



Water losses reduction and compliance with the Drinking Water Directive in Cyprus



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Tuesday 14/10/2025



Presentation Structure



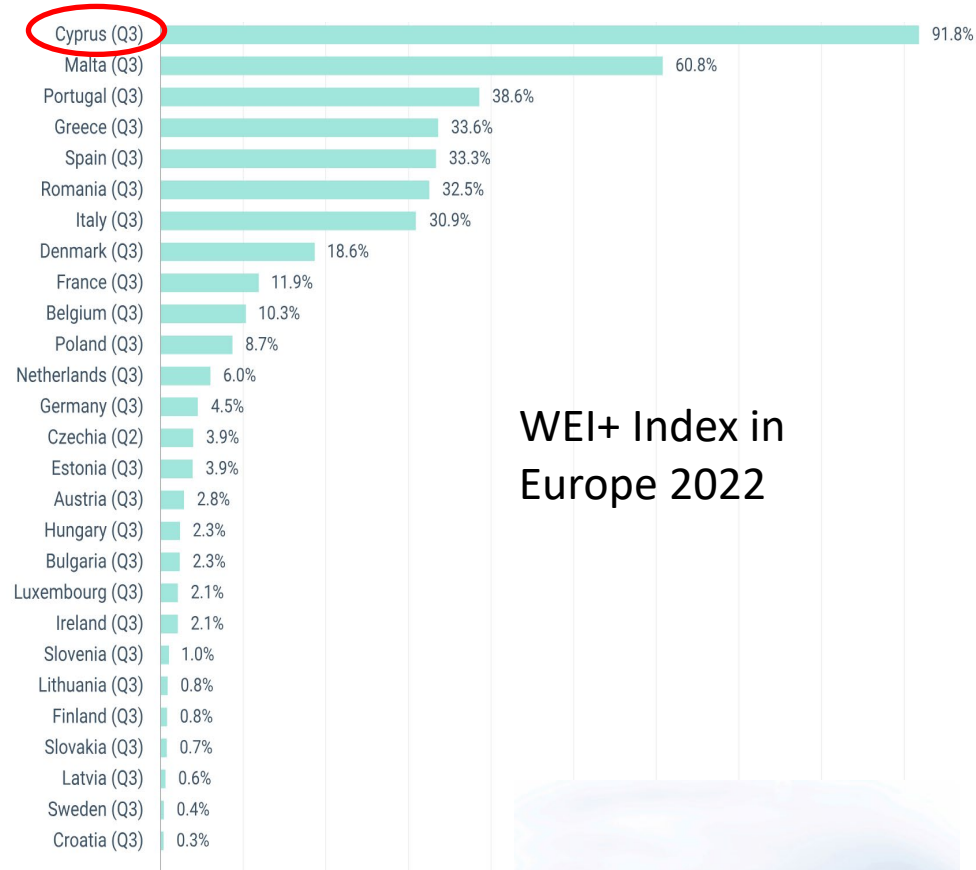
1. The Problem of Water Scarcity in Cyprus
2. Dealing with the Problem
3. Water Losses in Cyprus
4. TSI funded Project “**Water Losses Reduction and Compliance with the Drinking Water Directive**”



The Problem of Water Scarcity in Cyprus



- ❑ Cyprus is the 2nd most Water Stressed country in the world with a Water Stress Index of **>80%**. The OECD defines a water stress index of >40% as high-water stress
- ❑ Cyprus is the country with the highest water exploitation index (WEI+) in Europe with a WEI+ of **91.8%** in 2022.



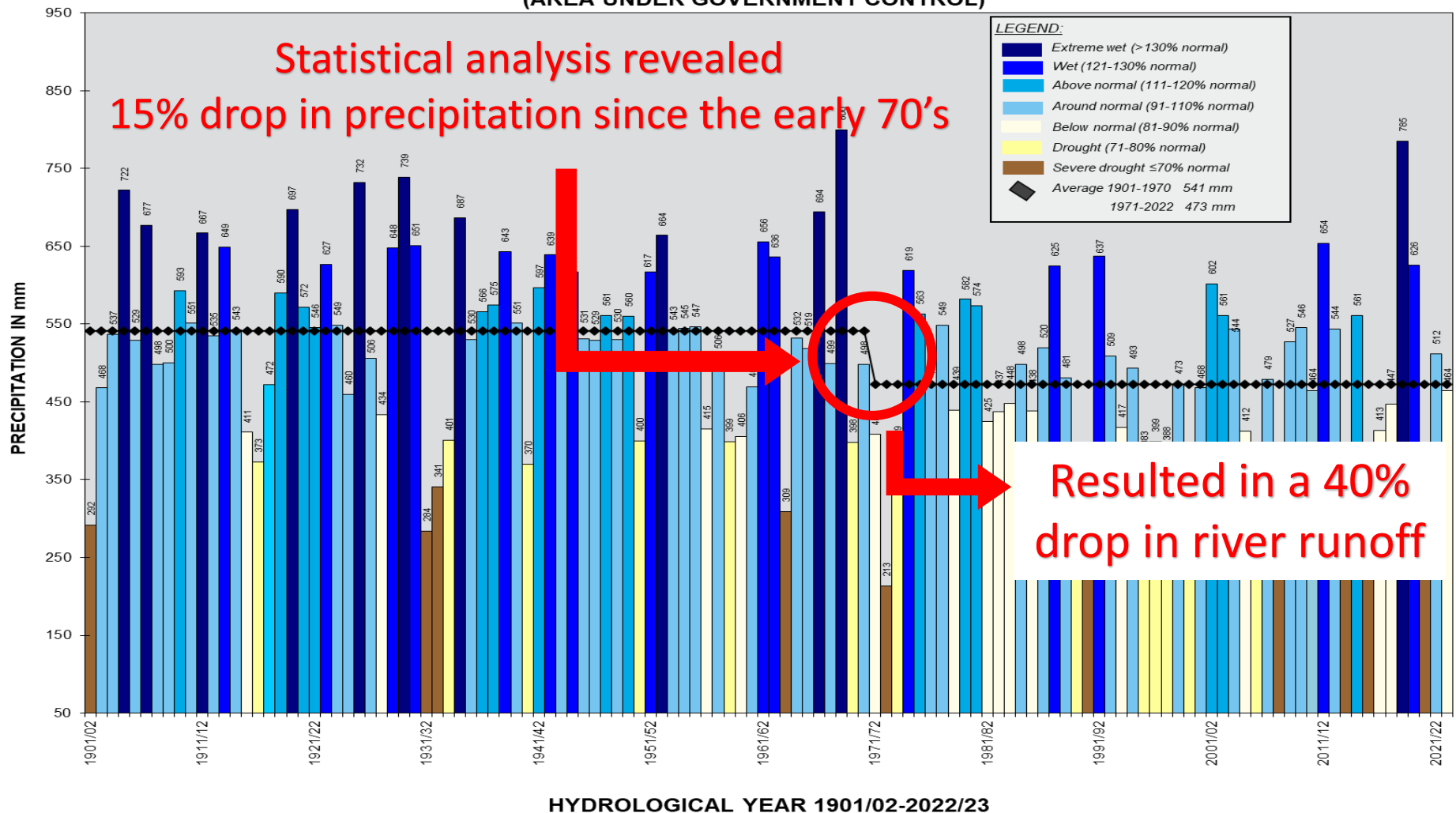
WEI+ Index in Europe 2022



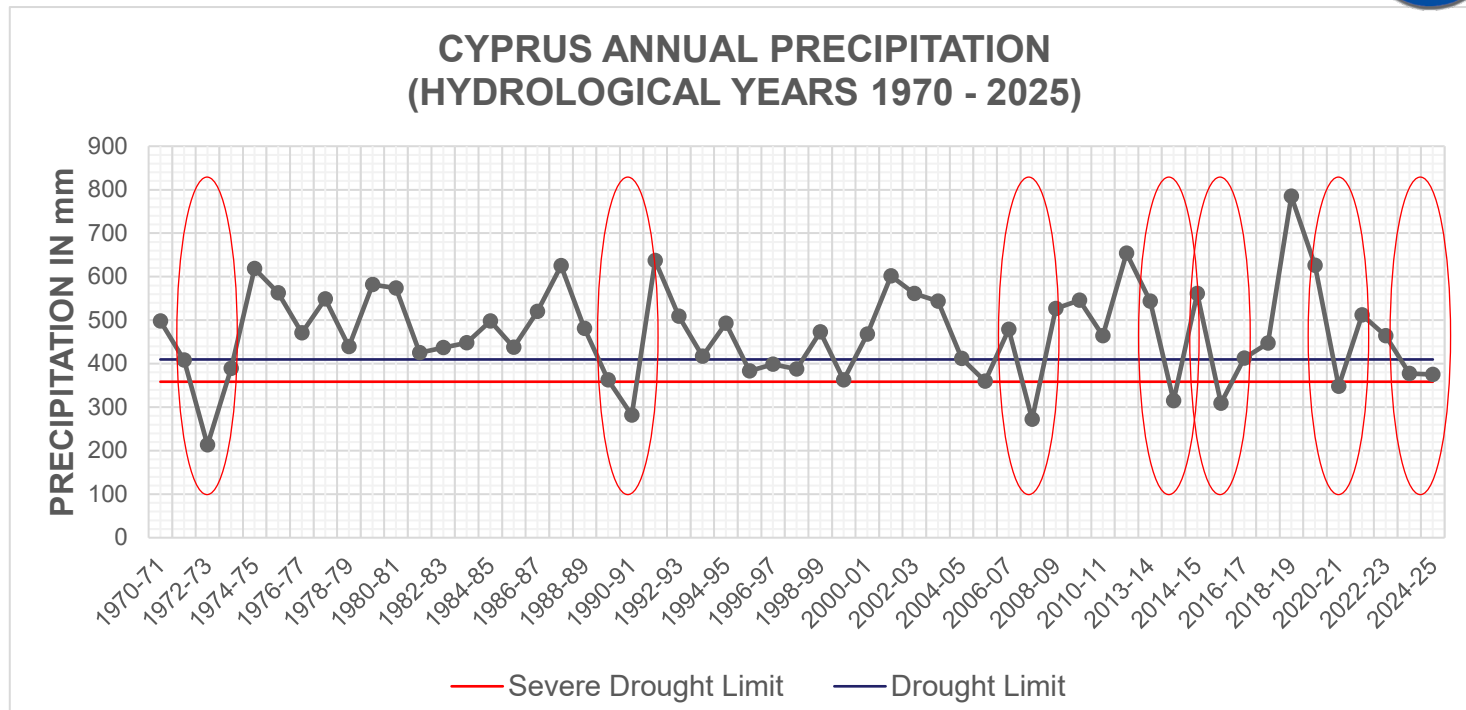
The Problem of Water Scarcity in Cyprus



CYPRUS ANNUAL PRECIPITATION (AREA UNDER GOVERNMENT CONTROL)



The Problem of Water Scarcity in Cyprus



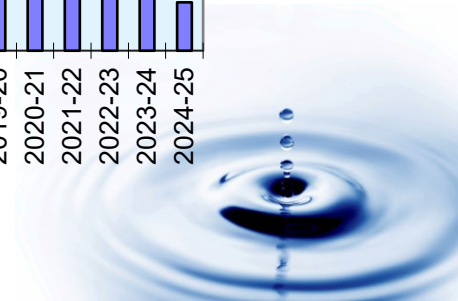
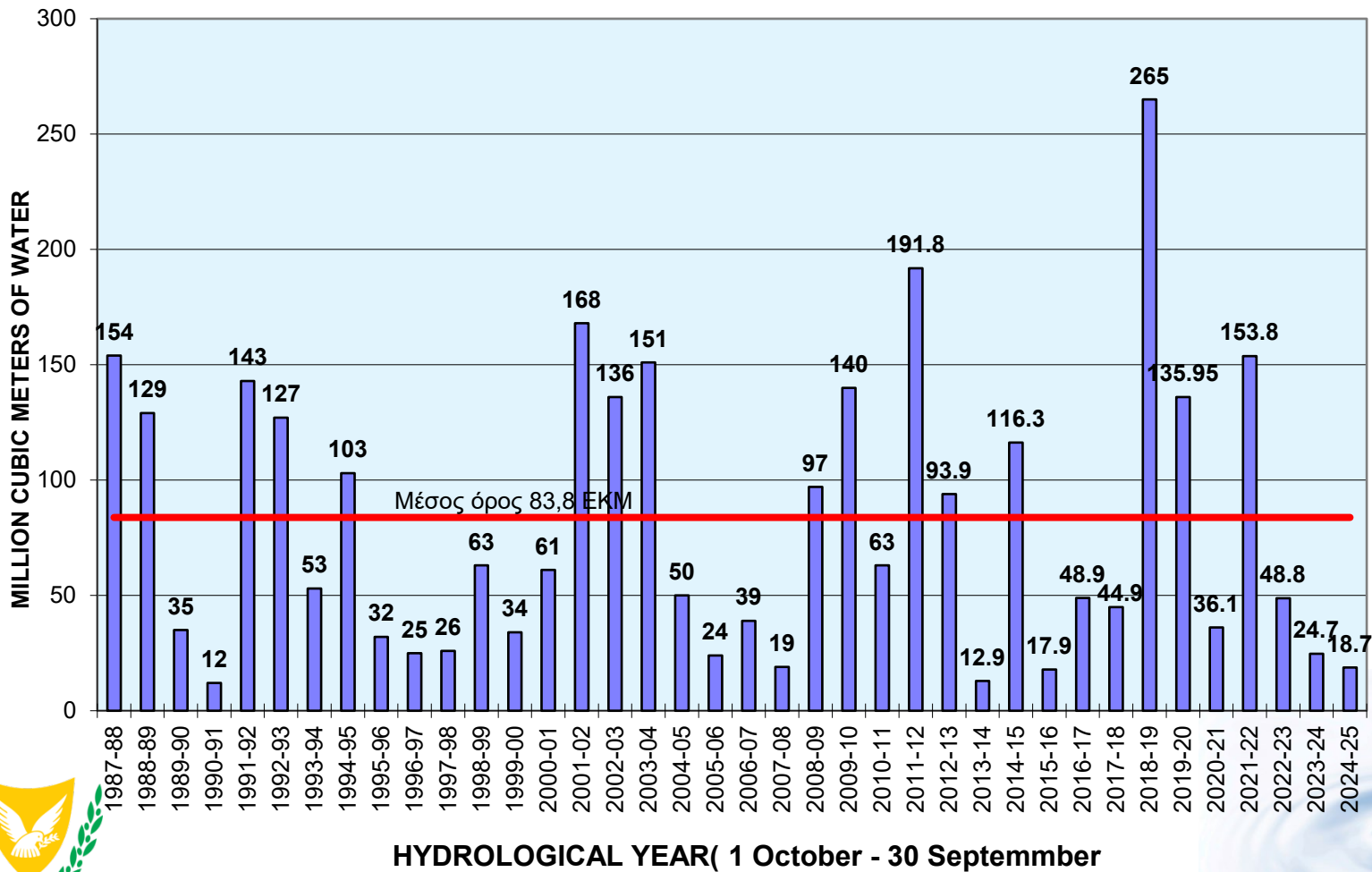
- In addition to the step drop in precipitation and the subsequent drop in river runoff, the occurrence of **Extreme Drought Events** has increased in frequency.
- These events affect not only the **quantity** of the available water but also the **quality**.



The Problem of Water Scarcity in Cyprus



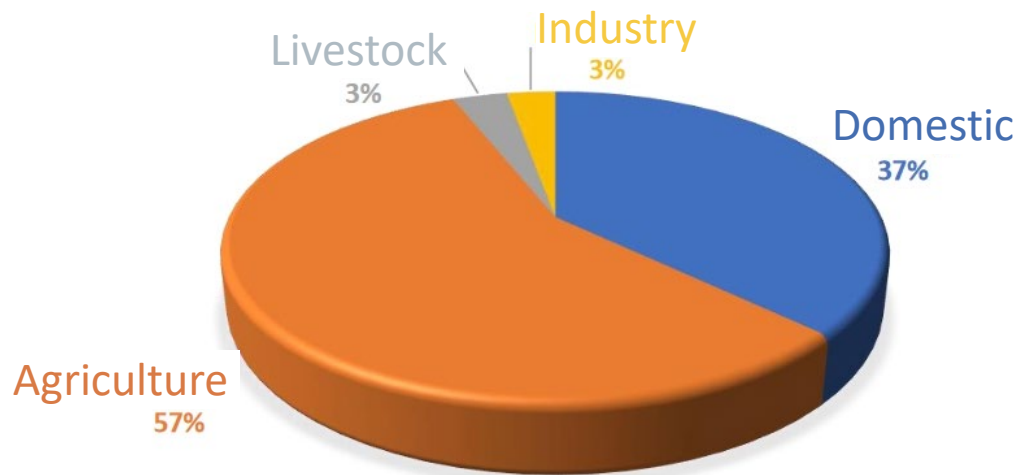
WATER INFLOW IN CYPRUS DAMS 1987/88 - 2024/25



The Problem of Water Scarcity in Cyprus



- The total water demand is higher than the availability and irrigation needs are therefore rarely satisfied.
- Since 1996, water demand for irrigated agriculture was met only twice, in 2004 and in 2020, when dams were full



Demand: 266 MCM / year
Fresh water availability: 200 MCM / year
Deficit: 66 MCM
2023 Data



The Problem of Water Scarcity in Cyprus



WATER BALANCE from main Government Water Works in million m³ (MCM)

		2022	2023	2024	2025
Water Supply					
Source	Desalination	52.7	59.9	77.2	74.7
	Dams	42.2	40.8	28.1	36.3
	Boreholes	6.1	4.6	6.7	6.2
	Total	101.0	105.3	112.0	117.2
Irrigation					
Source	Dams	42.9	43.9	33.6	14.0
	Boreholes	9.3	10.2	11.4	11.1
	Reclaimed Water	13.3	14.5	15.0	15.5
	Total	65.5	68.6	60.0	40.6
	Total demand	65.5	68.6	69.2	69.6
	Deficit	0.0	0.0	9.2	29.0
Total demand		166.5	173.9	181.2	186.8



NOTE: ALL VALUES IN MILLIONS OF CUBIC METERS (MCM)

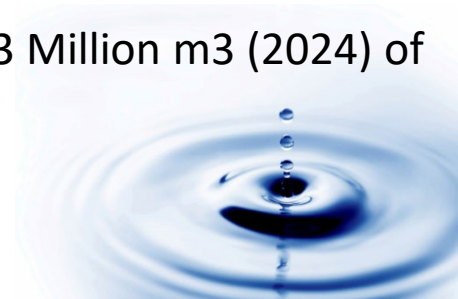


Dealing with the Problem



In an effort to meet the demand for water of all uses, the Water Development Department, implemented several large-scale infrastructure projects:

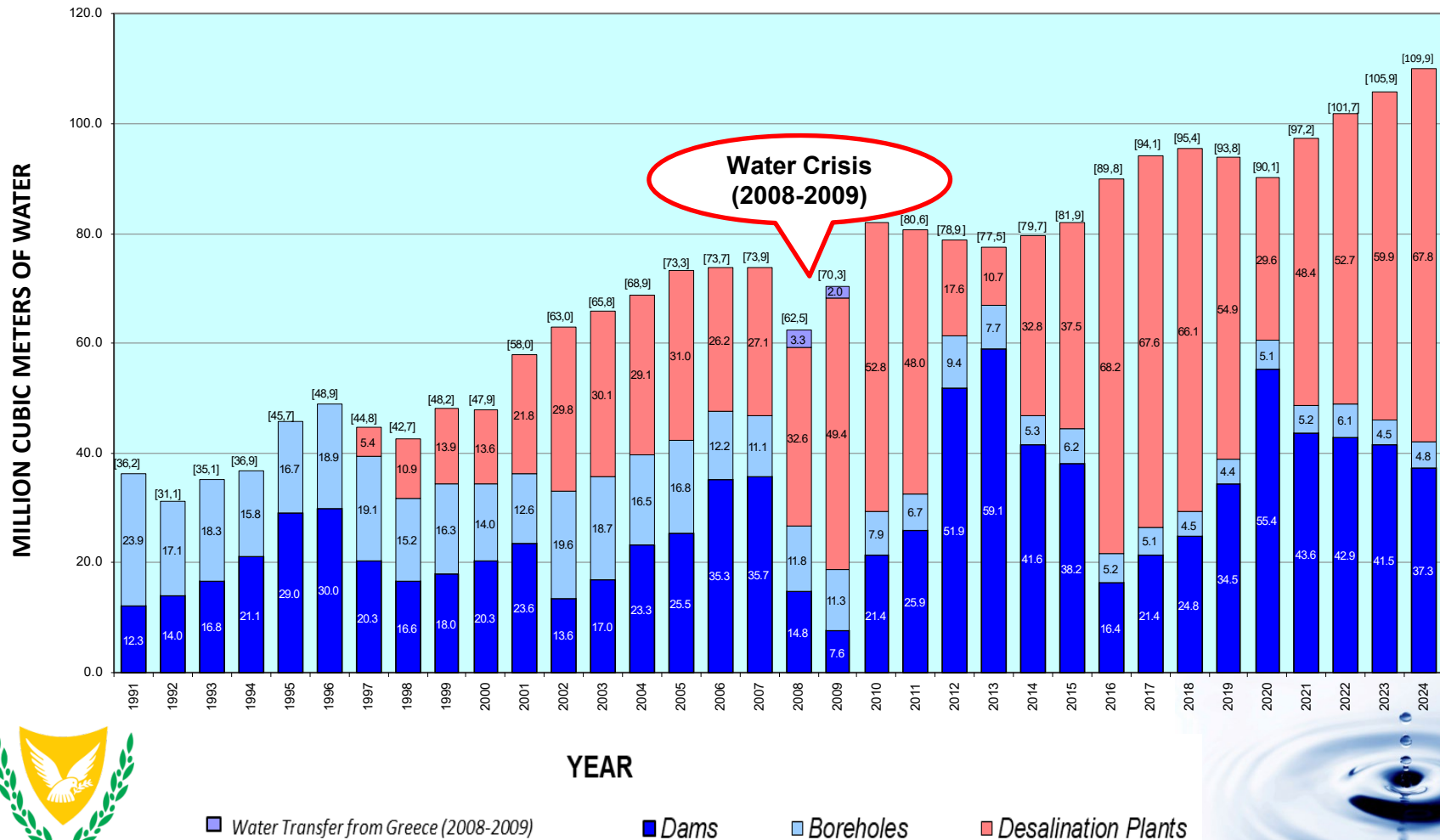
- 110 Dams and Reservoirs with a total capacity of 332 million cubic meters of water
 - 56 large dams according to the International Committee of Large Dams (ICOLD)
 - The European country with the highest number of large dams/area
- 6 Water Treatment Plants with a total daily capacity of 242.000 m³
- 7 Desalination Plants of a total daily capacity of 264.000 m³
 - Several more plants are under construction or planning
 - Desalination covers approximately 75% of water supply demand
 - The highest per capita desalination production in Europe
- 13 Wastewater Treatment Plants with a total production of 31.3 Million m³ (2024) of tertiary treated water 90% of which is used for irrigation
 - The highest percentage of water reuse in Europe



Dealing with the Problem: Water Supply



GOVERNMENT WATER WORKS – DRINKING WATER (1991 – 2024)



Dealing with the Problem



Priority order according to the principle of “Water Efficiency First” which is promoted under the new EU Water Resilience Strategy:

1. Water demand reduction
 2. Increased efficiency (e.g. losses reduction)
 3. Water reuse (reclaimed water)
 4. Water production increase
- Cyprus has very limited reliable potable water resources other than expensive and energy consuming desalination.
 - Water reuse is undertaken extensively but this is benefiting exclusively irrigation.
 - Thus, water demand reduction and increased efficiency are even more important.



Water Losses challenges in Cyprus



- Most water supply systems are old and not sufficiently maintained.
- No centrally collected data on water losses
- Most water supply providers traditionally have been small (e.g. small municipalities and communities) with very low capacity to collect data and deal with water losses
- 3 largest cities (Nicosia, Limassol, Larnaca) had Water Boards with active water loss strategies. They reports losses in the range of 15-25% but with different and unclear methodologies.
- All other water suppliers did not report water loss data.
- A study undertaken for WDD in 2024 for the Kokkinohoria area (small communities) showed water loses rates ranging between 30%-71% with an average rate of app. 40%.
- Despite the lack of data, it is estimated that average NRW (drinking water) in Cyprus has been exceeding 30% perhaps even 40%



Local Government Reform



In **July 2024** a local government reform took place in Cyprus:

- 30 municipalities merged into 20 larger ones incorporating many communities
- 5 District Local Government Organizations (DLGO) established in charge of:
 - **Water supply**
 - Sewerage
 - Development Licencing (Urban planning & building permitting)
 - Solid waste management

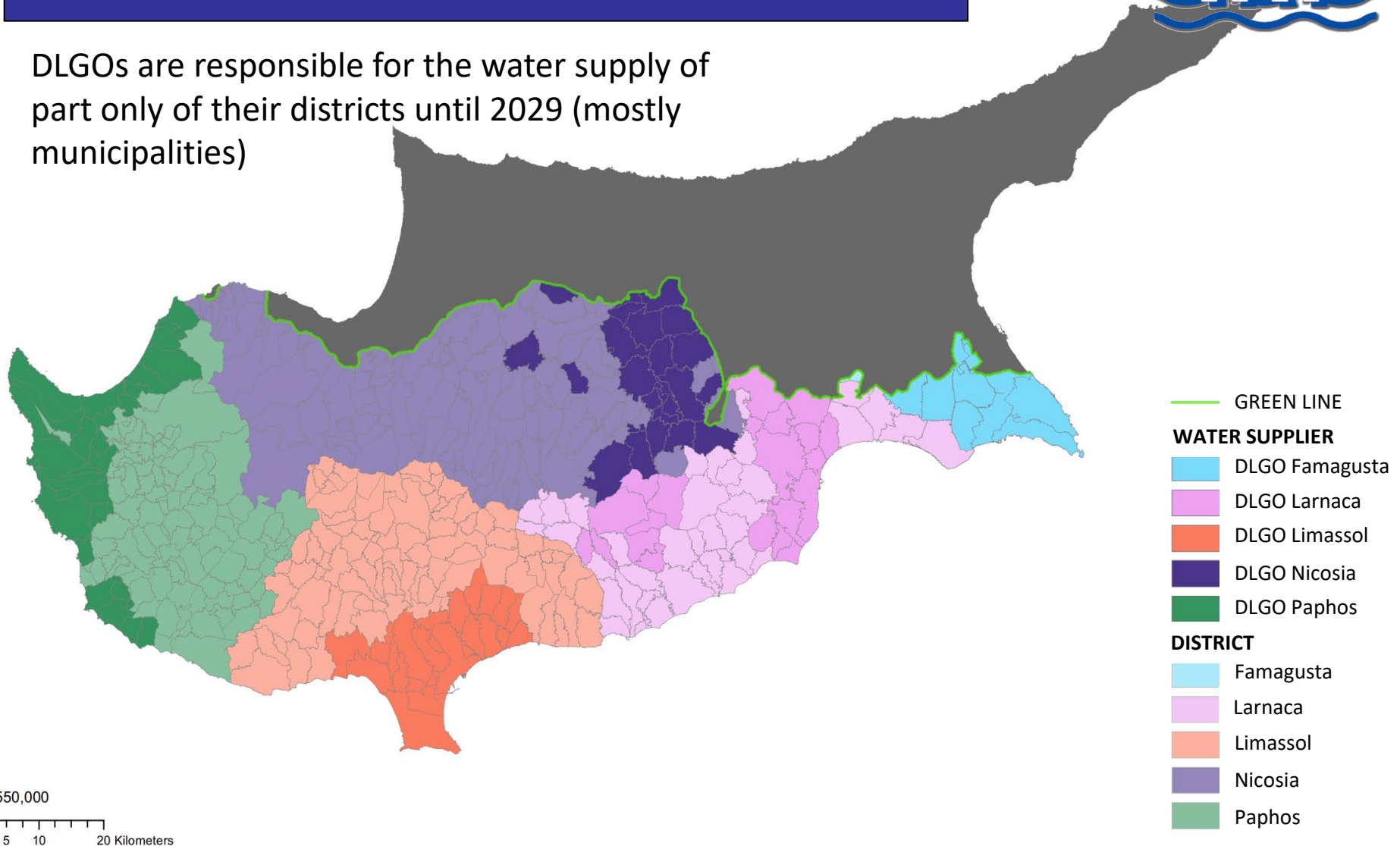
Data are gradually becoming available on a district level from 7/2004 onwards



Local Government Reform



DLGOs are responsible for the water supply of part only of their districts until 2029 (mostly municipalities)



Technical Support Instrument

Supporting reforms in 27 Member States

WATER LOSSES REDUCTION AND COMPLIANCE WITH THE DRINKING WATER DIRECTIVE



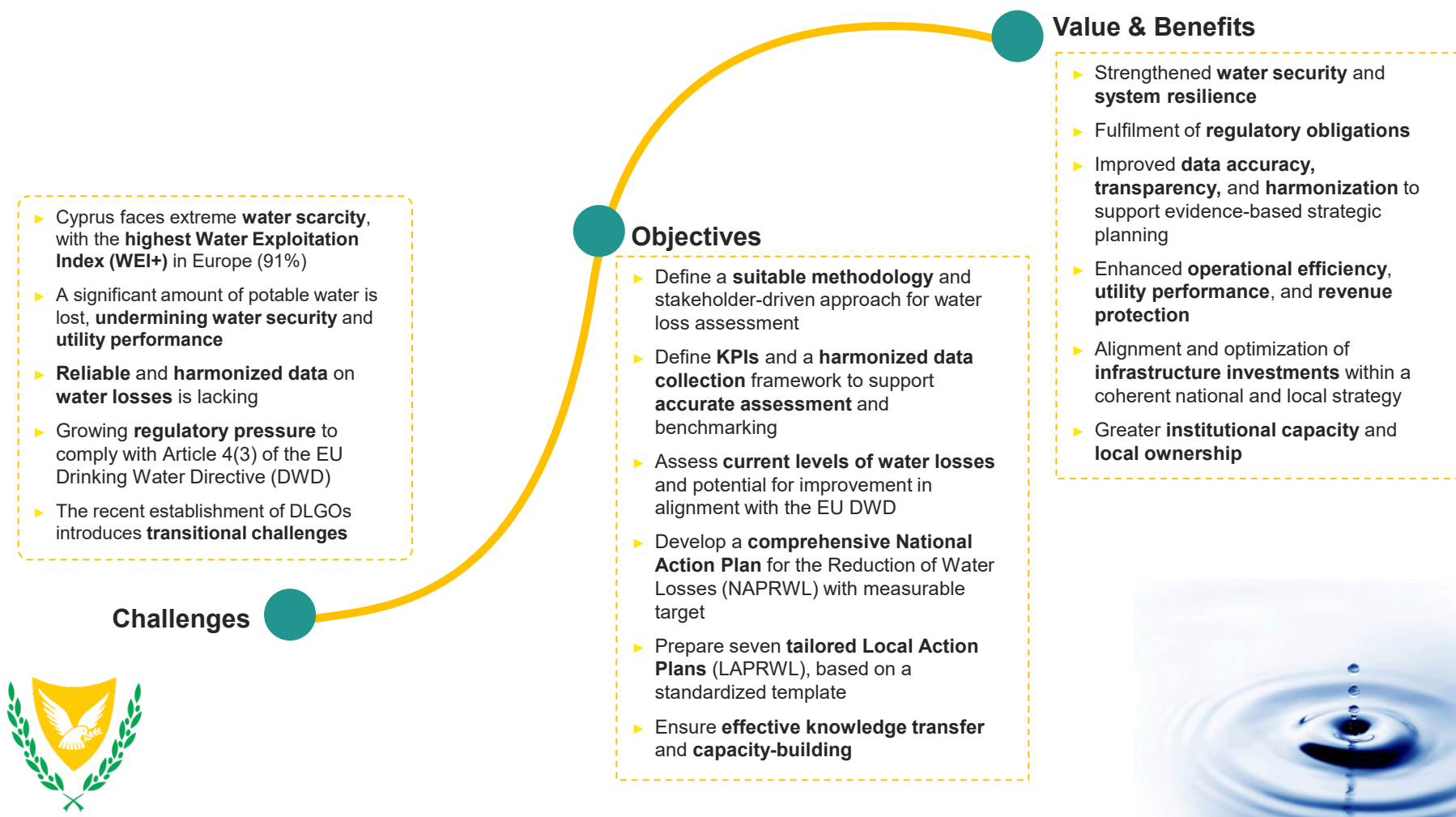
Funded by
the European Union



Shape the future
with confidence



TSI Water Losses: Scope and Objectives



TSI Water Losses: Deliverables



1. Assessment of Water Losses and Improvement Potential (11/2025)
2. National Action Plan for Reduction of Water Losses (06/2026)
3. 7 Local Action Plans for Reduction of Water Losses (01/2027)
4. Training and Capacity Building Programme (04/2027)

Final Report and closing Events (05/2027)



1. Assessment of Water Losses and Improvement Potential

New Drinking Water Directive 2020/2184

Article 4(3): In accordance with Directive 2000/60/EC, Member States shall ensure that **an assessment of water leakage levels** within their territory and of the potential for improvements in water leakage reduction is performed using the infrastructural leakage index (ILI) rating method or another appropriate method. That assessment shall take into account relevant public health, environmental, technical and economic aspects and cover at least water suppliers supplying at least **10 000 m³ per day** or serving at least **50 000 people**.

The results of the assessment shall be communicated to the Commission by
12 January 2026.



1. Assessment of Water Losses and Improvement Potential

EUREAU Method

The approved indicator is defined as the volume of non-revenue water per unit of mains length, so the WLL is obtained by dividing NRW by the total mains length (abduction, transport and distribution pipes):

$$\text{Non - Revenue Water } [m^3/(km.year)] = \frac{\text{Non-Revenue Water } (m^3)}{\text{Total mains length } (km)}$$

- | | | |
|---|---|---|
| Minimum Required | → | • Minimum data requirements for MS' water leakage level assessment within their territory: data related to the EUREAU method , requiring Non-Revenue Water (NRW) on a yearly basis and per km mains (unit = $m^3/(\text{year.km})$). (*) |
| Optional | → | • Additional data on 'real losses' ("water that is lost into the ground") as part of NRW (m^3/year) is recommended by COM in view of the upcoming Commission Water Resilience Initiative |
| Reporting period | → | • Reference period: COM recommends data covering at least 3 distinct years within the period 2021 – 2025 |
| Reporting Scale
Article 4(3),
DWD | → | • Level of detail: data per water supplier ("supplying at least 10 000 m^3/day or serving at least 50 000 people"), indicating the % of the total national water supply represented |

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TSI Water Loses: Deliverables



IWA Water Balance – EU Drinking Water Expert Group (Specialist Group for Water Leakage Levels)

Raw Water Abstracted (RWAB)	System Input Volume (SIV)	Authorised consumption (including exported water) (ACON)	Billed authorised consumption (BAC)	Billed metered consumption (BMC)	Revenue Water (RW)
				Billed unmetered consumption (BUC)	
			Unbilled authorised consumption (UAC)	Unbilled metered consumption (UMC)	Non Revenue Water (NRW)
				Unbilled unmetered consumption (UUC)	
		Water losses (WLOS)	Apparent losses (AL)	Customer metering inaccuracies (CMI)	
				Unauthorised consumption (UC)	
			Real losses (CARL)	Leakage on transmission and distribution mains (LTD)	
				Leakage and overflows at utility's storage tanks (reservoirs) (LOS)	
				Leakage on service connections up to the point of customer metering (water suppliers' responsibility) (LSC)	
Imported raw water (IRW)					
Imported treated water (ITW)					

Reporting Period for Cyprus: 01/2024-12/2024
due to the Local Administration Reform





2. National Action Plan for Reduction of Water Losses

- ▶ Development of NAPRWL using findings from 1 and stakeholders' input
- ▶ Definition of strategic actions, KPIs, cost estimates, funding sources, and implementation mechanisms
- ▶ Stakeholder engagement through workshops

3. 7 Local Action Plans for Reduction of Water Losses

- ▶ Standardized LAPRWL template based on the national plan
- ▶ Seven tailored plans for WDD, five DLGOs, and five transitioning communities with detailed local actions, KPIs, and cost estimates
- ▶ Field assessments





4. Training and Capacity Building Programme for WDD and 5 DLGOs

- ▶ Training Needs Analysis (TNA), gap assessment, and stakeholder mapping
- ▶ Development of tailored training materials, formats, and digital repository
- ▶ Delivery of training sessions, train-the-trainer workshops, and evaluation reports



TSI Water Losses: Water System Improvement Matrix



- A matrix developed based on **collective experiences, knowledge** and **expertise**.
- Begins at the **current level of water system** and proceeds to the next level through a series of much-needed **sustainable changes** and system improvements.
- Imperative to fully **understand, measure and document a water utility's current level of operations** and then develop plans on how to move forward to the next operational level.
- Common for utilities to **underestimate the effort and work needed** to improve system efficiency.
- To **move forward** will take many processes, some simple and some that are not so easy, along with some that will **require investment and time**.

Bulk Flow Measurement				
Instructions Click on the red box and use the drop down menu to choose the system level which best describes your system.		System Level	Start	Results
				2 - Customer Metering
	BASIC NETWORK SYSTEM	ORDINARY NETWORK SYSTEM	SMART NETWORK SYSTEM	INTELLIGENT NETWORK SYSTEM
System Level	A	B	C	D
1	No reliable flow measurement. Limited metering of bulk flows in the system.	All bulk flows are metered but not sure about the meter accuracy.	Bulk flows are metered, remotely read, monitored, and analysed with a permanent meter accuracy test programme in place.	Bulk flows are metered, remotely read, monitored and analysed with software recognition for meter accuracy drifts with automatic meter recalibration capability and flow pattern analysis.
2	A continuous programme for the installation of bulk meters in place.	Meters are manually read and/or remotely monitored with meter accuracy occasionally checked.	Bulk flows are metered, remotely read, monitored and analysed with software to recognise when meter accuracy drifts.	Bulk flows are metered, remotely read, monitored and analysed with software recognition for meter accuracy drifts with automatic meter recalibration capability and flow forecasting based on historical supply and demand trends.
3	The majority or all of the system bulk flows are metered.	Bulk flows are metered, remotely read, monitored, and analysed with frequent meter accuracy tests.	Bulk flows metered, remotely read, monitored and analysed with software recognition for meter accuracy drifts and flow pattern analysis.	Complete machine learning algorithms that control the system, to manage system input volumes and pressures.

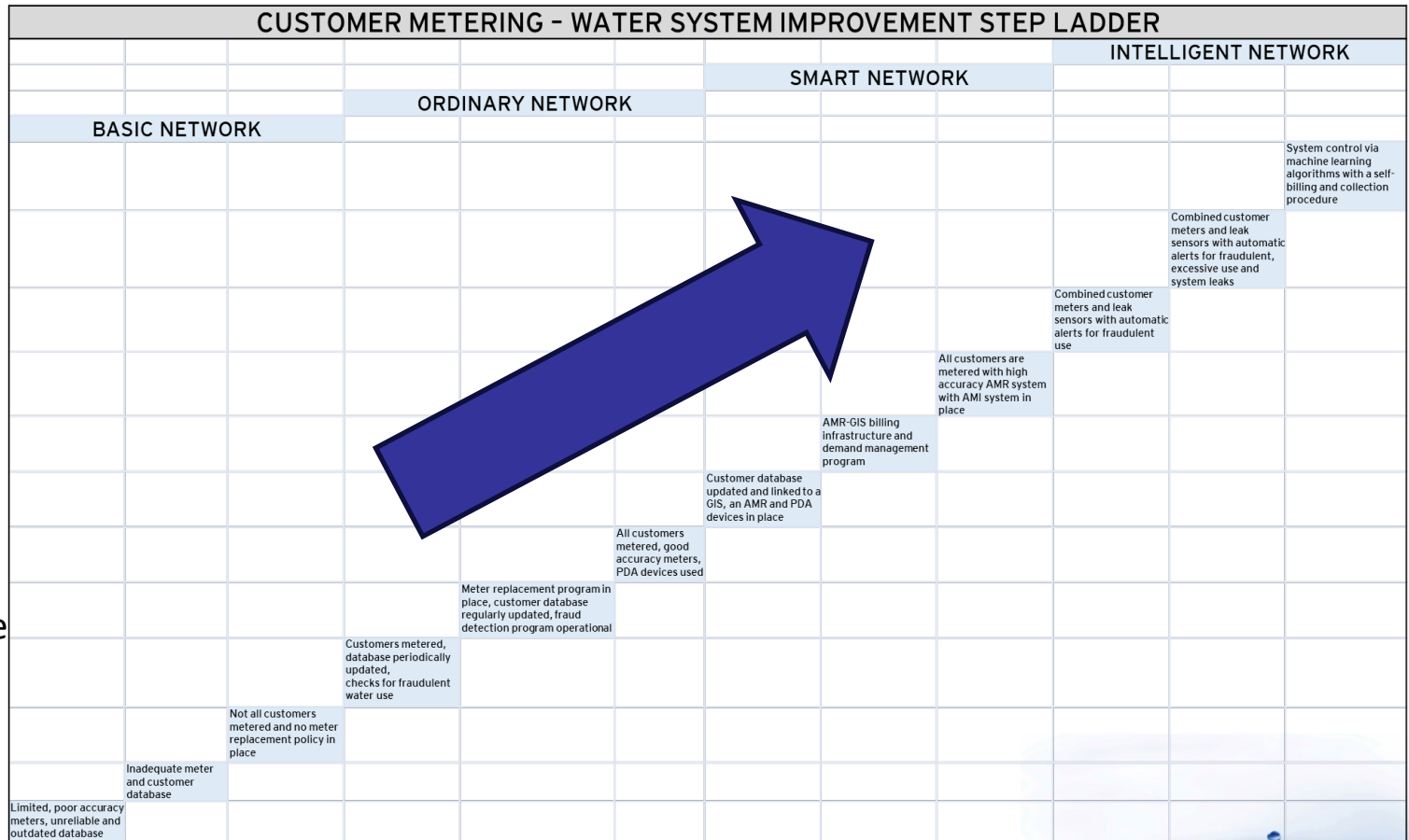


TSI Water Losses: Water System Improvement Matrix



Area of assessment

1. Bulk Metering
2. Customer Metering
3. Pressure Management
4. Leakage Management
5. Asset Management
6. Water Balance
7. Human Resources





THANK YOU

