Sustainable Non-Revenue Water Control
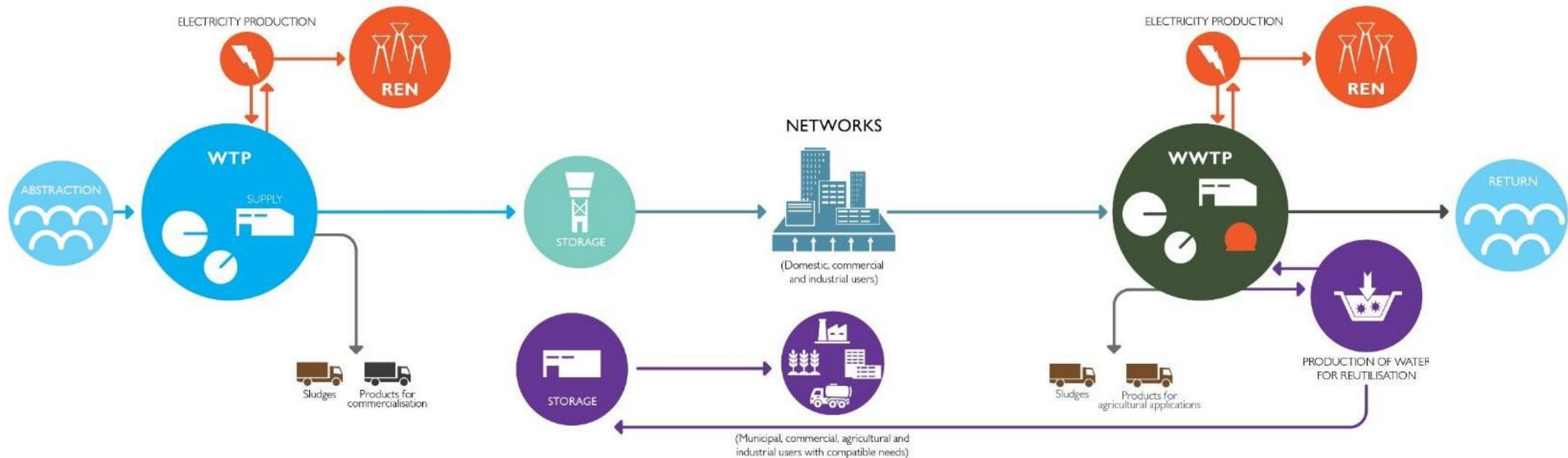
The Lisbon Case Study

Cláudio de Jesus

CEO AdP Internacional

ORGANIZATION

ÁGUAS DE PORTUGAL IS A **STATE OWNED HOLDING FOUNDED IN 1993** WITH THE MISSION

OF DESIGNING, BUILDING AND MANAGING **WATER SUPPLY AND WASTE WATER SYSTEMS,**

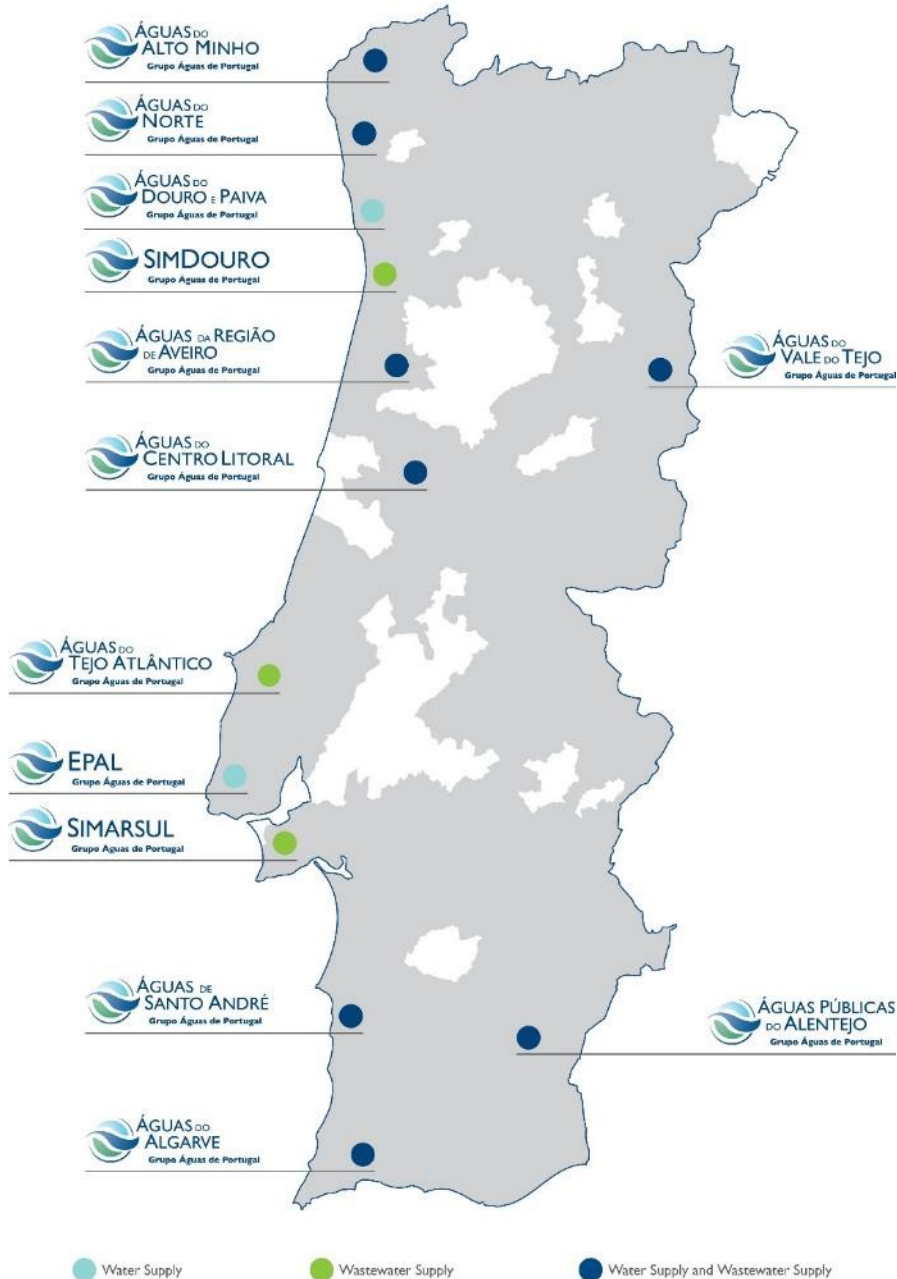IN FRAMEWORK OF ECONOMIC, SOCIAL AND ENVIRONMENTAL SUSTAINABILITY.

| UPSTREAM | DOWNSTREAM | UPSTREAM |

KEY INDICATORS (2019) - AdP GROUP

- **NET PROFIT**
  83.1 MILLION EUROS

- **EBITDA**
  365.7 MILLION EUROS

- **TURNOVER**
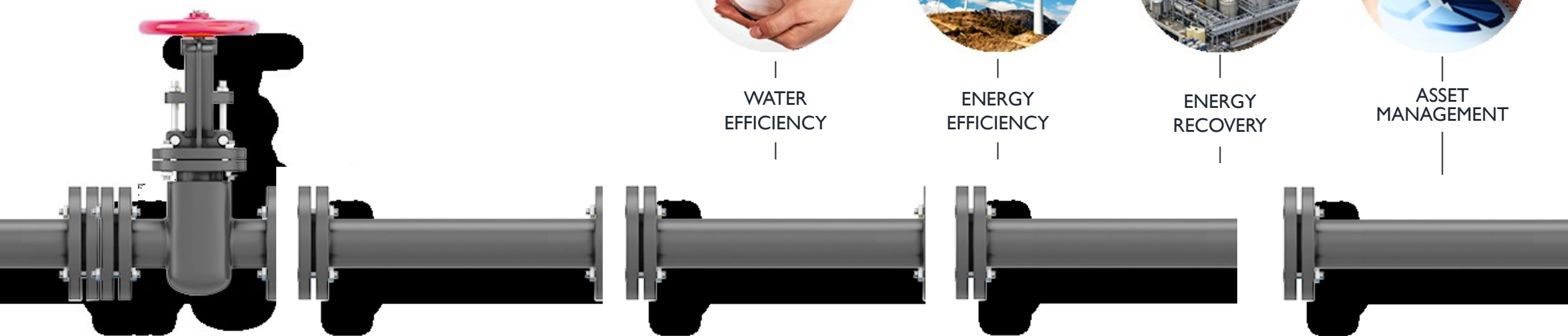 691.5 MILLION EUROS

- **WATER PRODUCED**
  597.3 Hm³

- **OPERATIONAL RESULT**
  160.9 MILLION EUROS

- **TOTAL ASSETS**
  6,137 MILLION EUROS

- **INVESTMENT**
  144.2 MILLION EUROS

- **WASTEWATER TREATED**
  498.1 Hm³

OUR TECHNICAL KNOW-HOW

WATER EFFICIENCY

ENERGY EFFICIENCY

ENERGY RECOVERY

ASSET MANAGEMENT

COMMERCIAL MANAGEMENT

WATER QUALITY & LABORATORIES

SMART SYSTEMS

OPERATION AND MAINTENANCE

WATER SAFETY PLANS

COWATER INVESTMENTS

ÁGUAS DE PORTUGAL

OUR KEY INFRASTRUCTURES

980 WWTP

9 692 km SEWERAGE NETWORK

742 PUMPING STATIONS

19 SUBMARINES OUTFALLS

118 WTP

17 155 km WATER TRUNKS AND NETWORKS

2 106 PUMPING STATIONS

1 216 WATER INTAKES

ÁGUAS DE PORTUGAL

Smart System for **Energy Management in WWTP**

SW4E
Smart Water for Energy

ENKI - Engineering Knowledge Integration Digital platform to **integrate, share and standardize operational data.**

ENKI ®
Engineering Knowledge Integration

AQUASAFE aims to increase **efficiency in operations management,** providing real time information and its perfect integration with forecast and diagnostics tools.

AQUASAFE

Customer Support Service
providing data on drinking water consumption

waterbeep
Smart efficiency.

Hands-on Analysis on Performance Indicators.
Monitoring and Decision-Support tool applied in Contract Management activities, including performance and result-based in

HAPI
Improved Performance

Commercial and Technical Management
system supported on IS

AQUA matrix ®

Maintenance Management Software focuses on the life cycle of assets adjusted to the reality and needs of entities responsible for Water Supply and Sanitation Services

MANUTEC
Grupo Águas de Portugal

Water Optimization for Network Efficiency, allow the implementation of a strategy focused on improving efficiency, reducing water losses and optimizing management of water supply systems.

WONE
Water Optimization for Network Efficiency

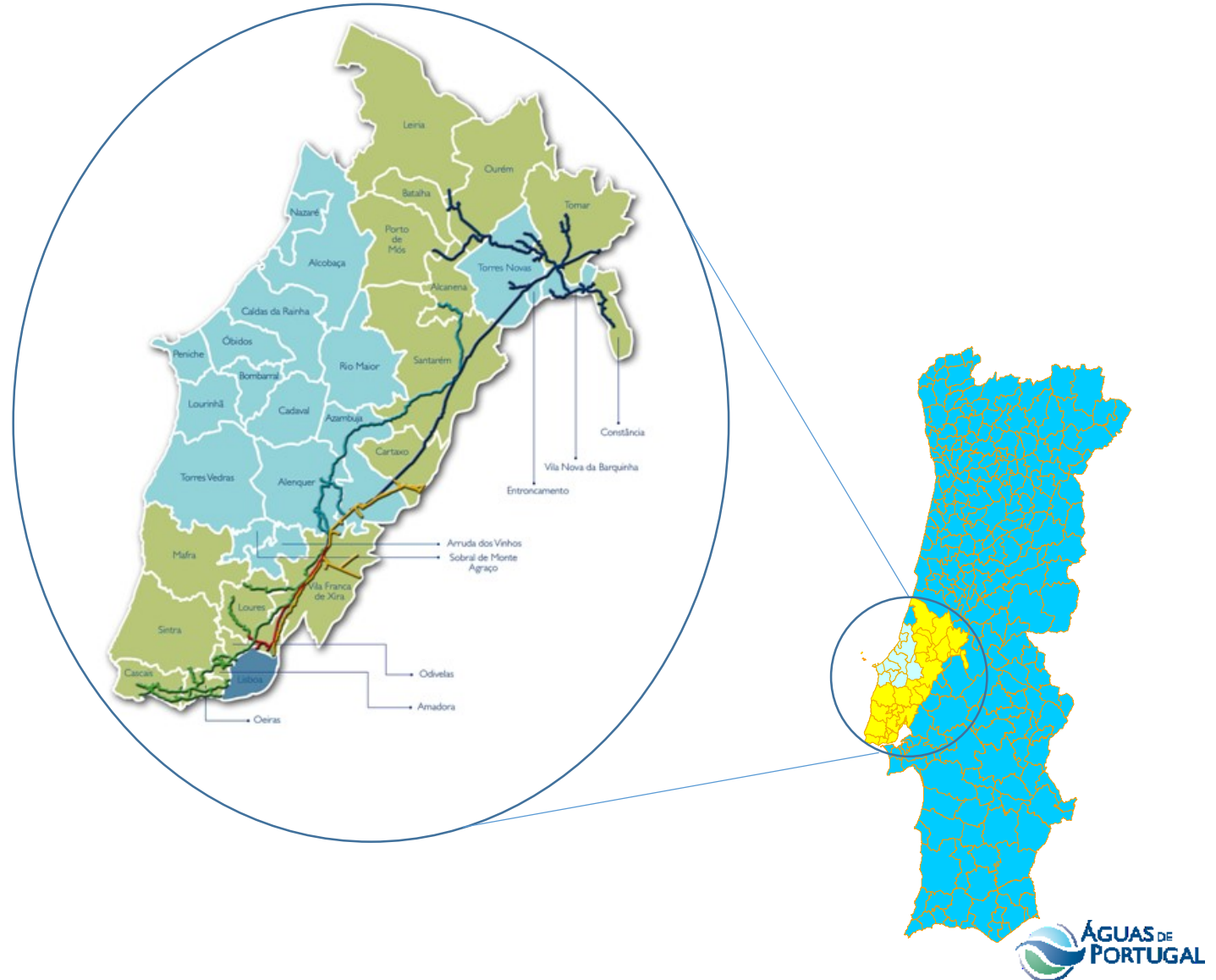# IT SOLUTIONS FOR EFFICIENCY & QUALITY

ÁGUAS DE PORTUGAL

EPAL – PRESENTATION

150 years of History

Largest water supplier in Portugal

- Area **7 100 km²**
- Bulk water supply to **34** Municipalities
- Population supplied around **2,9 M**
- Water supply **204 M m³**
- **750 km** pipelines
- **2** Water Treatment Plants
- **23** Chlorination Points
- **38** Pumping Stations
- **40** Water Tanks

EPAL – PRESENTATION

City of Lisbon distribution system

- Area – **85 km²**
- **356.000** Direct supply clients
- **564.000** Population
- Average daily demand: **150.000 m³**
- **1450 km** distribution mains
- **6** Chlorination Points
- **10** Pumping Stations
- **14** Reservoirs
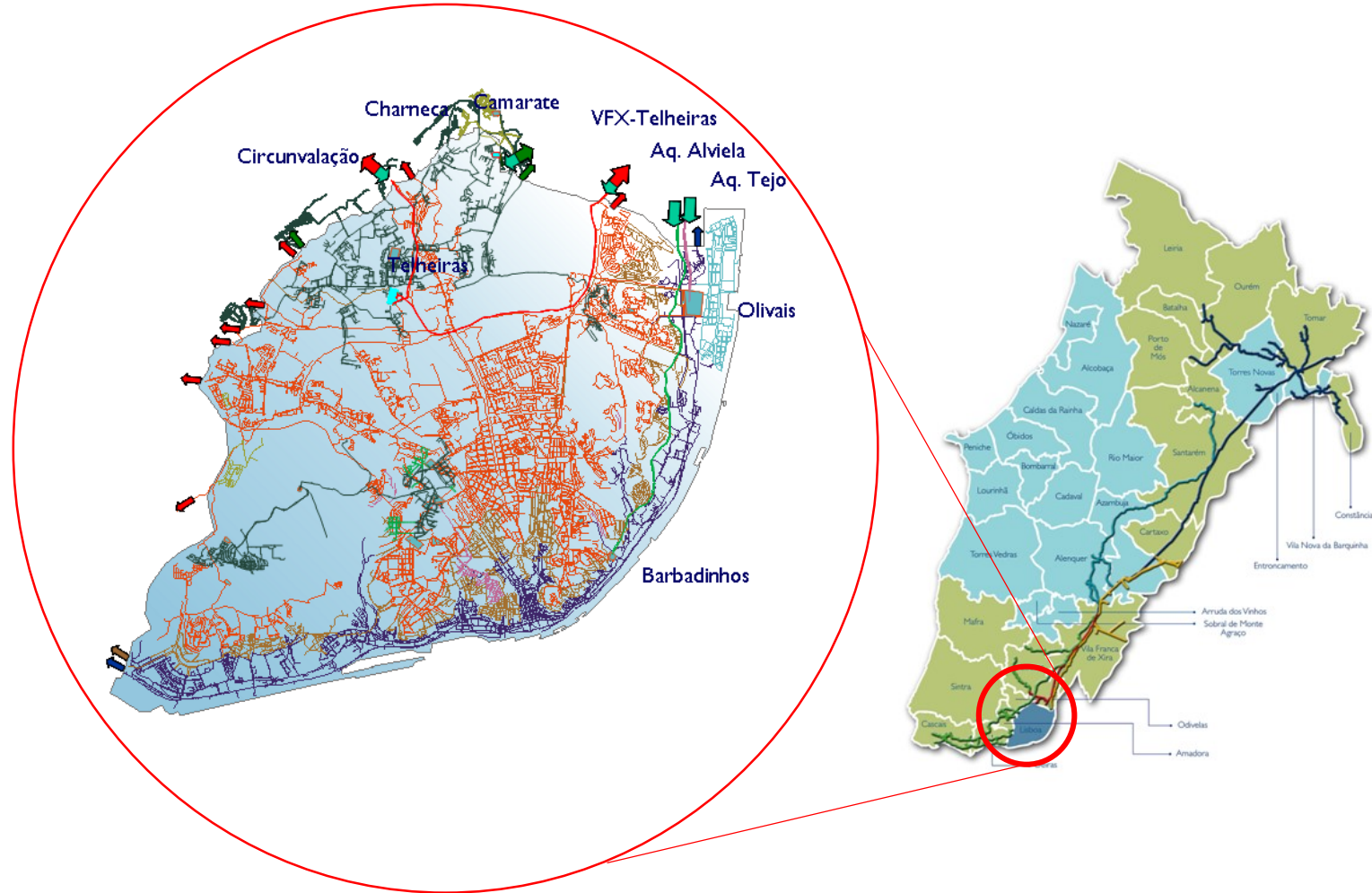
PORTUGAL NATIONAL CONTEXT

Problems contributing to Non-Revenue Water (NRW):

- **Poor measurement** of system water balances;

- **Aging networks** and often built with poor quality materials;

- **Deficit of knowledge** regarding networks: GIS, technical, operational;

- **Insufficient data,** standardization & systematization of reporting;

- **Insufficient technical teams** with low skill levels and poor knowledge.

PORTUGAL NATIONAL CONTEXT

Differing Perspectives on Water Loss Control

…the Pessimist

Nothing can be done, given all the difficulties listed…

…the Optimist

Make use of the water loss challenge as a catalyst for change in the utility...

2030 20%   2016 30%

In Portugal, **efficiency targets** have been for utilities to achieve and **funding mechanisms** created for their implementation.

Source: ERSAR – RASARP 2017 (Portuguese Regulatory Report)

ÁGUAS DE PORTUGAL
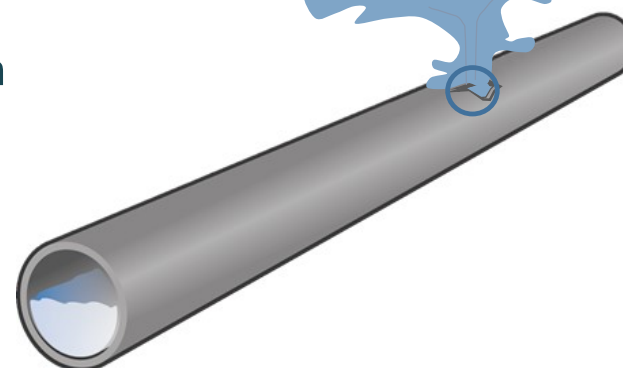
EPAL NON-REVENUE WATER SITUATION

Millennium Challenge

Annual NRW volume of 40 million m^3 in Lisbon distribution network, valued in excess of €25 million per year

Production losses   Losses on transmission mains   Losses on distribution mains   Exported water

EXTRACTED WATER

TREATED WATER

REVENUE WATER

Imported water   Operational & illegal use   Apparent losses
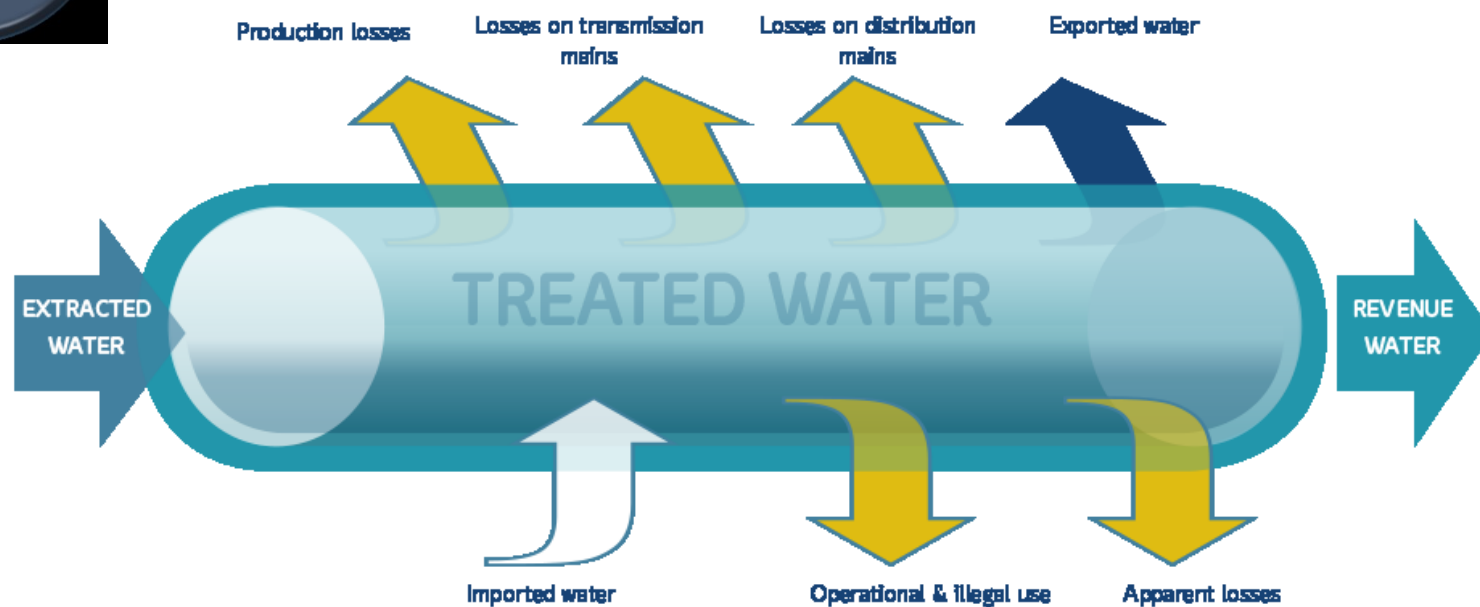
Strategy Decision

To reduce NRW and promote sustainable & efficient resource usage in the Lisbon distribution network, by adopting and adapting best practice used by the most efficient global water utilities

Águas de Portugal

STRATEGY REQUIREMENTS

Metering	Identification	Qualification	Location	Repair
What is the flow?	How much is lost?	What is the priority?	Where is it lost?	Resolution
DMA Network Segmentation & continuous telemetry monitoring	Basic Data: Clients Network Length Connections Pressure	Data analysis: Selection Criteria & Performance Indicators	Optimization of Active Leak Control	Quick & Effective Repairs with good materials
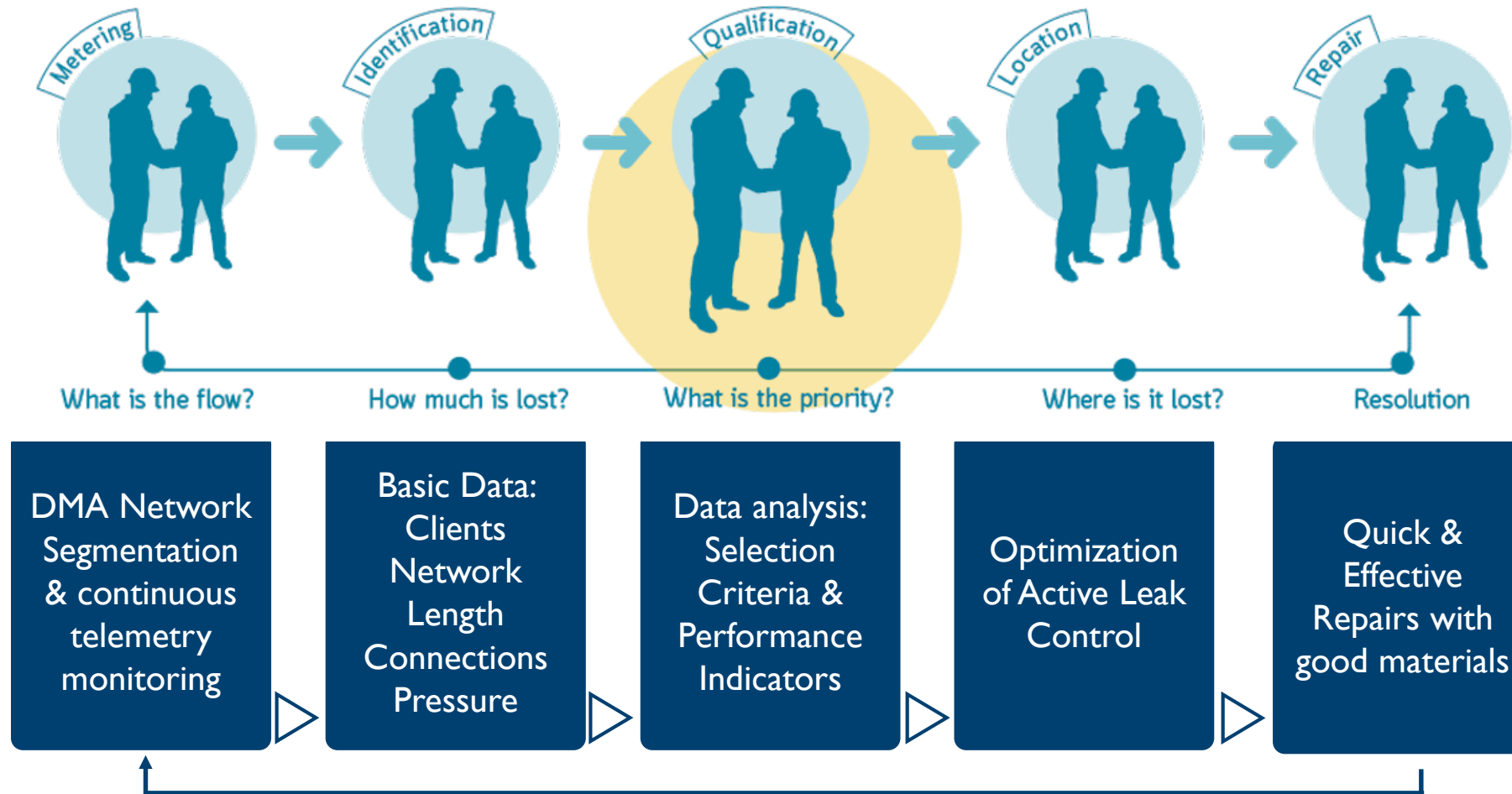
4 PHASES TO IMPROVE NETWORK KNOWLEDGE

1. DMA PLANNING & SET UP

Create **metering points & telemetry**

Design & boundary **validation**

DMA **Implementation**

2. CONTINUOUS MONITORING

Recording of **pressure & flow**

Passive system with **active alarms**

4 PHASES TO IMPROVE NETWORK KNOWLEDGE

3. DATA ANALYSIS

Integration in analysis **software**

Practical Performance Indicators

System **Alarm & Alert** Management

Leakage assessment & **Target setting**
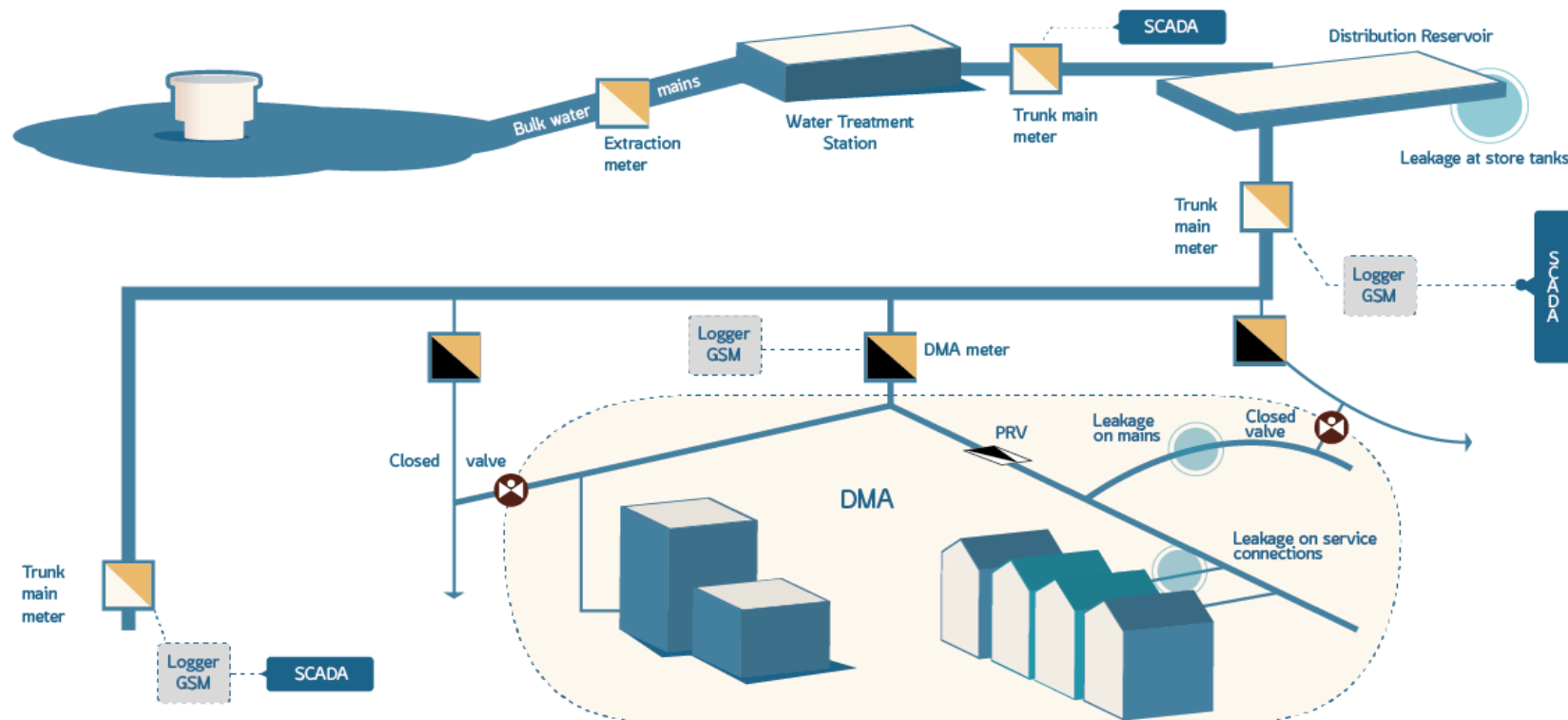
Surgical Control of leakage
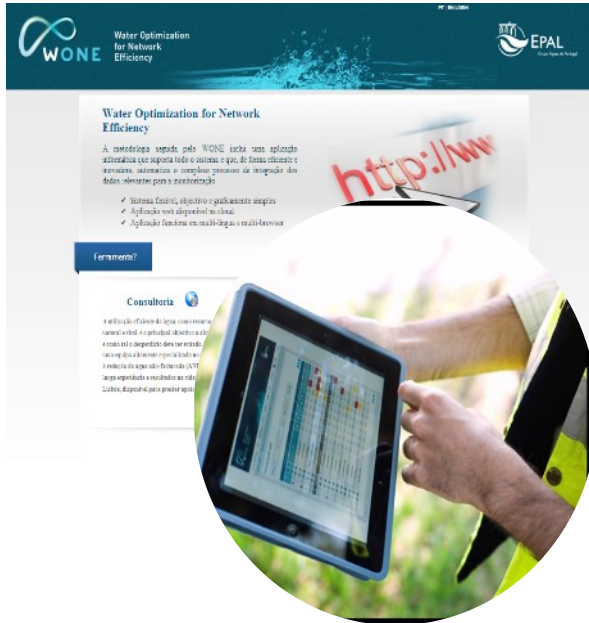
4. INFORMATION REPORTING

DMA **Proposals & Reference Manuals**

DMA **Analysis & Audit Project Reports**

WONE
Water Optimization
for Network
Efficiency

Welcome Unidade Monitorização   WONE ▶   ADMINISTRATION ▶   CLIENTS ▶   MONITORING ▶   GEOREFERENCING ▶   EVENTS ▶   [?]   search 🔍 ✖

3/21/2014 2:56:00 PM   Monitoring Dashboard   >   DMA Daily Control - Net

DMA Daily Control - Net

DMA [▼]   Date [3/21/2014] 📅   [REFRESH]   Export [EXCEL ▼] ▶

< [1 /7] >

					FRIDAY, MARCH 21, 2014				THURSDAY, MARCH 20, 2014						
(!) (171)	(🔔) (0)	Detail	Net	Combi.	DMA	Flow Minimum (m3/h)	Flow Minimum (m3/h)	Snap. Flow Minimum (m3/h)	Flow Maximum (m3/h)	Total Volume (m3)	Min/Avg Flow Coeficient (37%-50%)	Retriev. Night Losses (m3/h) (6-10)	Retriev. Night Losses (m3/h/km) (0.6-1.2)	Ranking (45/70)
🔴		➕	⬛	⬛	2260 - Olivais Sul	2.3	2.3	1.7	39.8	390.2	13.8%	NaN	NaN	0
🔴		➕	⬛	⬛	2270 - Olivais Norte	11.7	10.6	8.7	76.4	944.8	27%	2.5	0.1	0
		➕	⬛	⬛	2280 - Olivais à Chelas ZM	2.0	0.8	-1.2	13.4	185.2	10.1%	0.5	0.1	0
		➕	⬛	⬛	2290 - Vale Formoso de Cima	2.0	2.3	2.0	15.7	201.9	27%	1.1	0.4	0
		➕	⬛	⬛	3000 - Alto do Restelo Oeste	4.8	5.7	4.4	39.1	532.8	25.5%	2.2	0.2	0
		➕	⬛	⬛	3010 - Caselas	3.0	3.3	2.5	22.1	294.7	26.7%	0.8	0.1	0
🔴		➕	⬛	⬛	3020 - Alto do Restelo	3.4	3.4	3.1	45.5	556.9	14.7%	0.6	0.1	0
🔴		➕	⬛	⬛	3030 - Ajuda e Alvito	6.1	6.2	5.9	39.0	541.8	27.4%	3.1	0.3	0
		➕	⬛	⬛	3040 - Escola Manuel da Maia	8.6	8.0	7.2	37.2	546.2	34.9%	4.8	0.7	15
🔴		➕	⬛	⬛	3050 - Bairro Calçada dos Mestres	3.5	4.0	3.8	30.4	345.2	28%	NaN	NaN	0
		➕	⬛	⬛	3060 - Infante Santo	12.1	10.8	10.4	63.6	862.8	30.1%	5.0	0.6	0
		➕	⬛	⬛	3070 - Campo de Ourique	8.4	9.3	8.8	88.7	1084.2	20.6%	0.9	0.1	0
🔴		➕	⬛	⬛	3089 - Estrela	16.7	14.2	12.0	118.8	1537.4	22.2%	4.7	0.3	0
🔴		➕	⬛	⬛	3090 - Mae d Agua	19.3	14.5	6.2	93.2	1292.8	26.9%	NaN	NaN	0
🔴		➕	⬛	⬛	3100 - Bairro Alto	12.8	10.7	10.2	85.1	1224.8	20.9%	NaN	NaN	0
🔴		➕	⬛	⬛	3110 - Pontinha Metro	8.2	9.5	8.4	23.2	385.3	59.2%	6.3	0.8	65

DMA Data Integration & Performance Analysis Table

ÁGUAS DE PORTUGAL

IT SOLUTIONS FOR EFFICIENCY & QUALITY

NON-REVENUE WATER REDUCTION IN DISTRIBUTION NETWORKS

WONE
Water Optimization for Network Efficiency

Monitoring system for **Network Management** and Water Losses Control

WONE has been proven to be **successful, adaptable and universally applicable**

WONE can **assist any utility to reduce water losses** and increase efficiency

Powered by EPAL, the **largest and oldest water utility** in Portugal

Water losses reduction chart:

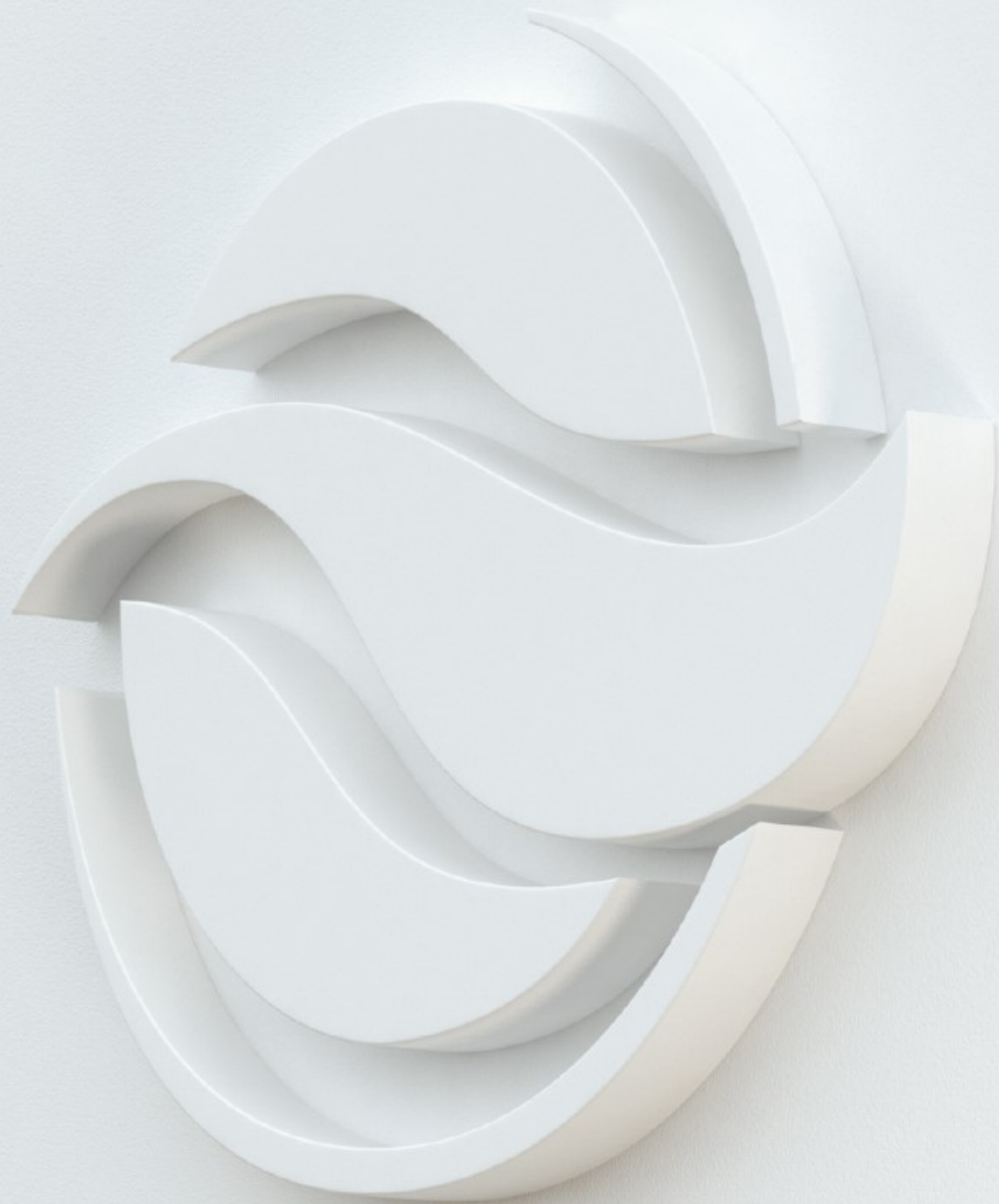| Year	Percentage	Value
2005	23.5%	26.93
2006	20.2%	23.41
2007	17.2%	19.41
2008	14.8%	16.25
2009	13.5%	15.40
2010	11.8%	13.97
2011	10.0%	11.22
2012	8.7%	9.01
2013	7.9%	8.17
2014	8.1%	8.18
2015	8.5%	8.73
2016	10.5%	10.33
2017	11.1%	11.06
2018	10.4%	9.76

WATER LOSSES REDUCTION IN LISBON

Thank you
謝謝

c.jesus@adp.pt

ÁGUAS DE **PORTUGAL**
INTERNACIONAL