

**Dealing with the complex Interrelation of Intermittent Supply and Water Losses**  
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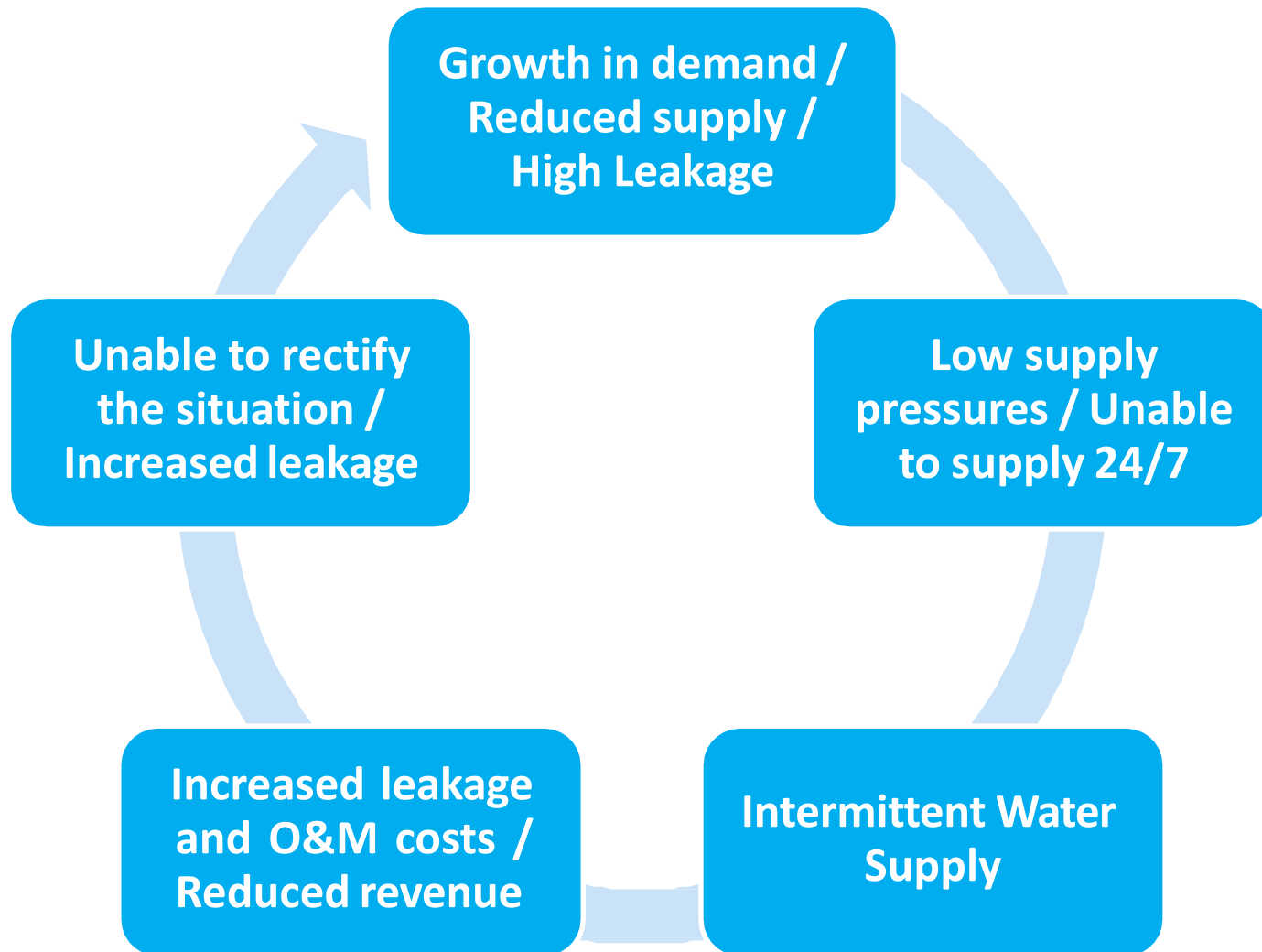


# Dealing with the complex Interrelation of Intermittent Supply and Water Losses

BAMBOS CHARALAMBOUS & ROLAND LIEMBERGER



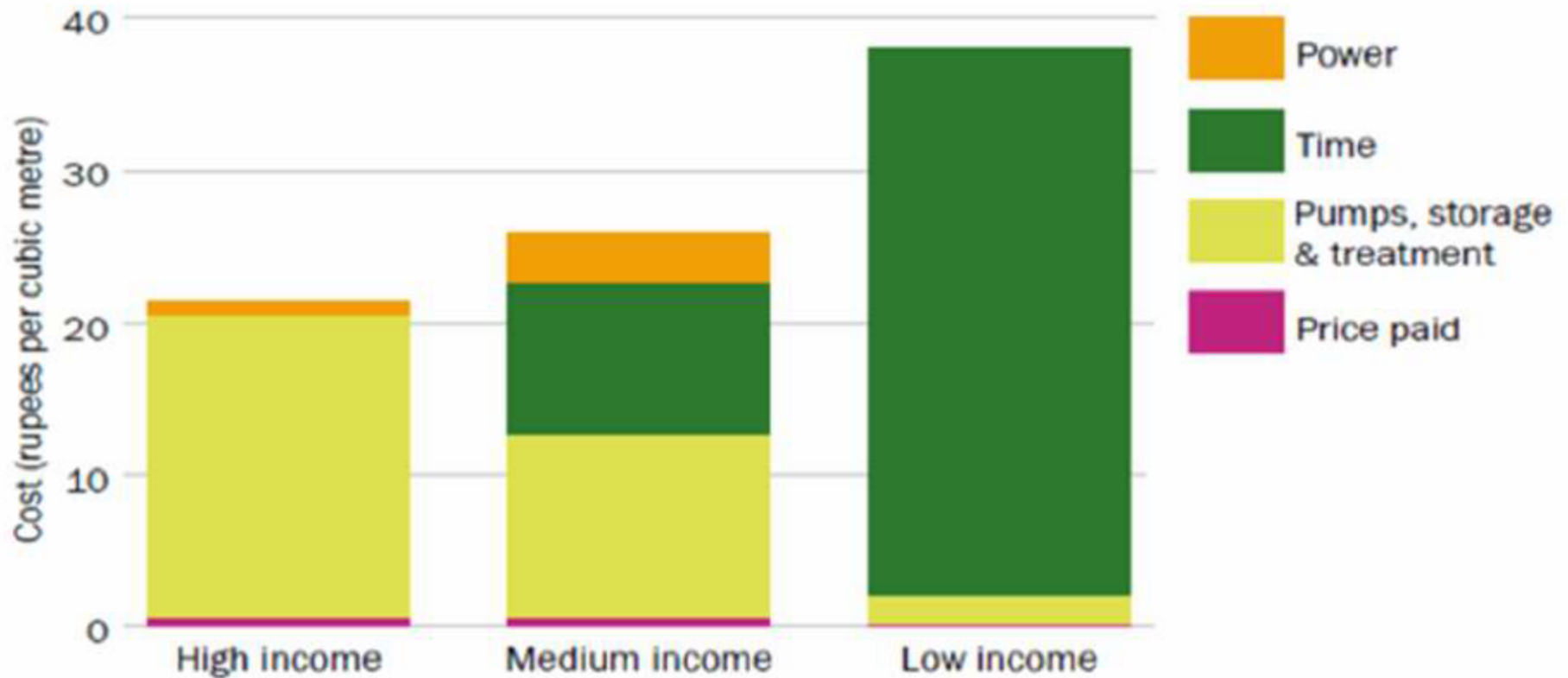
# THE VICIOUS CYCLE OF IWS



# IMPLICATIONS OF IWS

- Water quality deterioration / Health hazard
- Inequitable distribution within a network
- Increased mains and service connections failures
- Increased difficulties in detecting and fixing leaks
- Illegal connections – meter tampering
- Meter malfunctioning & accelerated wear & tear
- Ineffective supply and demand management
- Inefficient operations – more manpower

# COPING COST OF INTERMITTENT SUPPLY

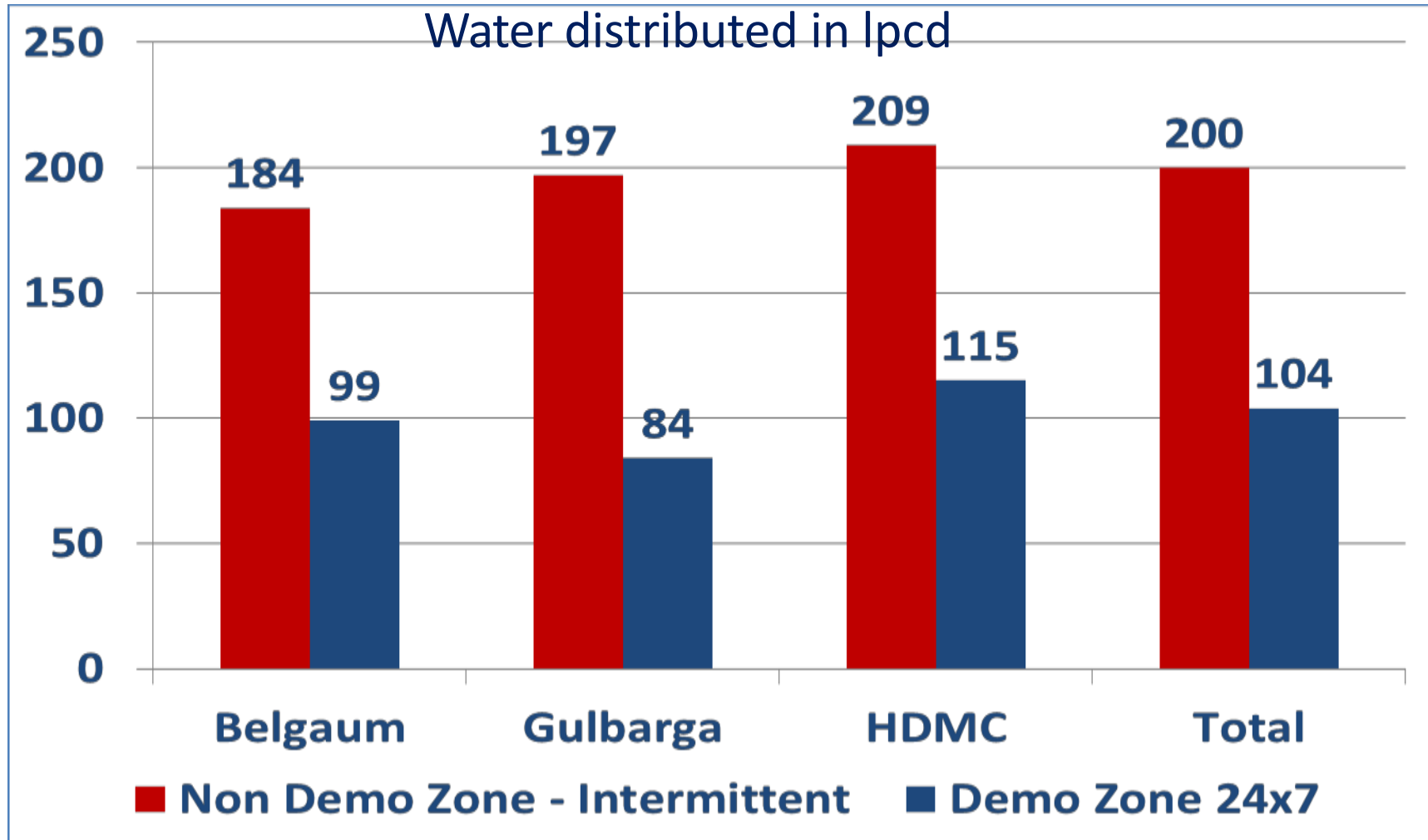


Source: Srivinas Chary ASCI



**MYTH  
BUSTERS**

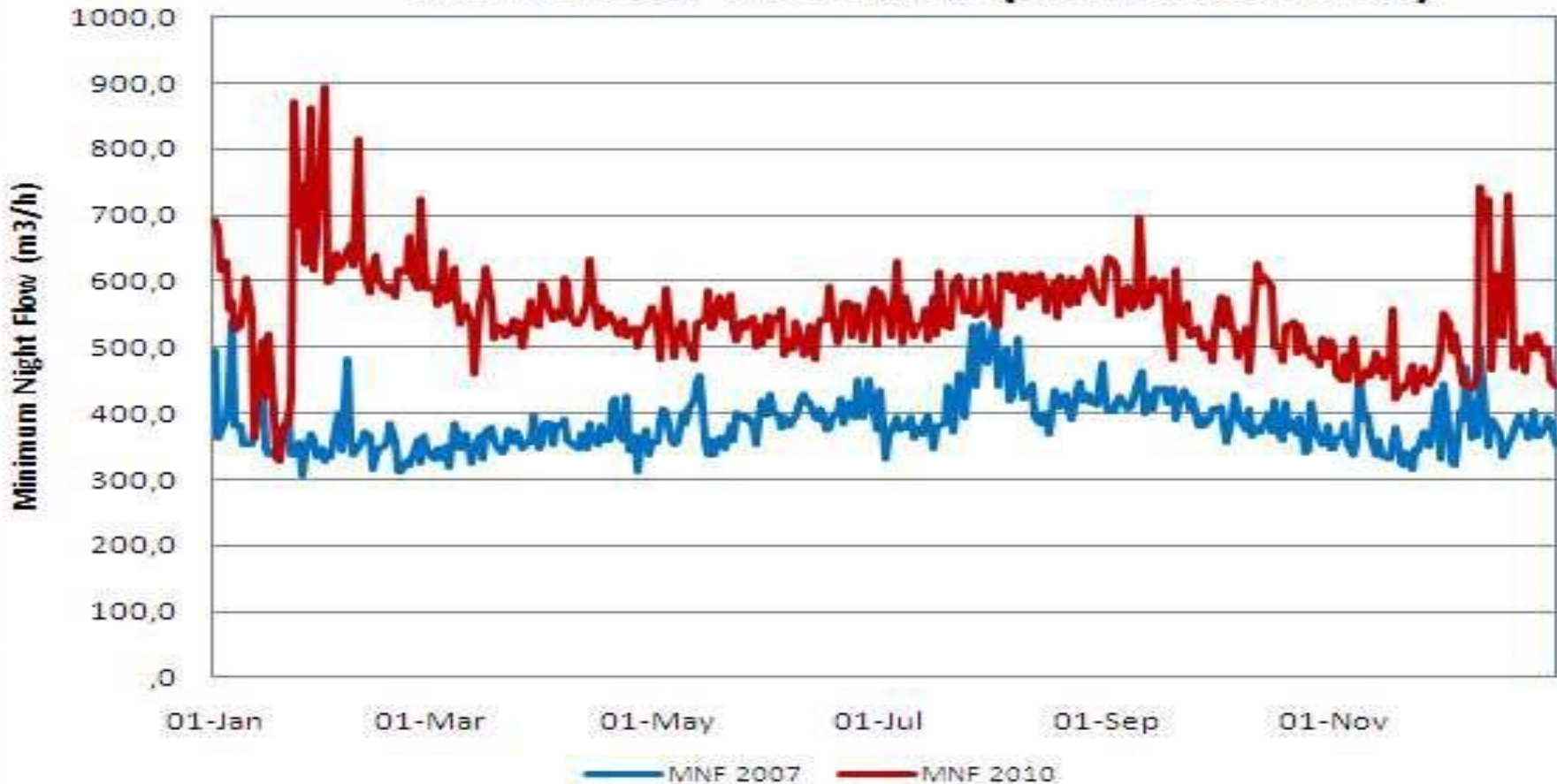
# IS DISTRIBUTED WATER LESS UNDER IWS?



Source : KUIDFC

# IS IWS AN EFFECTIVE LEAKAGE REDUCTION MEASURE?

## Minimum Night Flow Years 2007 and 2010 (All Reservoirs)



Source: Water Board Lemesos, Cyprus



# PIPE AND SERVICE CONNECTION BREAKS

## 20 DMAs: 373Km: 45%total

2008 – 2009 Intermittent Water Supply (IWS)

### Number of reported breaks

Description	Number of reported breaks		
	2007 Before IWS	2010 After IWS	%increase
Mains	14 / 100km	42 / 100km	<b>200</b>
Service connections	15 / 1000 connections	30 / 1000 connections	<b>100</b>

Source: Water Board Lemesos, Cyprus

# IS IWS AN EFFECTIVE DROUGHT / WATER CONSERVATION MEASURE?

Year	System Input Volume	Customer Consumption
2007 Before Intermittent Supply	0% (base line)	0% (base line)
2008 Intermittent Supply	-17,5%	-9,2%
2009 Intermittent Supply	-9,1%	-8,9%
2010 After Intermittent Supply	+12,8%	-1,2%

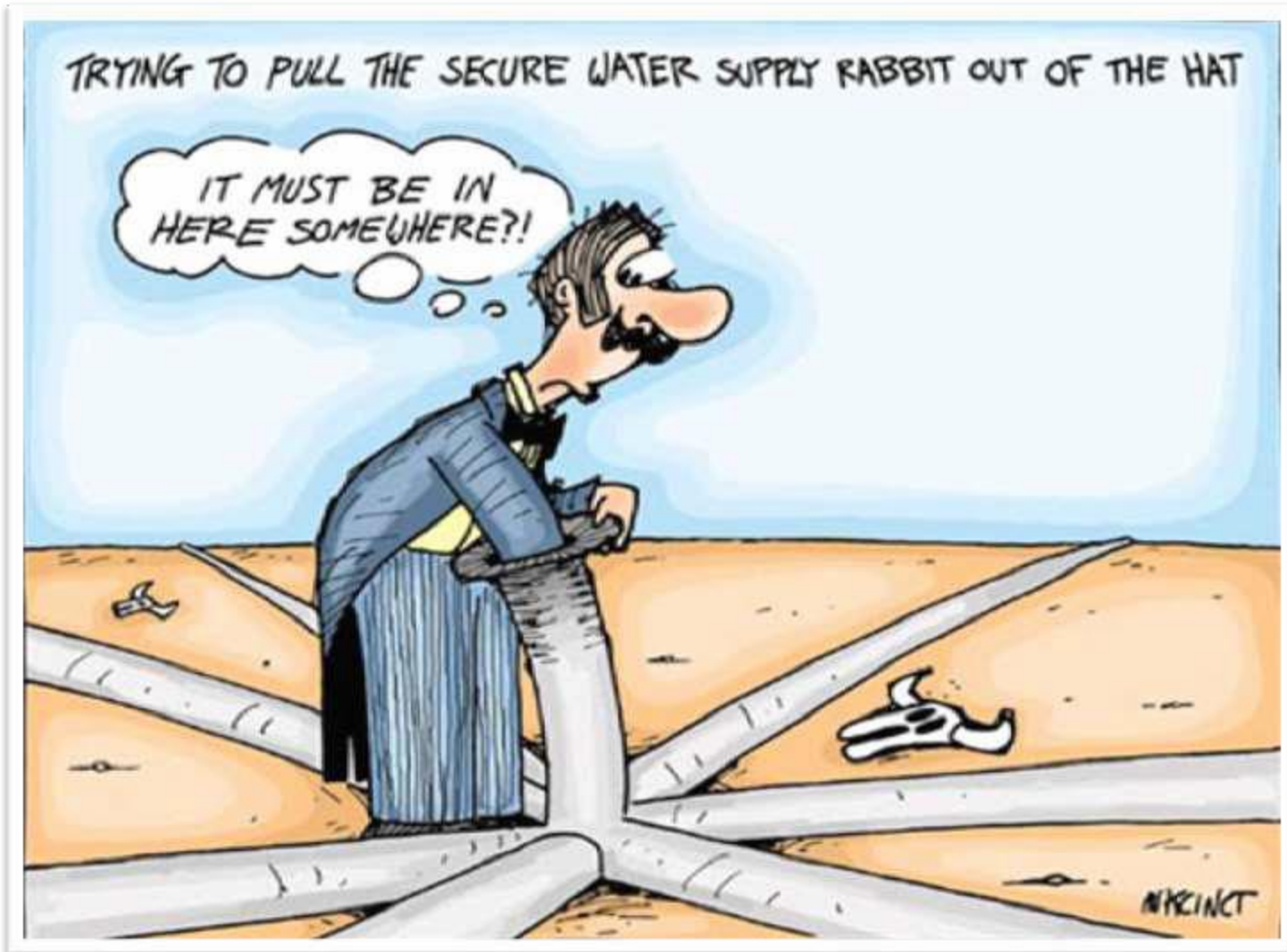
Source: Water Board Lemesos, Cyprus

# THE CHALLENGE

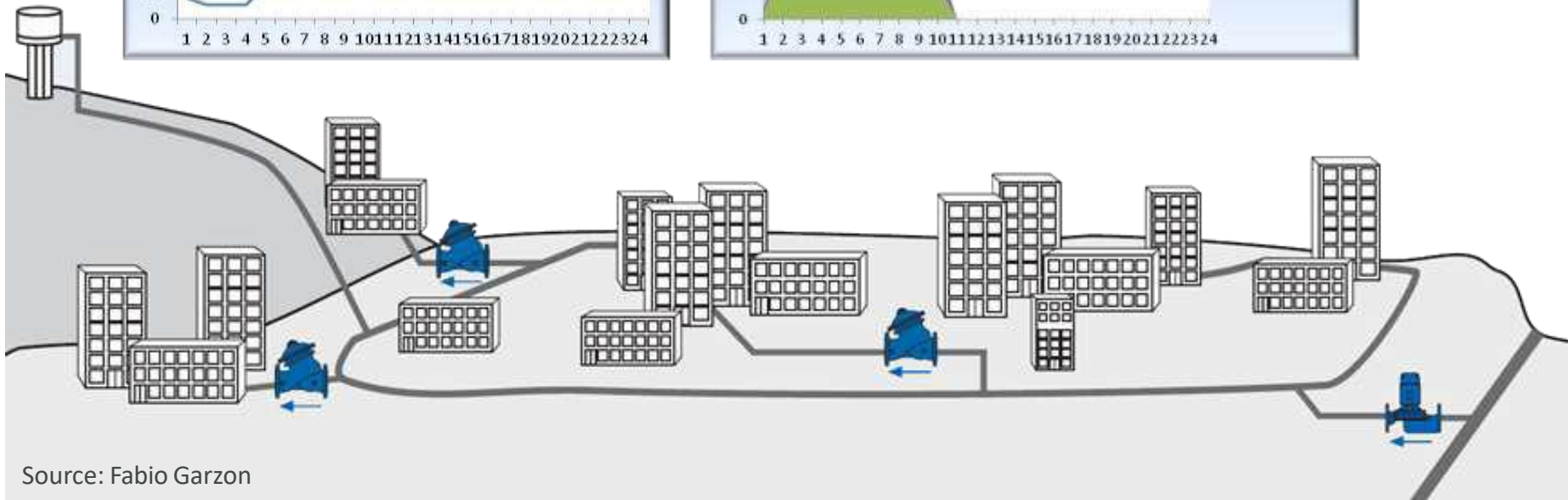
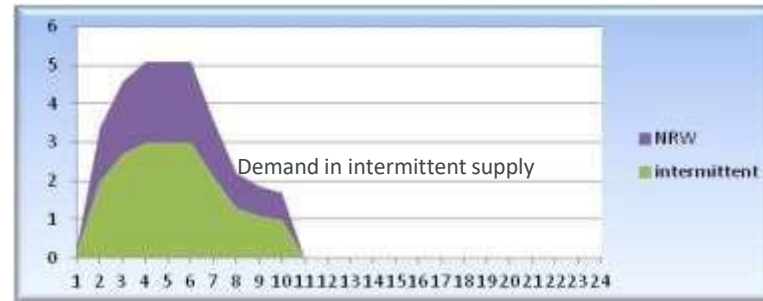


While it is relatively easy to turn a 24x7 system to an intermittent supply, it is very hard to do the opposite

# A PARADIGM SHIFT IS IMPERATIVE



# IMPROVE IWS CONDITIONS – TRUNK / DISTRIBUTION MAINS PRESSURIZED 24/7



Source: Fabio Garzon

- Eliminate pipe refill time
- Reduce operational costs
- Reduce infrastructure damage

# THE NEED FOR A STANDARDIZED APPROACH



- It is well known that **expressing water losses (or NRW) in percentage** of system input **is misleading** in the best case and **doesn't work at all in IWS** situation (no wonder that % water loss can be low if a utility has only a few hours water supply per day)
- Water loss performance indicators, for example physical losses in litres/connection/day, always **need to be adjusted to continuous supply** (the acronym used is “w.s.p.” – when the “system is pressurized”)

## SIMPLE EXAMPLE:

A system with 10,000 service connections and IWS of 4h/day physical losses are 3,000 m<sup>3</sup>/day the correct performance indicator would be:

- $3,000 \text{ m}^3/\text{d} / 10,000 \text{ connections} = 0.3 \text{ m}^3/\text{conn.}/\text{d}$  (**300 l/conn/d**)
- $300 \text{ l/conn.}/\text{d} / 4\text{h} \times 24\text{h} = \mathbf{1,800 \text{ l/conn/d (w.s.p.)}$

The IWA water balance methodology and the IWA water loss PIs can also be used in IWS systems – **IF** the supply time is properly taken into account

# TRANSITIONING FROM IWS TO 24X7

..... will be different depending on the type of IWS:

- If the system was **designed for IWS** (like most in South Asia) one needs to start with **pressurizing** the system **24x7 on a zone by zone or DMA by DMA basis** starting from the zone or DMA closer to the water source.
- In systems where **IWS was not planned** but became a reality in fringe areas of the system, **water loss reduction** (again, zone by zone) **must be started** in the part of the network **with best supply and highest water losses** and the water saved can then be pushed to the poorly supplied areas



# KEY LEARNINGS (1/2)

## Intermittent Supply:

- can easily be adopted by the water utility but it is extremely **difficult to revert to 24x7 supply** due to the damage caused to the network.
- may seem to be a water saving measure however in the long run **greater quantities of water will be lost** through increased leakage and wastage compared to the quantities that may initially be saved.
- has a **detrimental effect on the structural integrity** of the distribution network thus leading to quicker asset deterioration.
- results in a **substantial increase** in the number of pipe bursts in mains and service connections thus increased leakage.

## KEY LEARNINGS (2/2)

### Intermittent Supply:

- could create **water quality problems** which may be detrimental to human health and wellbeing.
- has an **adverse financial effect** on the water utility resulting in lower water sales and higher costs due to additional O&M activities needed to run IWS.
- results in **customer dissatisfaction** and reluctance to pay due to poor quality of service provided.
- is **not considered an appropriate intervention** to drought / water shortage.

# THANK YOU



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