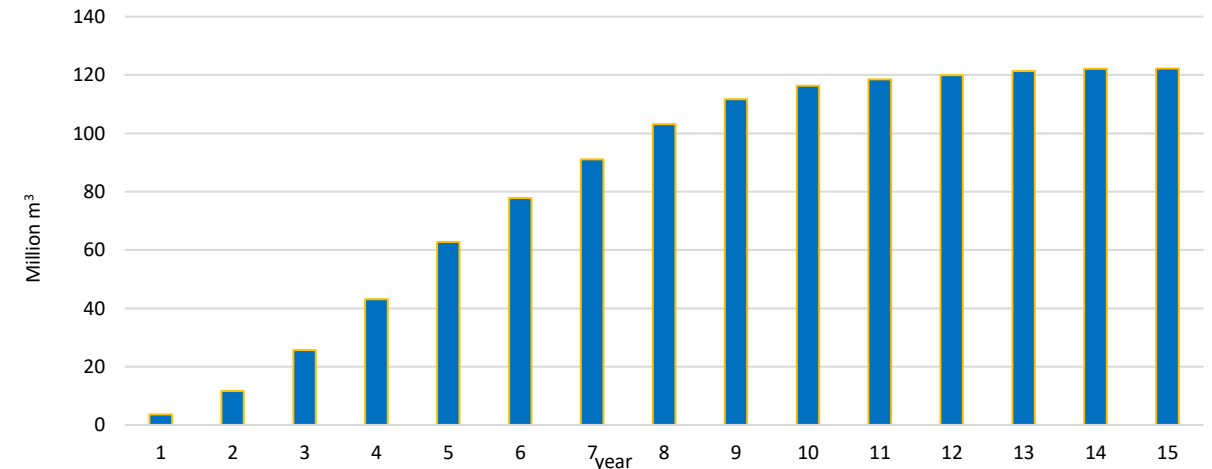
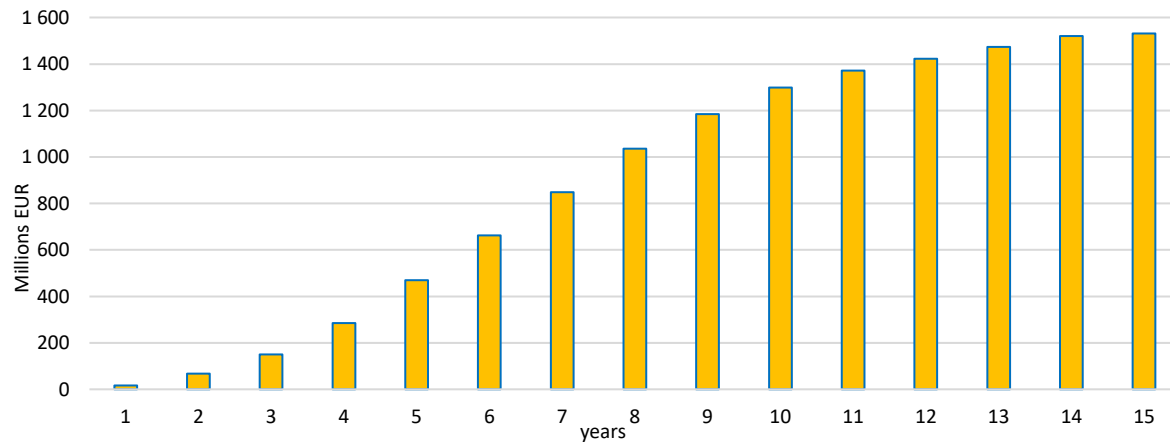
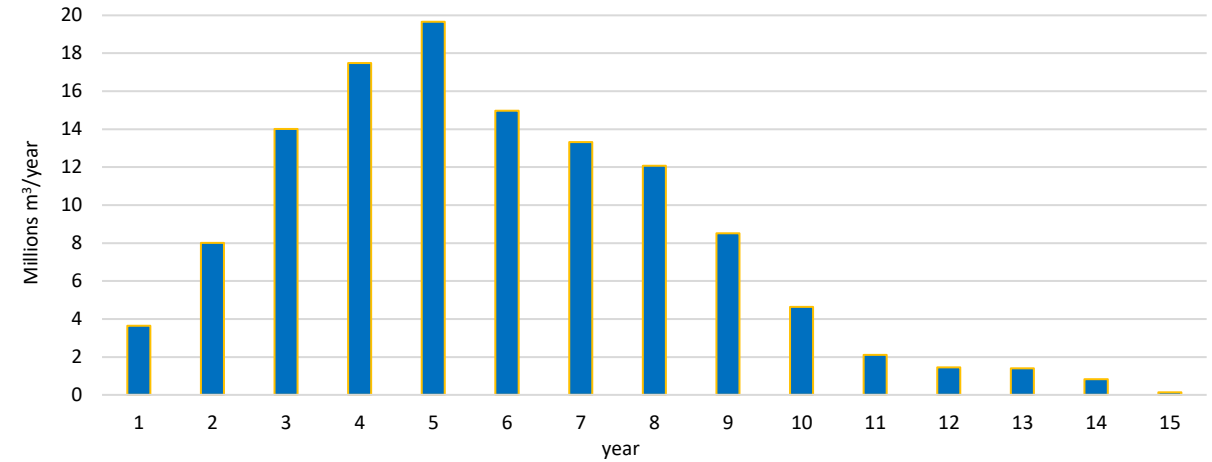
**liter/conn/day/m of pressure
(before/after)**

Investments and effects on water loss reduction

Investments



Effects



Projection of potential sources of financing

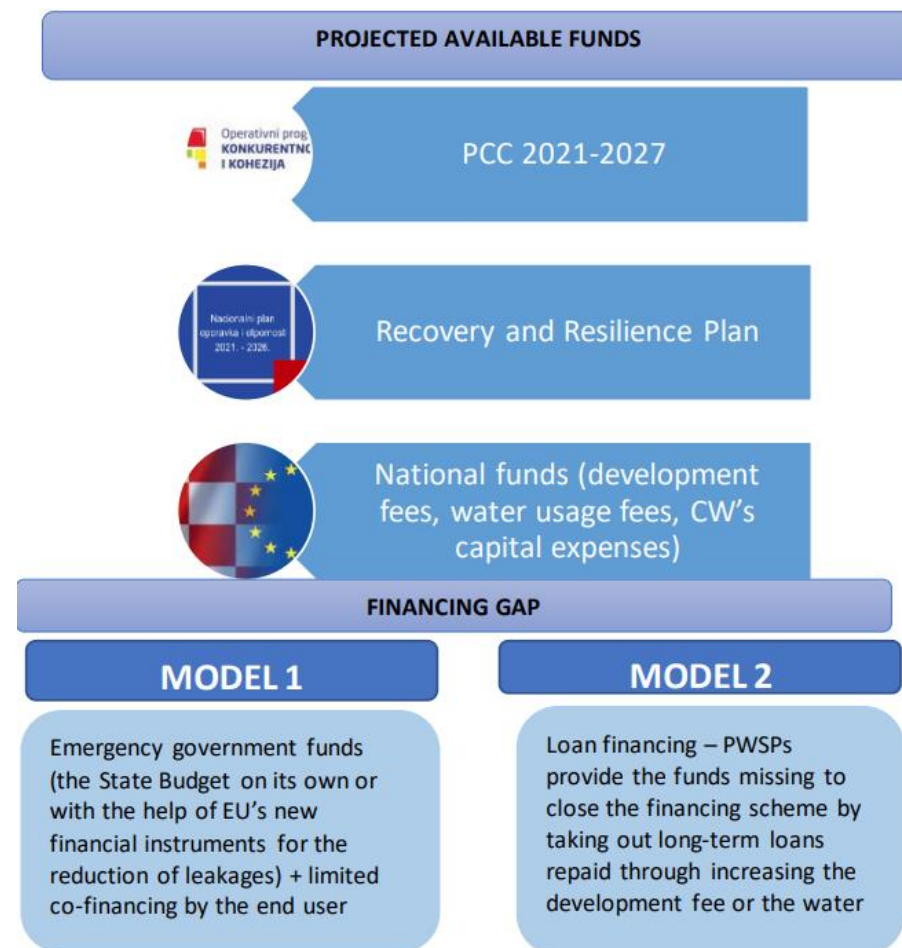
Estimated total **financing needs: EUR 1,580 million**

Total projected **available funds: EUR 675 million**

Financial gap: EUR 905 million (or 57% of the total projected investment value of the measures)

Due to significant financial gap, two models are discussed:

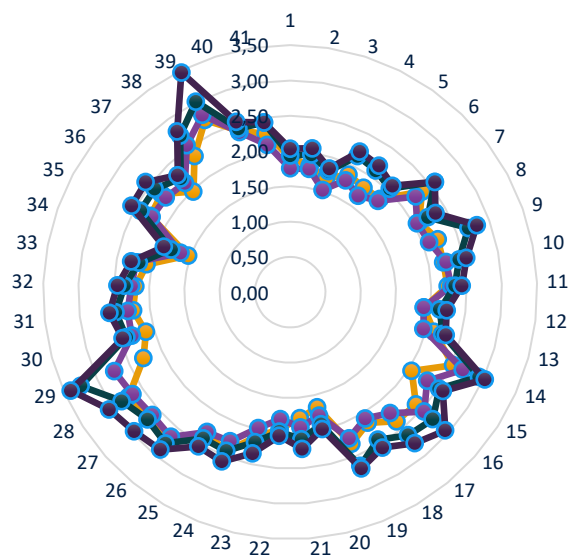
- **MODEL 1:** Emergency government funds and limited funds of the end users
- **MODEL 2:** Loan financing (IFI loans as a more favorable option or loans from commercial banks) through charging the future water price or through increasing the development fee



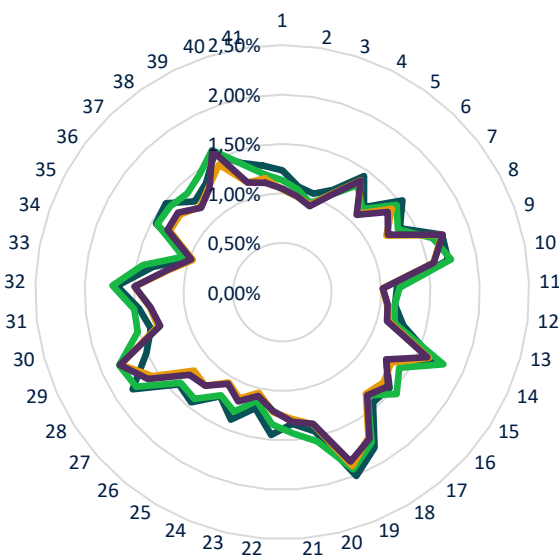
Draft National Loss Reduction Action Plan

Effect on the price of water and affordability

Impact of implementing the NLRAP - Model 1 on the total price of water services and on the affordability

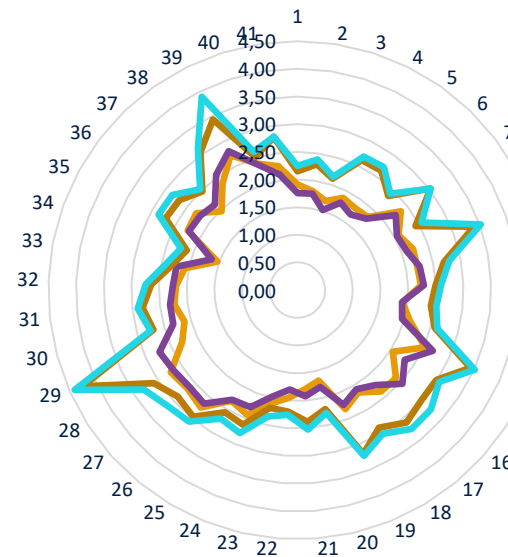


- Total water price today (Households)
- Total water price (2023) EUR
- Total water price 2033 - Model 1 EUR
- Total water price 2038 - Model 1 EUR

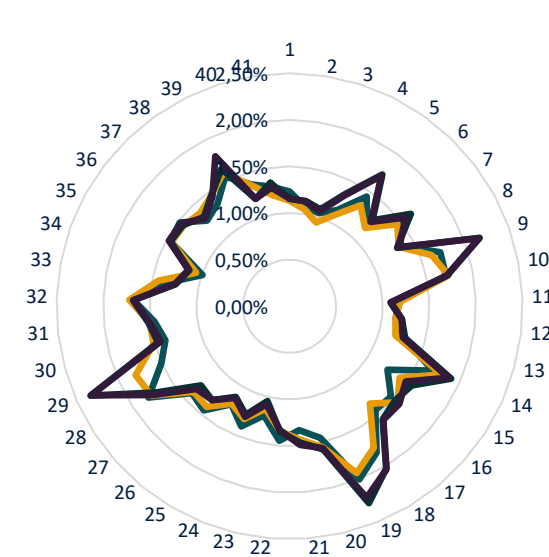


- NRD - 2022
- NRD - 2023
- NAI - 2033 MODEL 1
- NAI - 2038 MODEL 1

Impact of implementing the NLRAP - Model 2 on the total price of water services and on the affordability

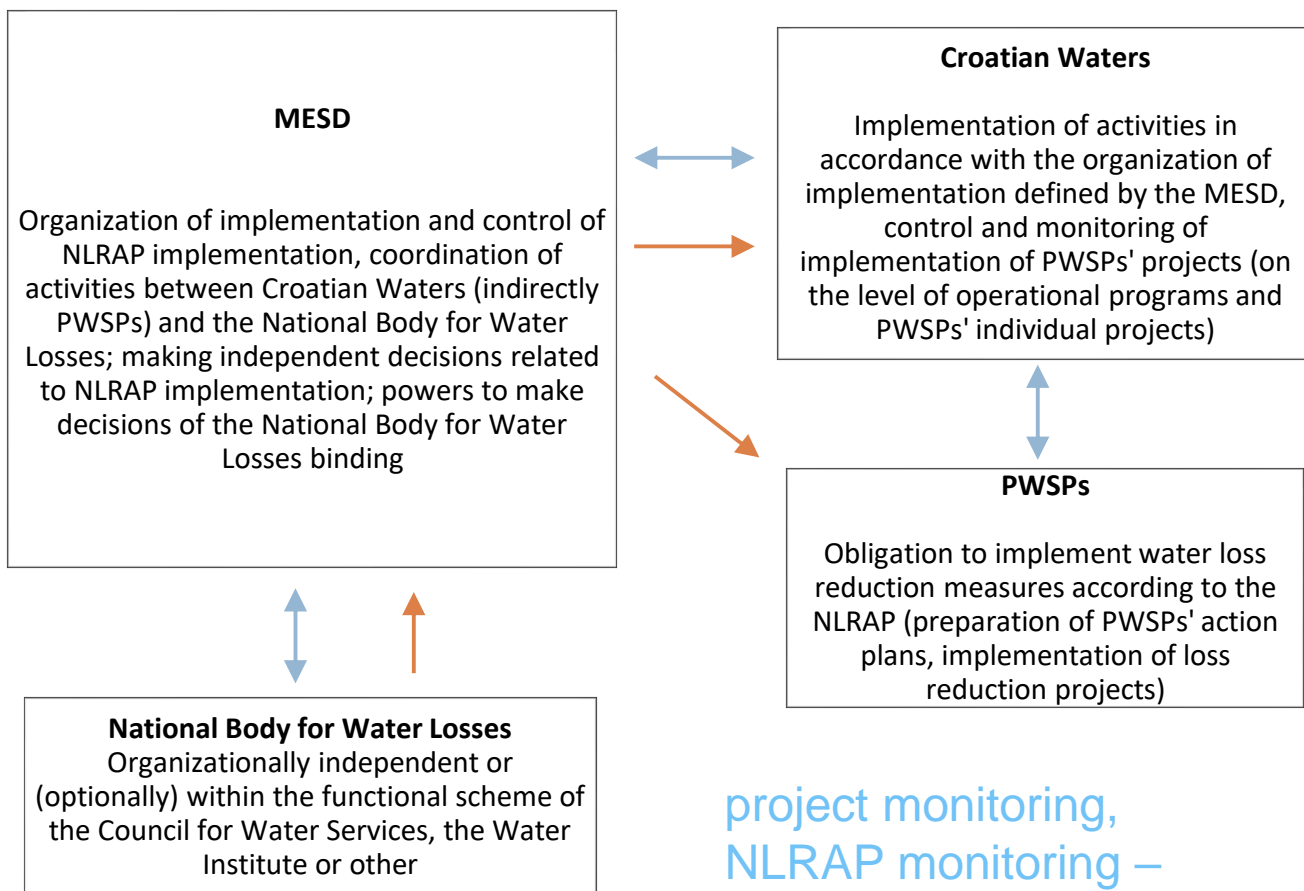


- Total water price today (Households)
- Total water price (2023) EUR
- Total water price 2033 - Model 2
- Total water price 2038 - Model 2



- NRD - 2022
- NRD - 2023
- NAI - 2033 MODEL 2
- NAI - 2038 MODEL 2

NLRAP implementation mechanisms



project monitoring,
NLRAP monitoring –
blue, decisions – red

- the NLRAP measures will be implemented through several national financial/operational programs and/or through individual measures/activities of individual PWSPs.
- At the same time, the NLRAP points to the need for a comprehensive analysis of water losses, monitoring the implementation of measures, and evaluation of results, including monitoring the achievement of the national objectives.
- In such form of implementation, it is extremely important to establish mechanisms for monitoring, control, and expert evaluation of, including approval, activities on the reduction of losses deriving from the NLRAP.

Importance of NLRAP

- The NLRAP is the first **comprehensive document prepared to improve the water loss reduction** in Croatia.
- A **detailed analysis of the current situation was conducted** on a qualitative basis, **key problems** in the operation of numerous PWSPs **were identified**, and **key groups of measures and sub-measures for the implementation** of the NLRAP were defined, applicable at all levels, from individual PWSPs to the national level with assessment of the impact of the implementation of the proposed measures.
- As part of the analysis of the current situation, **a database of all PWSPs in Croatia with the most important technical, operational, organizational and personnel data was created**.
- The **proposed actions are intended to cover all areas that have an impact on water loss reduction** and also aim to **raise awareness of the importance of long-term implementation** of all actions.
- A particular **contribution** of the **Croatian NLRAP** is the **applicability of the elaborated methodology** for water loss reduction and **NLRAP preparation in other countries** and in PWSPs **outside the borders of Croatia**.



Thank you!