3rd African Regional IWA Conference
Tim Waldron
Chair IWA Water Loss Specialist Group

HELLO FRIENDS OF TIM

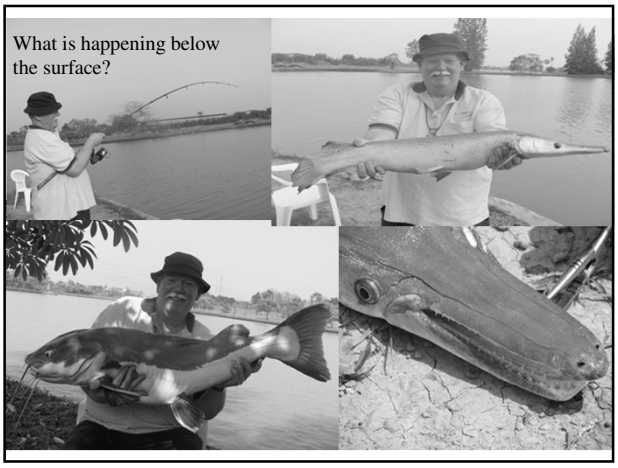
Today

- Fishing
- Global IWA Issues and Activity
- Water Loss, quick introduction
- Bigger Picture items
- WLSG success?
- A new Plan

3rd African Regional IWA Conference

Global Water Politics

Tim Waldron
Chair IWA Water Loss Specialist group
IWA Strategic Council
IWA Board Director
Former CEO WBW Corporation Australia



3rd African Regional IWA Conference

Global Water Politics

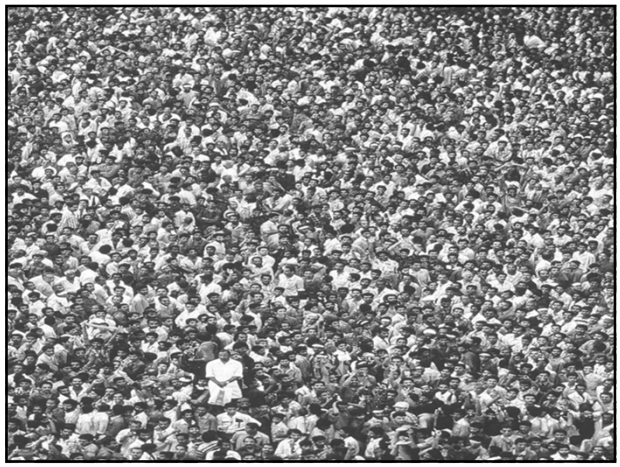
Tim Waldron
Chair IWA Water Loss Specialist group
IWA Strategic Council
IWA Board Director
IWA Chairman Honours and Awards
Former CEO WBW Corporation Australia

Its not all Fishing!
As Chairman of IWA WLSG,
I meet some interesting people

Why is Water Loss the most important KPI of a Water Company ?

- It impacts on every part of the business
- Treatment, finance, debt, depreciation, dams, Operational cost, Capital deferment, asset life extension, distribution knowledge, organisational speed, intelligent understanding, engineering challenge, measurement knowledge, impacts on "total Management plans and Corporate structure"
- It impacts on profitability, less service interruptions, water quality improvements via less contamination, environmental excellence, political strength, and disaster management recovery.

How does this all influence the actions of the International Water Associations issues?



How Do we Deal with the World Water Issue ?

- A new city every week.
- Viewing ourselves – what is missing?
- Innovation and training
- Challenge, search,
- Appreciation of different views
- Cultural
- Different thinking

Un Secretary General's Advisory Board on Water & Sanitation **"UNSGAB"**

High-level independent board
created by Kofi Annan on 22 March 2004

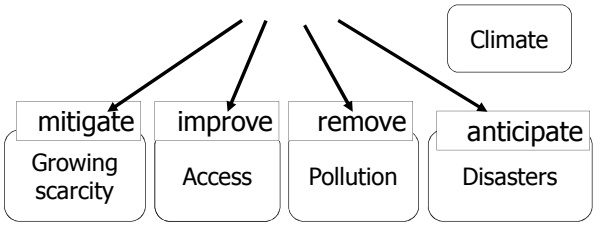
To stimulate action by political decision-makers, with a focus on access to drinking water and sanitation

20 members from all continents

www.unsgab.org

18

4 (+1) main challenges

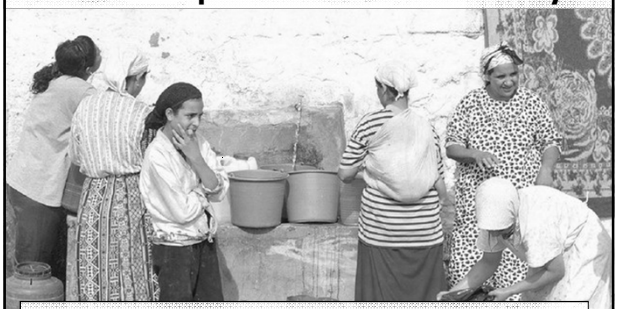


19 G.Payen

- Access to safe drinking water

Source: G.Payen 20

Nearly 3 billion people
have no tap at home or in the vicinity



About 4 billion people
have no continuous access to water

Pollution control
Wastewater management

G. 22

Access to water: the great hypocrisy

The common wording is untrue:

800 million people lack access to
safe drinking water …

UN General Assembly, 26 July 2010
UNICEF-WHO , 16 March 2012

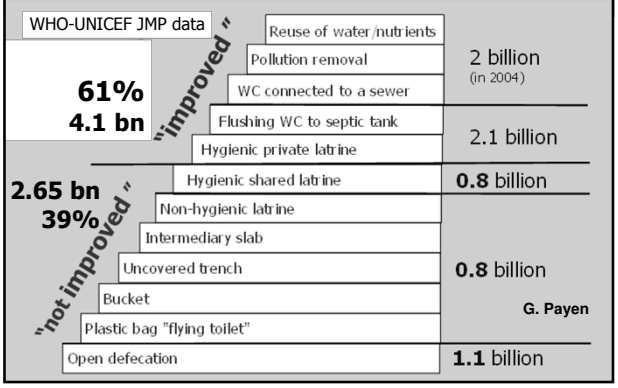
The truth
800 million people lack access to
"improved" water sources

Billions of people lack access to
"safe" drinking water

23 G.Payen

The sanitation ladder

2008 Population
6.75 billion



Global trends between 2000 and 2008

AquaFed

Change of population (millions)...		Urban half	Rural half
Safe Water	without access to permanent tapwater (running water)	*Not monitored*	
	without access to tapwater	+114 ↗	-24 ↘
	without access to "improved" sources	+13 ↗	-188 ↘
Sanitation	without wastewater treatment	*Not monitored*	
	without wastewater collection	*Not monitored*	
	without private sanitary toilets (= "improved" sanitation)	+134 ↗	-69 ↘
	without toilets (Open defecation)	+7 ↗	-129 ↘

URGENT The race between development of urban infrastructure and urban growth

Access to Water is deteriorating in the urban half of the world[1]

If this trend is not reversed soon,
we will leave to our children a world where
they will have more difficulty to live than us.

[1] See AquaFed press release on 7 September 2010 and Ban Ki-Moon declaration on 22 March 2011

26 G.Payen 26

Components of the Right to Safe Drinking Water

Water should be:

- *safe (drinkable)*
- *acceptable*
- *accessible*
- *affordable*
- *in sufficient quantity*
- *without discrimination*

27 G.Payen 27

Towards more ambitious post-2015 goals

How the earthquake and tsunami effected the water supply in Japan

18 April 2012

Shigeru Imai
Director of Asaka Purification Plant Office
Bureau of Waterworks, Tokyo Metropolitan Government

1 Outline of the Great East Japan Earthquake

(1) Earthquake Outline

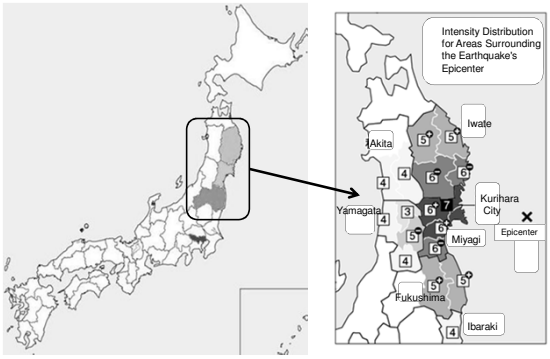
Great East Japan Earthquake

Time & Date	2:46 PM, Friday March 11th, 2011
Scale	Magnitude 9.0
Epicenter	Sanriku Coast, Pacific Ocean, Depth of 24km (38.1 North Latitude, 142.9 East Longitude)
Maximum Strength (Shindo)	Shindo 7 (Kurihara City, Miyagi Prefecture)

(For Reference)

Great Kanto Earthquake	1923	Magnitude 7.9
Sanriku Earthquake	1933	Magnitude 8.1
Sumatra-Andaman Earthquake	2004	Magnitude 9.0

(2)Seismic Intensity Distribution



(3)Tsunami attacked coastal city/town

(4) Damage by earthquake and tsunami

Tsunami Height	Maximum 15.8m (Sanrikutakada City, Iwate Prefecture)
Casualties	Dead 15,636 Missing 4,808
Building Damage	Partially Destroyed 110,570 Completely Destroyed 132,494

Damage to Water Supply Facilities

Water Tower in Ichinoseki City, Iwate Prefecture

Before
Courtesy: Ichinoseki City

After
Courtesy: Japan Ductile Iron Pipe Association

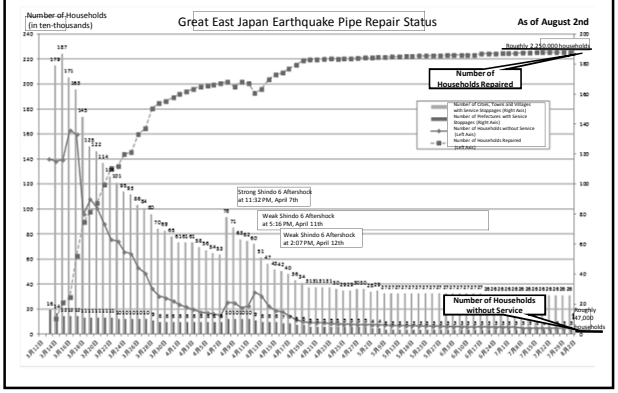
Damage to Water Supply Facilities

by Chiba Prefectural Waterworks Bureau

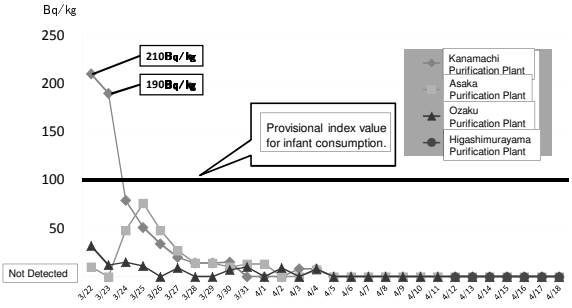
Damage to Water Supply Facilities

ϕ2400mm Pipe (Flexible Joint), Sennan-Senen Regional Waterworks
by Miyagi Prefectural Government

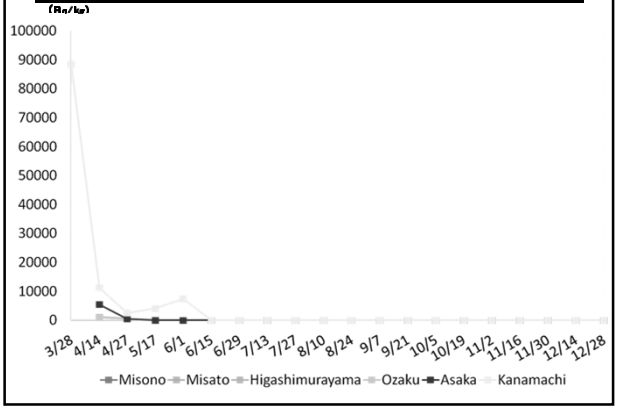
Recovery Rates and Service Stoppages resulting from the Great East Japan Earthquake



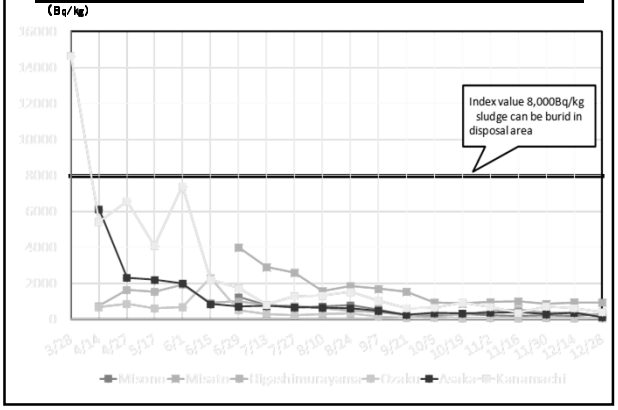
Change of the radioactive iodine density in treated Water



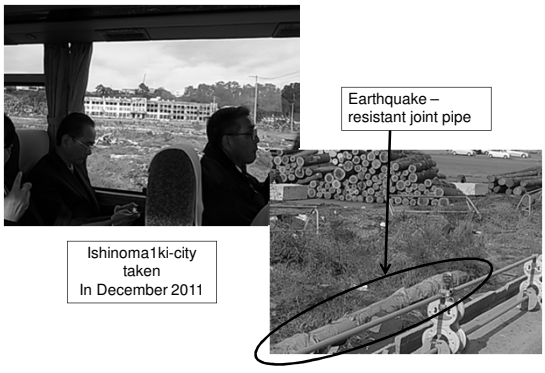
Change 0f the radioactive iodine density in sludge from purification plant



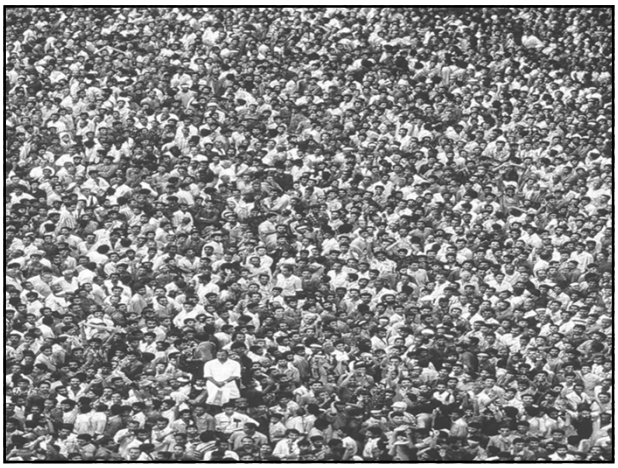
Change 0f the radioactive cesium density in sludge from purification plant



Example of Earthquake-resistant joint pipe



Earthquake-resistant joint Pipe



You

- Ask yourself why you are here
- Tomorrows needed leaders
- Ask yourself what makes you get up in the morning
- Essential needs
- Why the world needs you to get up and be brilliant
- Your team, your company, your community and

National attention

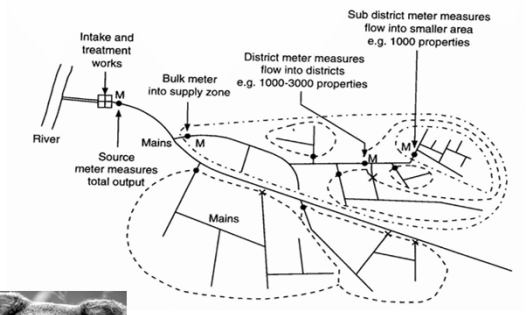
New To Water Losses?

- Some strategic fundamentals
- Keep the vision that's needed
- Will your actions definitely reduce losses?

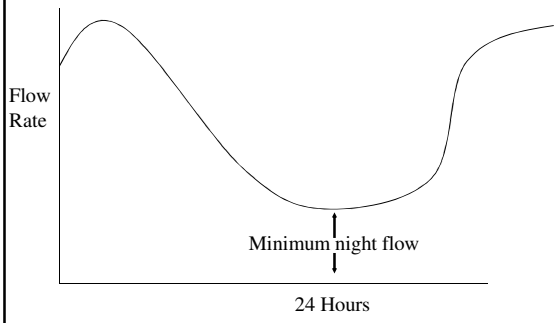
IWA Standard Water Balance

System Input Volume	Authorised Consumption	Billed Authorised Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorised Consumption	Unbilled Metered Consumption	Non Revenue Water
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorised Consumption	
			Customer Meter Inaccuracies	
		Real Losses	Leakage on Transmission and Distribution Mains	
			Leakage on Overflows at Storage Tanks	
			Leakage on Service Connections up to point of Customer Meter	

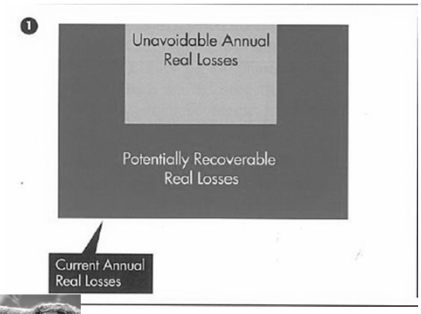
District Metering/Sectorisation



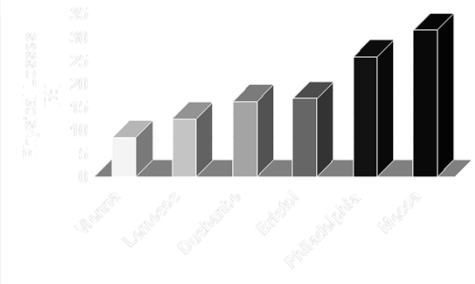
Leakage Levels



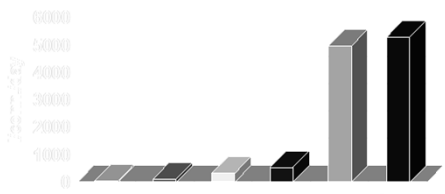
Infrastructure Leakage Index



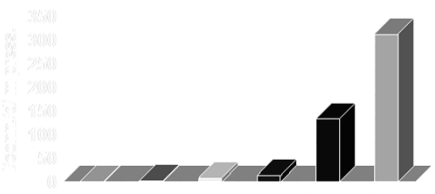
Ranked According to Physical Losses as % of System Input



Ranked According to: Litres/Connection/Day



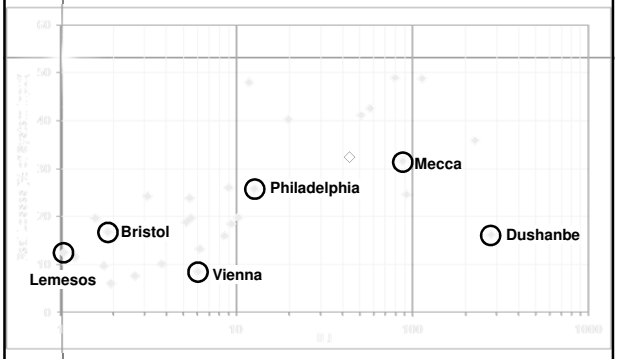
Ranked According to: Litres/Connection/Day/m Pressure



First Conclusions

- % Input Volume gives a false indication
- The picture becomes clearer using litres per connection per day
- But only when taking average pressure into account the true leakage situation is revealed
- Therefore: quote average pressure when talking about leakage

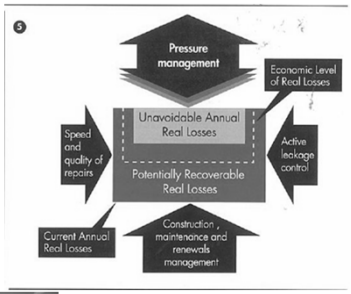
Comparing ILI to % Input Volume



Key Messages

- NRW as % of system input, misleading.
- $$$ NRW as % of total operating cost a powerful financial indicator – also with shock value!!
- separate indicators needed for physical and commercial losses
  - for physical losses use: l/connection/day at average pressure
  - For commercial losses: % of authorized consumption
- ILI, the best indicator for leakage benchmarking

IWA Four Strategies



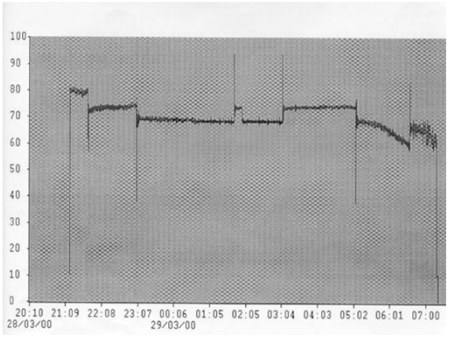
Nice Idea, But it won't work here…

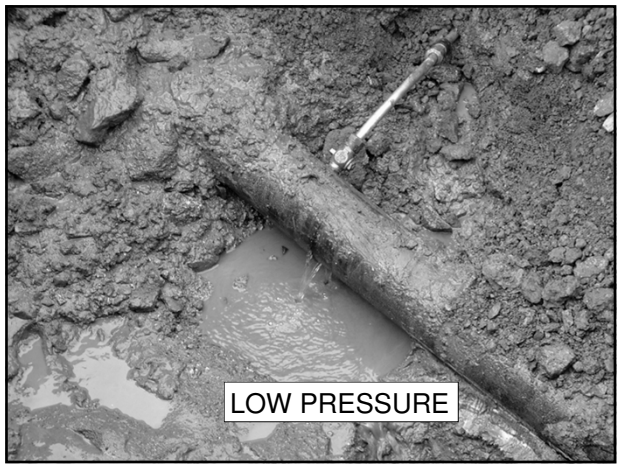
- "Ya But" barrier, don't do any thing different
- Lots of excuses not to implement concepts:
  - System designs, redundancy, minimum pressure, cost too much, no benefit, never needed it before
  - Looping, fire flow, water quality, dead ends, blah…
- DMA can be installed throughout system:
  - Assess candidate areas for implementation DMA & PMA: installed around the world to great benefit
- Even in fire flow designed systems

Recognize barriers
Nice Idea, But it won't work here…

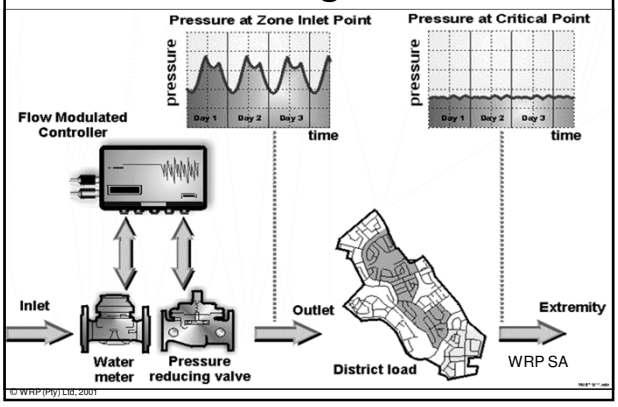
- "Ya But" barrier, don't do any thing different
- Lots of excuses not to implement concepts:
  - System designs, redundancy, minimum pressure, cost too much, no benefit, never needed it before
  - Looping, fire flow, water quality, dead ends, blah…

Remember to check for pressure transients with short period pressure measurements
- even in gravity supplied zones





Flow Modulating PRV Control



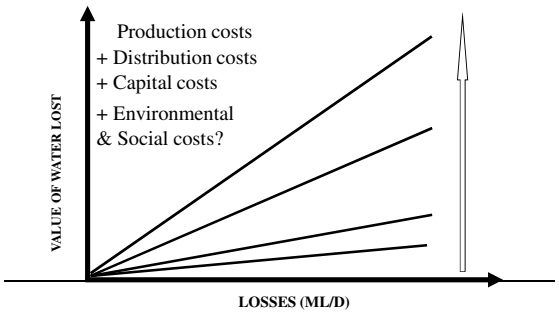
Pressure Management Benefits

		Applicability to US & Canada
1.	Reduction of leak flow rates	Medium
2.	Reduction of numbers of new mains bursts - reduces mains repair costs	High
3.	Reduction of numbers of new service leaks - reduces service repair costs	Low
4.	Reduction of rate of rise of unreported leaks - reduces costs of active leakage control	Low
5.	Deferment of infrastructure renewal costs - extends asset life of mains and/or services	High
6.	Reduction of some components of consumption	Low
7.	Improved customer service fewer interruptions, less damage to plumbing	Low

To make a financial case for pressure management, we need practical methods to predict each of these benefits for individual zones, depending on local circumstances

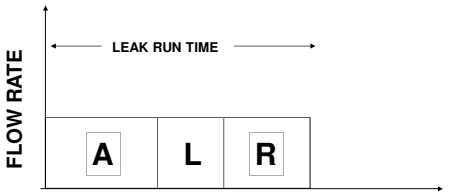
Source: A Lambert, Ferrara Keynote Address, 2010

The Value of Water Lost



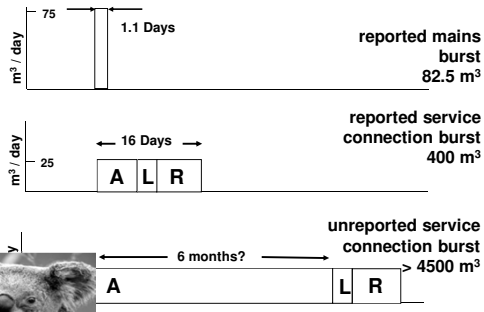
Leak Run Time Awareness

Leak Volume ***Loss = (A+ L+R) Time x Flow Rate***

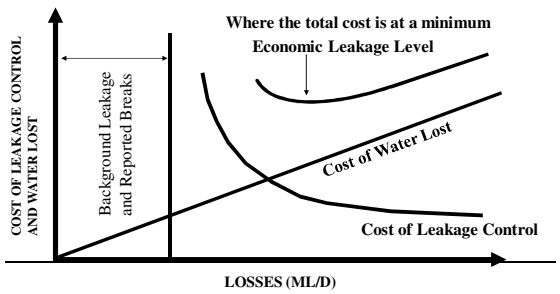


RUN TIME ***= *Awareness + Location + Repair***

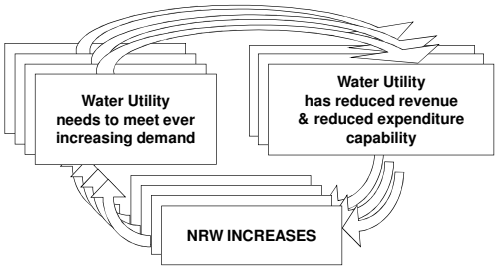
Bursts with high flow rates don't produce the largest volumes of Real Losses! Run time is a key factor.



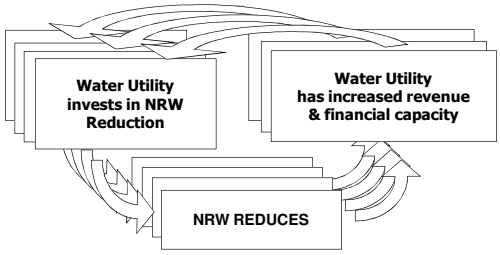
The Economic Balance



The Vicious NRW Cycle



The Virtuous NRW Cycle



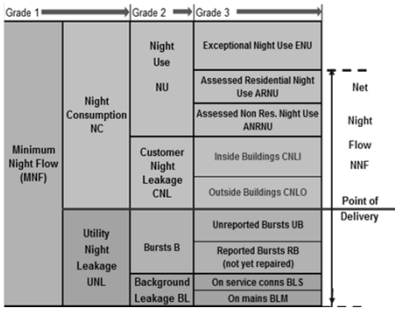
IWA
Water Loss Specialist Group

Minimum Night Flow Components Initiative

Summary of progress and
timescales for completion

By M. Fantozzi & A. Lambert 25th May 2012

Standard Night Flow Components Best Practice Terminology



Note: the term 'legitimate night use' was recognised as being too vague (rather like 'Unaccounted for Water' in the Annual Water Balance) and was therefore not included in the Standard best Practice Night Flow Components Terminology

The influence of pressure on each MNF component is also identified

Fantozzi/Lambert 2010 Manila paper

- Residential Night Consumption – Assessment, Choice of Units, Seasonal Variability
  - shows and promotes 2010 standard MNF terminology
  - shows practical ways to identify influences of:
    - seasonal variations in exceptional night use
    - day of week, time of night, duration of MNF measurement
    - probabilitity distributions of night consumption samples
  - shows how choice of units (lit/person/hr, lit/conn/hr or lit/prop/hr) depends on principal component of MNF
    - If 'person-driven' then use litres/person/hr (Austria, Germany)
    - If 'infrastructure-driven', use lit/conn/hr or lit/prop/hr

Remaining Deliverables

c) develop and propose guidelines on how to define when an approximate estimate is satisfactory and when further investigation is needed (depending mainly on night flow figures)
   -- use Grade 1 terminology, needs writing up in final report

d) Investigate relationship between leakage and legitimate night use.
   – recommend this is dropped from initiative, the term 'legitimate night leakage' is too vague, and there is no logical reason why there should be any such generally applicable relationship

e) Develop a matrix which will be the basis for calculating night consumption under any operating regime in any geographical location
   – this can now be attempted in the final report using principles outlined in the Fantozzi/Lambert Manila 2010 paper.

IWA
Water Loss Specialist Group

Pressure Management Specialist Team

Summary of progress and intentions for completion

By A. Lambert 12th April 2012

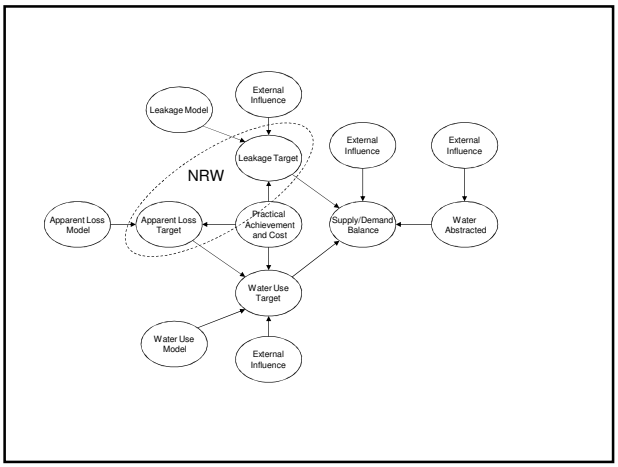
Target Setting Initiative

Progress at May 2012

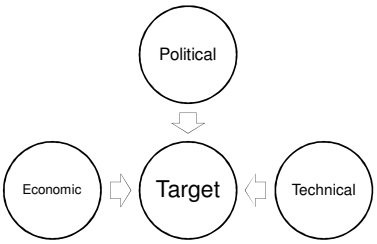
Stuart Trow – StuartTrow@hotmail.co.uk
David Pearson – daviddpc@btinternet.com

Reasons for setting targets

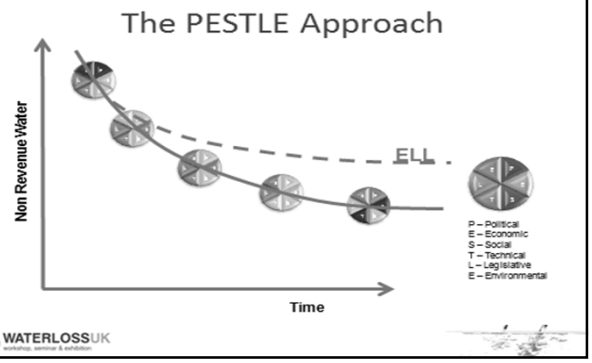
- To ensure efficient operations
- To safeguard future water supplies
- For technical comparisons between organisations
- To demonstrate continuous improvement to customers and the general public
- To satisfy political considerations
- To meet regulatory requirements



Prime Drivers Approach



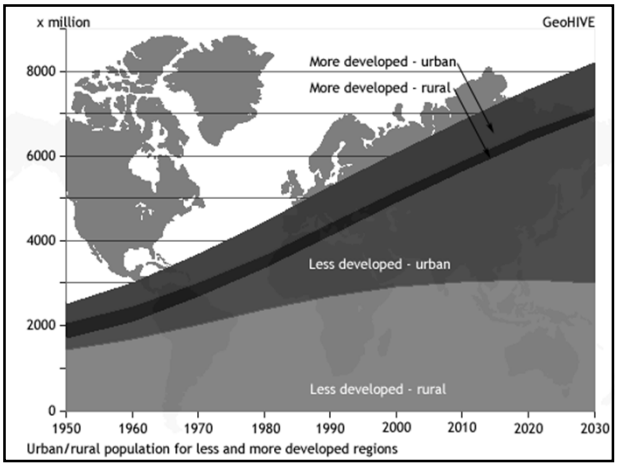
A possible way forward



Multiple benefits of pressure management

PRESSURE MANAGEMENT: REDUCTION OF EXCESS AVERAGE AND MAXIMUM PRESSURES							
CONSERVATION BENEFITS		WATER UTILITY BENEFITS				CUSTOMER BENEFITS	
REDUCED FLOW RATES		REDUCED FREQUENCY OF BURSTS AND LEAKS					
REDUCED EXCESS OR UNWANTED CONSUMPTION	REDUCED FLOW RATES OF LEAKS AND BURSTS	REDUCED REPAIR AND REINSTATEMENT COSTS, MAINS & SERVICES	REDUCED LIABILITY COSTS AND REDUCED BAD PUBLICITY	DEFERRED RENEWALS AND EXTENDED ASSET LIFE	REDUCED COST OF ACTIVE LEAKAGE CONTROL	FEWER CUSTOMER COMPLAINTS	FEWER PROBLEMS ON CUSTOMER PLUMBING & APPLIANCES

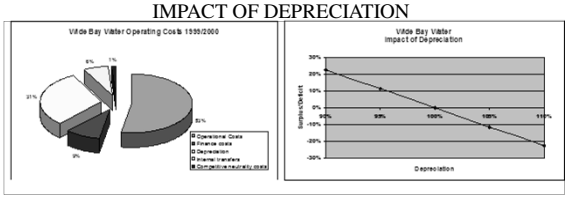
- 1980 - 1994: reduction of leak flow rates (UK and Japan) leads to FAVAD N1 concept
- 1994 - 2003: early evidence of pressure:burst frequency relationships for mains (UK, Australia, Brazil, Italy, New Zealand)
- 2004: individual PMZs in Gold Coast, Australia clearly confirmed influence of pressure reduction on burst frequency (mains and services)
- 2005 -06: WLTF members publish 50, then 112 data sets from 11 countries; develop 'Straw that breaks the Camel' s back' concept and quick prediction method using Burst Frequency Index
- 2006 – 11: increased international activity in pressure management for burst reduction as well as leak flow reduction (Australia, Brazil, Malaysia, South Africa).
- 2009-2011: improved methodology for predicting reductions in consumption (Australia)
- Initial methodology for predicting reduced cost of active leakage control, for economic intervention
  Initial methodology for predicting extension of asset life for AC mains
  Improved pressure:bursts analysis allows for non pressure-dependent bursts, different pipe materials

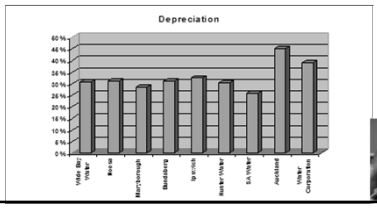


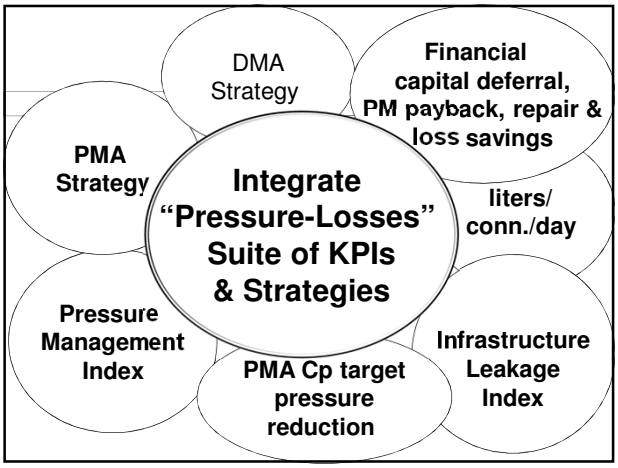
In the Future, Urban Water Systems Will Need To…

- Use much less water (50-70% less)
- Facilitate the safe reuse of water
- Produce energy
- Recover nutrients

IMPACT OF DEPRECIATION







World Water Congress & Exhibition
BUSAN KOREA

Achieving Optimised non-revenue water conditions in networks

- To have networks laid that minimise leaks
- That leak indicators are built into existing and new networks
- That all networks have pressures controlled
- That the conflict between fire fighting needs and customer water needs are removed.
- The system informs us of faults in a way that creates a speedy response
- in a drought situation we have the capability

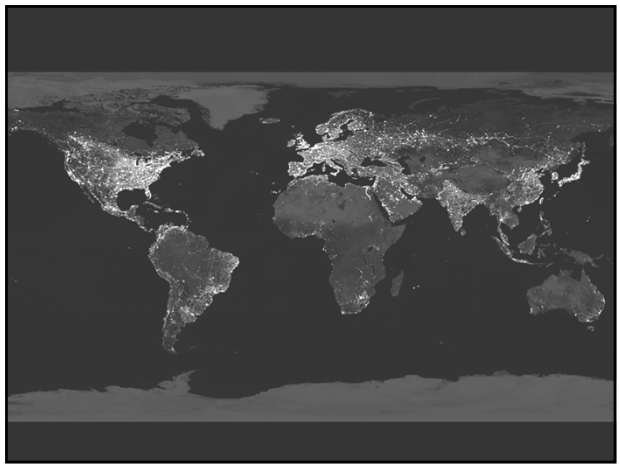
16~21 September 2012

IWA Planning for Success

- IWA Plan to increase the WLTF influence from 15% to 90% of worlds water utilities
- IWA recognition of individuals
- Plan to be Agreed, Publicly Announced at San Paulo Brazil and Launched World Wide

Achieving Optimised non-revenue water conditions in networks

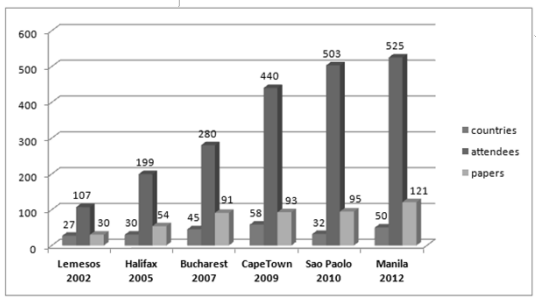
- International Protocols direct a top down approach



Our New World Leader ?

WATERLOSSUK
workshop, seminar & exhibition

IWA WATER LOSS SPECIALIST GROUP CONFERENCE STATISTICS



Water Loss Specialist Group

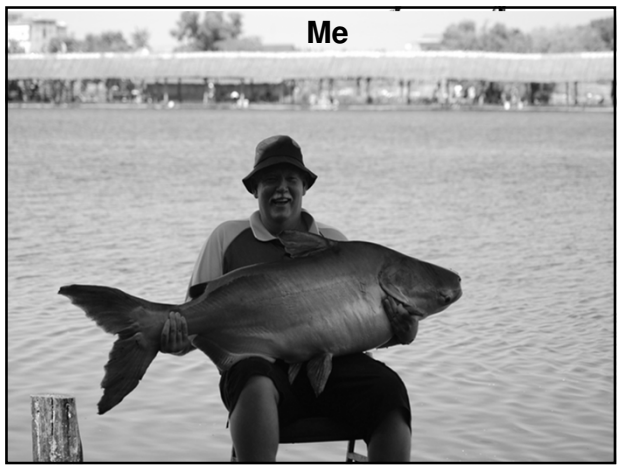
Bentley

TaKaDu

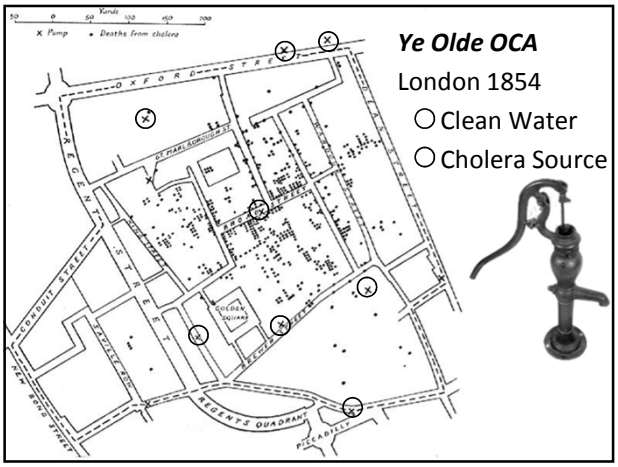
i2O WATER

Vienna, 30 March - 2 April 2014

Me



"Whether you think you can or can't
You are usually right". *Henry Ford*



Ye Olde OCA

London 1854

- Clean Water
- Cholera Source