History of NRW Management in Malta

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The Maltese Islands

• Three islands – Malta, Gozo & Comino

• Area
  – Malta – 246 km²
  – Gozo & Comino – 70 km²

• Population – 410,000 (density 1,300 pax/km²)

• Temperature – from 7°C to 35°C

• Rainfall – 500-600mm average

• No rivers or lakes

• Production Sources consist of 3 SWROs & 130 boreholes and pumping stations for a total of 135,000 m³/day
The Distribution Network

- Network is made up of 2,300km of main pipes, more than $\frac{2}{3}$ of which being DICL pipes laid from the 70s onwards.
  - 350km (or 15%) are trunk mains
  - 1,950km (or 85%) are smaller distributory or reticulation mains
- Feeding around 140k service connections – using pe since 1995
- Supplying the whole customer base (250k premises)
‘5 Force’ Leak Control Methodology

- Network Rationalisation
- Pressure Management
- Speed & Quality of Repairs
- Replacement of critically weak pipework
- Active Leakage Localisation

UARL

CARL
Improvements to the Network

- All premises are metered
- Network is divided into around 300 zones and subzones, each one permanently metered
- Pressure control:
  - We have 214 Pressure Reducing valves, some of which have automated control. Evolved from large PRVs controlling large zones to small PRVs on smaller zones
  - Control is also via 28 variable speed drives on pumps
Leakage Levels

• Leakage has been brought down from around 3,900m$^3$/hr in the mid-90s to below 500m$^3$/hr now.

• Correspondingly, ILI in the mid-90s was around 10 but was down to 2.3 for 2011
Water Production Variation from 1990 to 2011
Decrease in Water Production & Real Losses Over Time

Water Produced in Million m³ per annum
Real Losses in Million m³ per annum

Year

2004 2005 2006 2007 2008 2009 2010 2011

The graph shows a decrease in water production and real losses over time from 2004 to 2011.
One of many reasons why %s are unsuitable for both Process and Metric Benchmarking.
Non-Revenue Water

- Target now to sustain focus on RL and intensify efforts on AL
The Four Components

APPARENT LOSSES

- Meter Under-registration
- Meter Reading Errors
- Theft of Water
- Billing Errors
The Water Meter

- All premises are metered
- Rotary piston water meters.
- Magnetic coupling improved performance
- Two problems:
  - Meter performance at low flows
  - Gradual deterioration in overall performance
Low flows?

• Almost all premises have water storage
• Problem caused by float valve
• Very low flows below the starting flow of meters
The Effect of the Float Valve

Flow recorded by meter, at a flow above starting flow

Flow not recorded by meter, at a flow below starting flow

Water being consumed within household

Flow (Lt/Hour)

Time (Minutes)
% Apparent Loss is much lower for direct pressure systems

Direct pressure systems in white (many claim zero apparent losses) customer storage tanks

Source: IWA International Leakage Report, 2000
AMM Project Objectives

AMM installations: 5 main objectives

• Improve Billing → timely & reliable

• Cash Flow + reduction/elimination estimated bills

• To access meter data remotely & continuously

• Customer oriented – a communication platform

• Permits Total Water Balancing
AMM – VHF System Architecture

RF Reception Unit

VHF Antennas

Gateway unit

GSM/GPRS Mobile network

Acquisition system

VHF transmission
GSM/GPRS transmission
Benefits of AMM To WSC

1. More accurate billing (‘actual’)
2. Revenue / Cash flow enhancement
3. Unlimited access to meter data
4. More flexible billing cycles
5. Improved customer service - Can provide effective and meaningful feedback to consumers
6. Real time remote monitoring of flow (incl. DMA’s)
Benefits of AMM To WSC (continued)

7. Tampering will be more easily detected
8. Profiling of customers possible
9. Assists to find MNF’s and calculate the LNC’s
10. Water Balance in primary network
Benefits of AMM:
To Customers

1. Less estimates, more accurate and timely bills
2. Consumer Profiling is possible
3. Less disturbance to customer to read meter manually inside the premises
4. Less billing disputes
5. Can help to detect internal leaks & high consumption
Water Balancing in DMAs

E.g - Comparing DMA metered volume with the aggregate consumption for same period
Thanks for listening

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