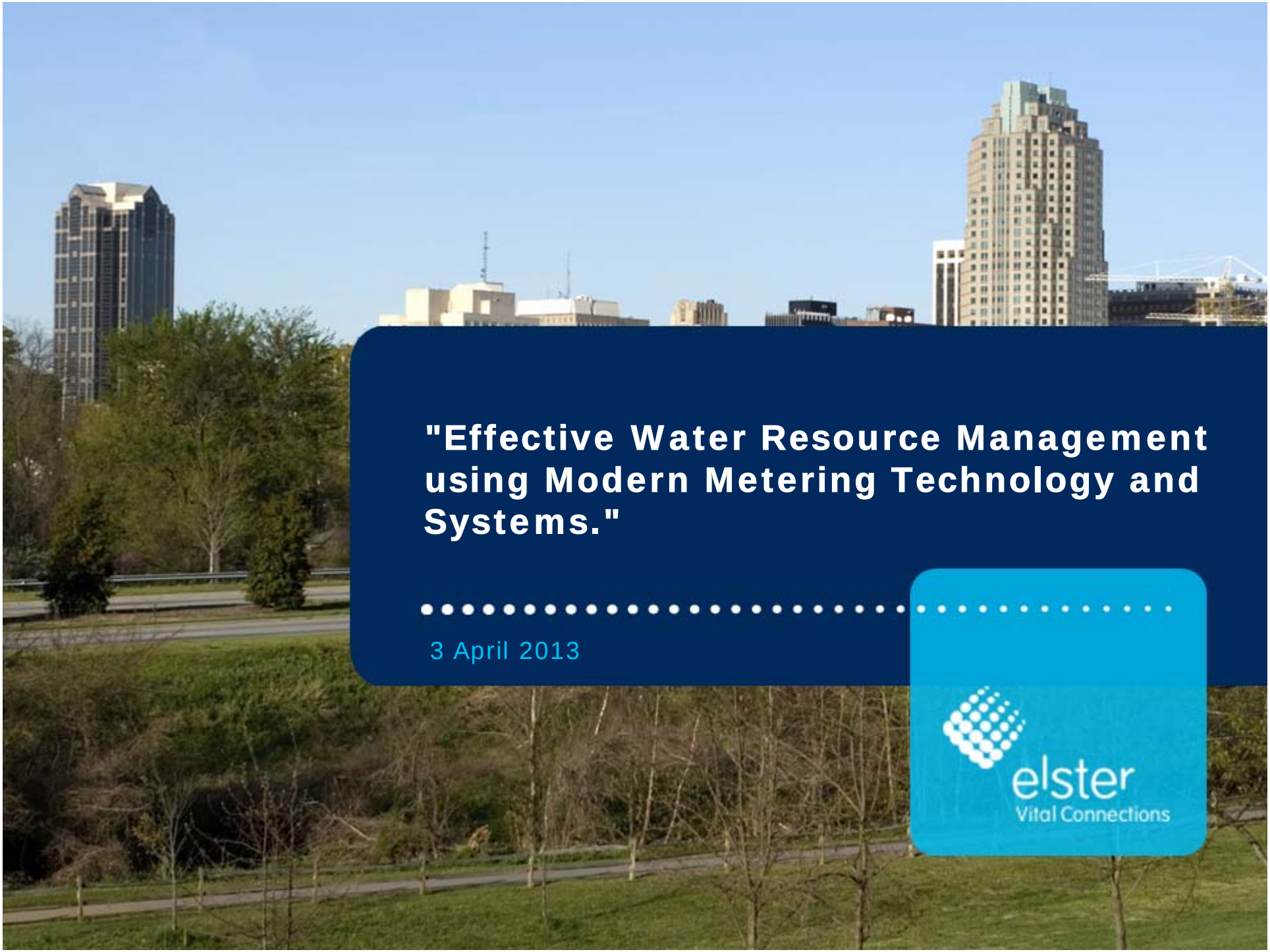


"Effective Water Resource Management using Modern Metering Technology and Systems."

3 April 2013

elster
Vital Connections

- Canada is still one of the highest water users per capita in the world?

- Managing Canada's water resources, which represents about seven per cent of the world's renewable freshwater, is everyone's responsibility.

Environment Canada Website – March 2013

- **How do we effectively monitor utility water use ?**

- **How can new Technologies help ?**

- Fact : On average, 30% to 50% of treated potable water is lost !

- Most losses can be attributed to system wide leakage.

  Major leaks are not always the problem, they tend to make themselves noticeable and are fixed as a matter of urgency.

  It's the unnoticeable smaller leaks have a bigger impact. A 1/8" diameter hole in a pipe will lose approximately 1 Million US Gallons of water in a year (3,785 m3).

- Detecting all existing water leakage, and provide methods of continuous monitoring for the early detection of any new leakage, should be a priority for all water utilities !

- Treated water needs to be accounted for, how do we do this ?

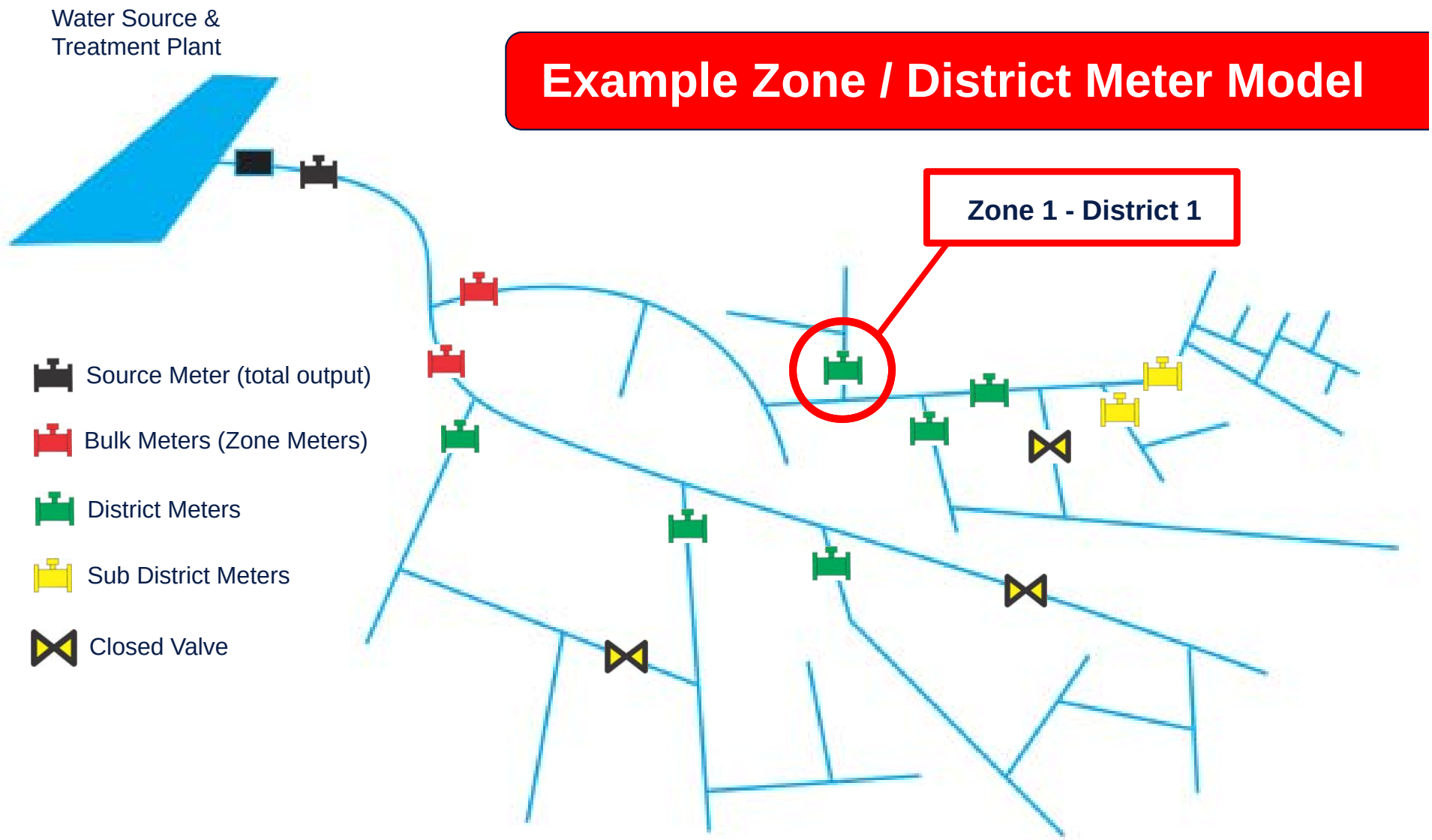
The effective application of Distribution Metering !

Key requirements for effective water management by measurement :-

- **Measure at the right places !**
- **Measure accurately and frequently !**
- **Collect measurement data daily !**

Measure at the right places !

Typical Water Distribution System

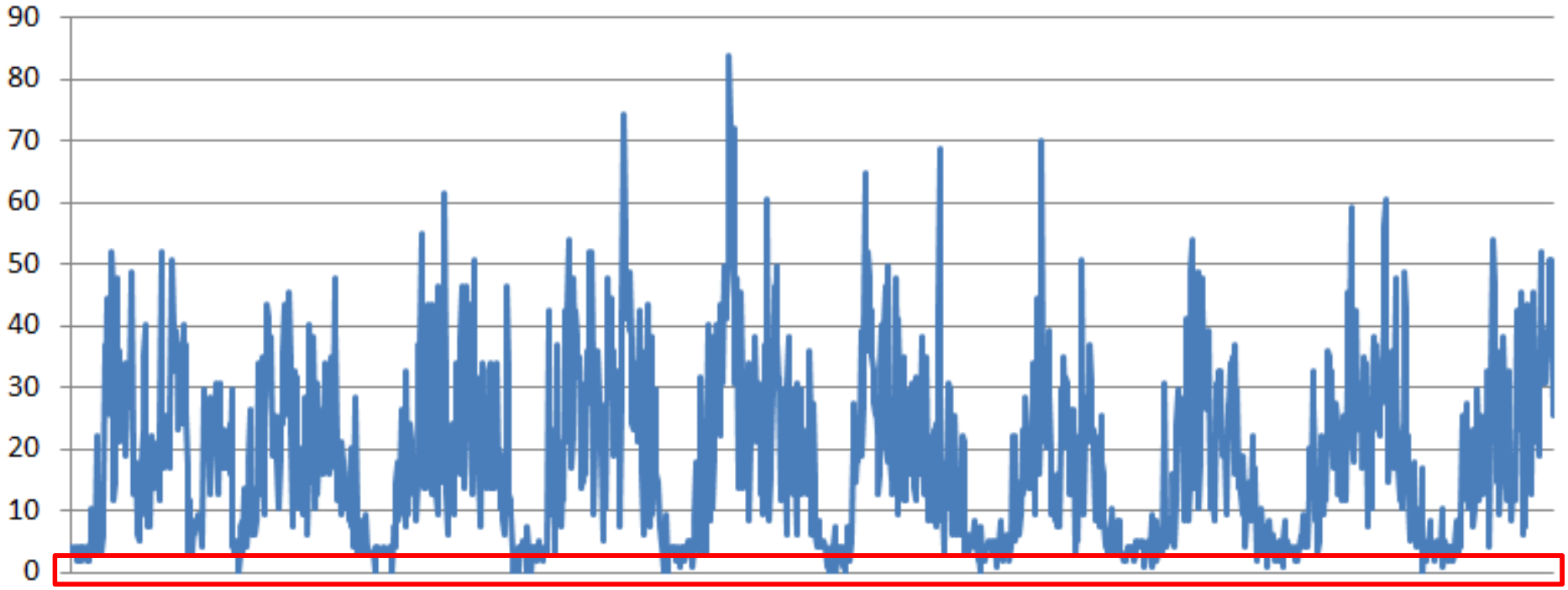


Measure at the right places !

Typical Water Distribution System

Zone 1 - District 1

Example Zone / District Meter Model



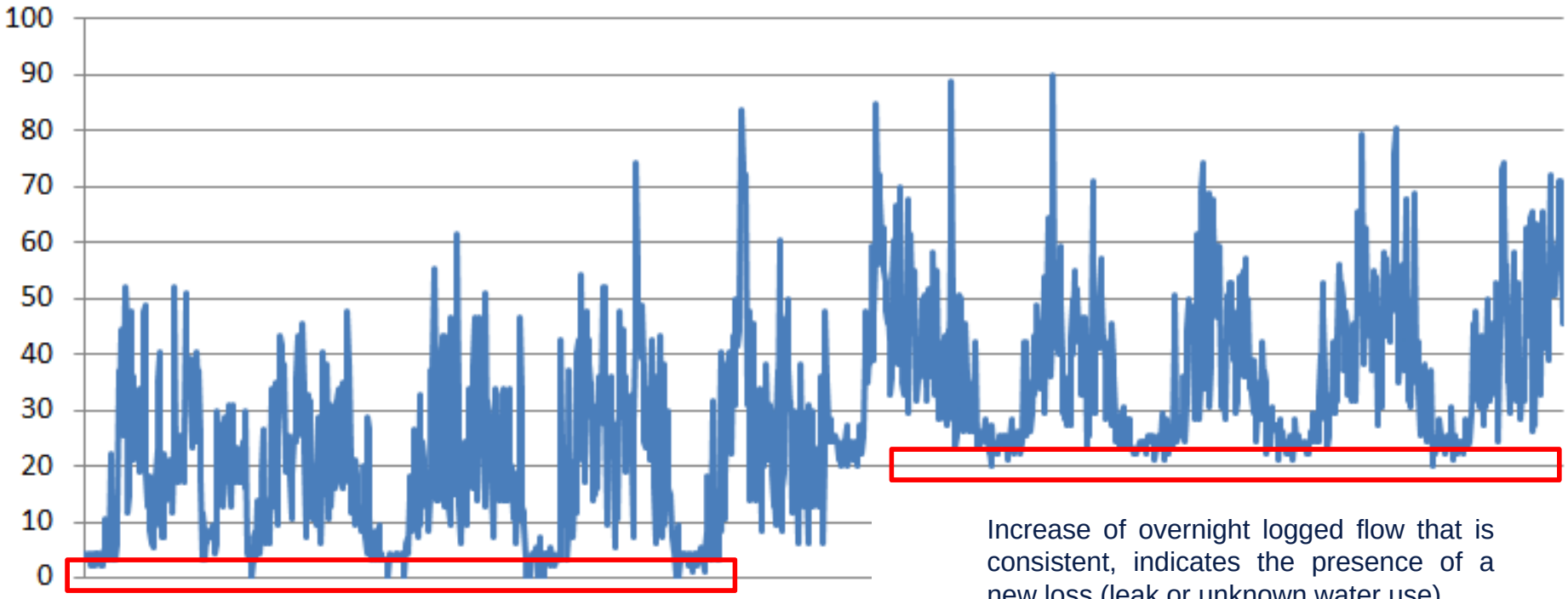
Overnight logged flow – Typically between 2am and 4am, used as a datum.

Measure at the right places !

Typical Water Distribution System

Zone 1 - District 1

Example Zone / District Meter Model



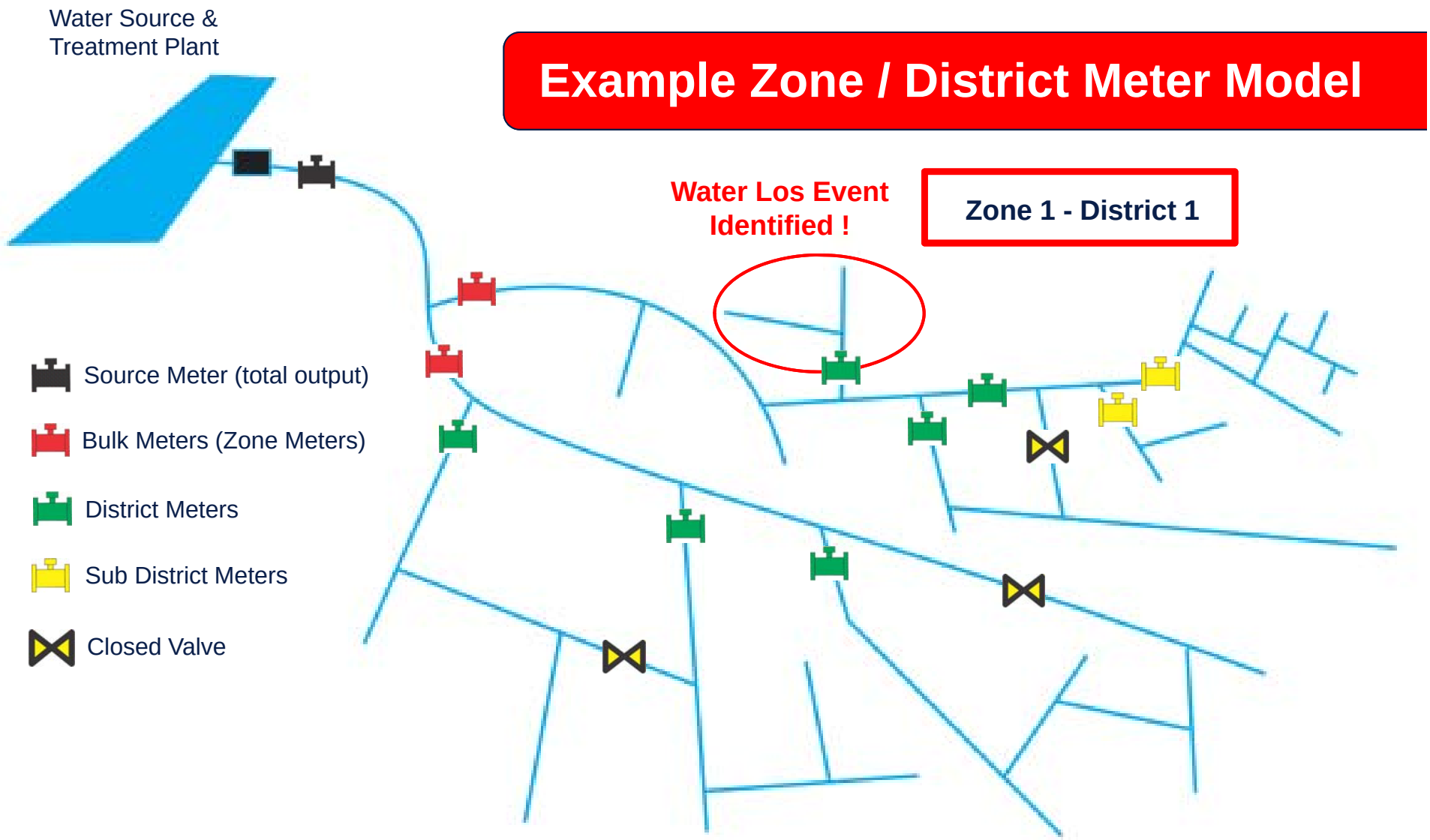
Overnight logged flow – Typically between 2am and 4am, used as a datum.

Increase of overnight logged flow that is consistent, indicates the presence of a new loss (leak or unknown water use).

- Monitoring each District or Sub District meter in this way enables the identification of a loss event, and which district, or sub district, it has occurred in!

Measure at the right places !

Typical Water Distribution System

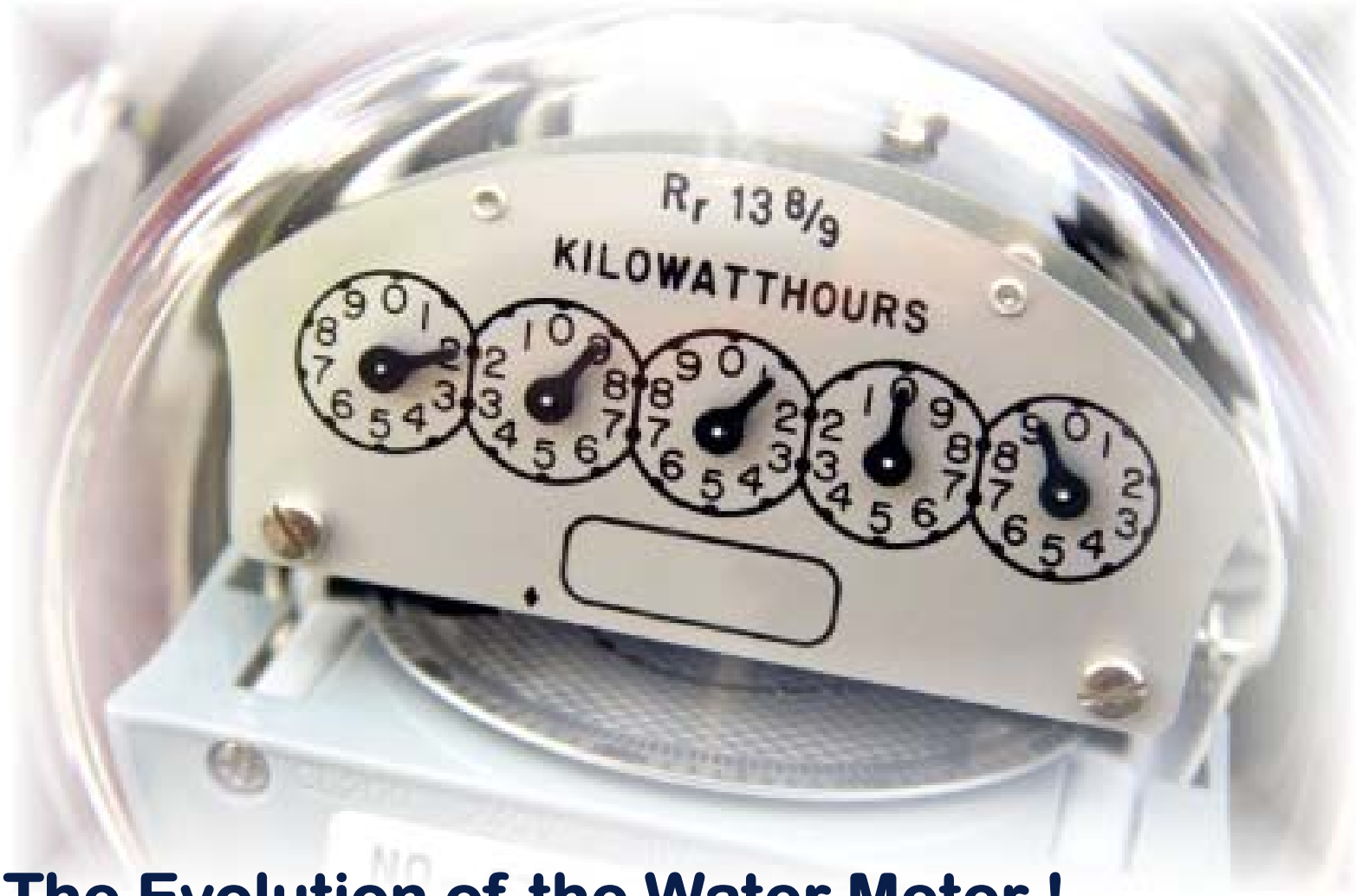


Measure at the right places !

Typical Water Distribution System

Example Zone / District Meter Model

- Zone / District Metering is a well proven method for water loss management and has been applied worldwide for decades.
- Applying modern metering and data collection technologies enables superior data sets and data accuracy, and greatly reduces labor requirements through automation and remote data collection.
- Zone / District Metering and Water Loss Management is a permanent on going process. Modern technologies return greater operational efficiencies and lower operational costs than legacy equipment.



The Evolution of the Water Meter !
A case of Déjà vu

During the 1980's the Electricity Metering Industry started to adopt a fundamental but crucial change in metering technology.

Traditional Electromechanical Meters, using a technology that was over 100 years old, started to be replaced by Solid State Electronic meters…….

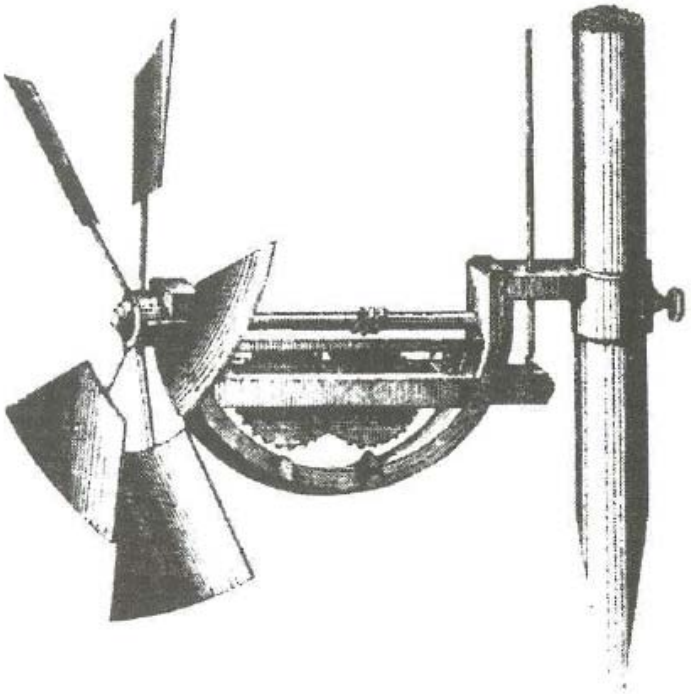
…..it became the first step in the evolution of the Electricity Smart Meter and AMI.

Utility Water Meters are now going through the same evolution

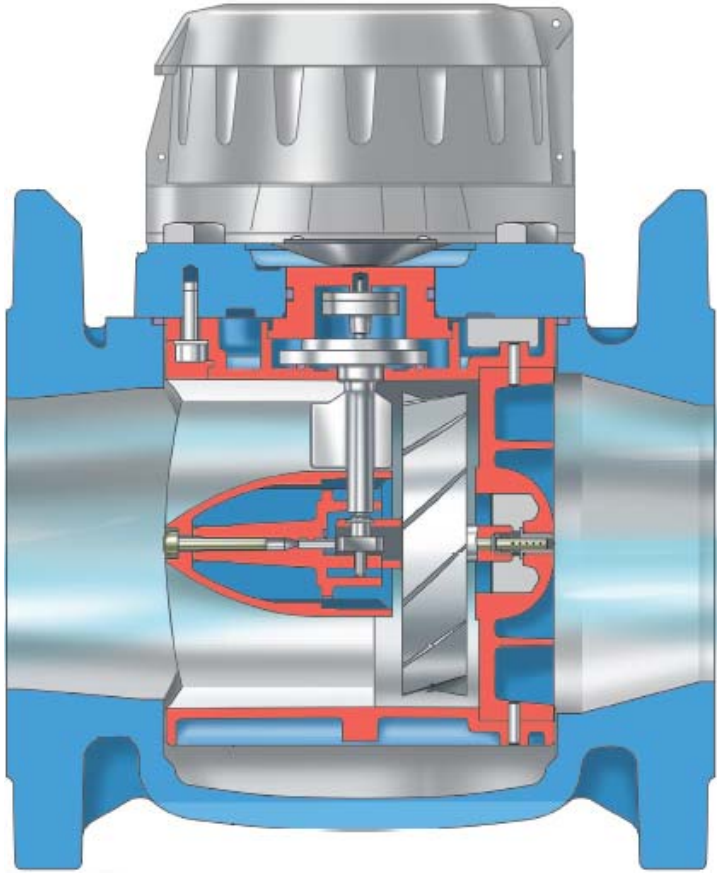
Measurement of potable water flow and consumption in water utility systems has been dominated by mechanical metering technology for over 100 years.

Turbine Type Meters

The first documented references for a mechanical water meter were in 1790, detailing an “Inferential” turbine type meter invented by Reinhard Woltman. As a testament to his ingenuity, the “Woltman” type mechanical water meter is still used to this day, and is officially referred to as a Class II Turbine meter.



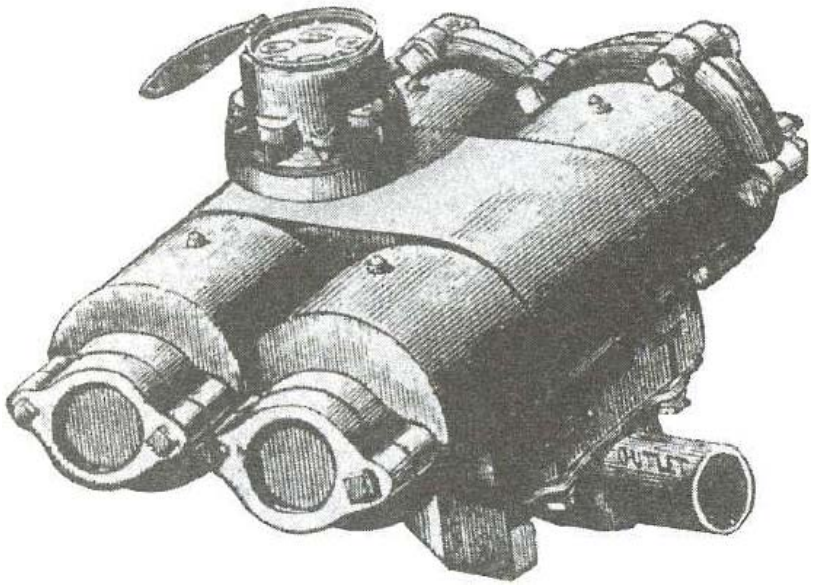
Woltman Concept of 1790



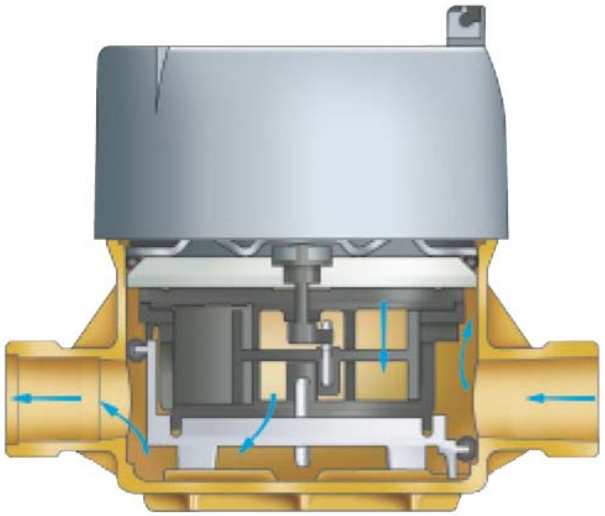
Modern “Woltman” Class II Turbine

Positive Displacement Type Meters

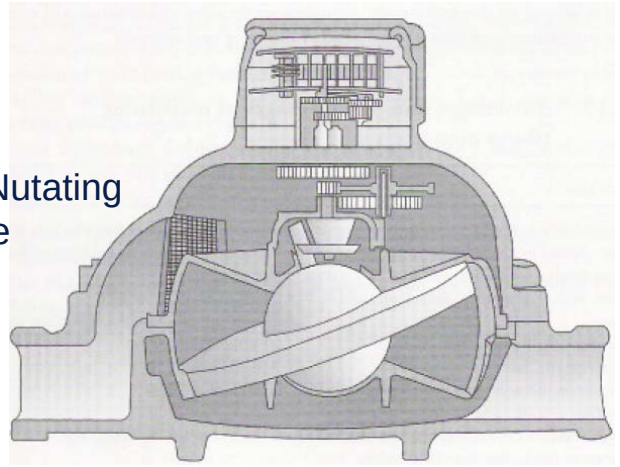
The first reference to a “Positive Displacement” (PD) type meter was in fact the modification of a water pump. Each stroke of a piston equaled a known measurable volume of water. The first commercially available PD, “Piston” type water meter was patented in 1885. The Nutating Disk type water meter first appeared in 1887.



Piston Type Meter of 1885



Modern
Piston Type



Modern Nutating
Disk Type

The Mechanical Disadvantage

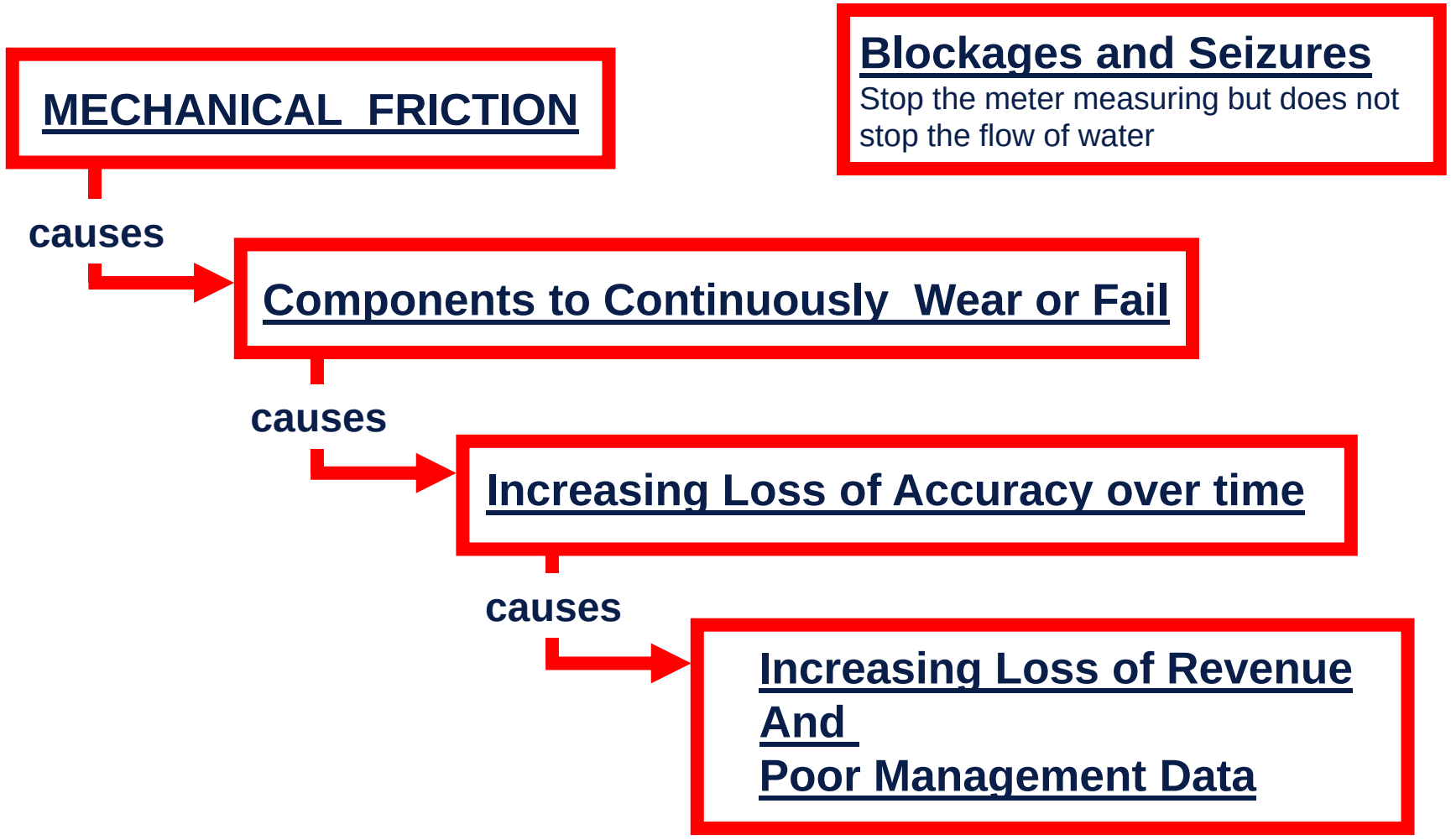
Mechanical Water Meters are inherently flawed. Flaws that have a SUBSTANTIAL and COMPOUNDING effect on operational accuracy and cost.

MECHANICAL FRICTION

BLOCKAGES

SIEZURES

The Mechanical Disadvantage



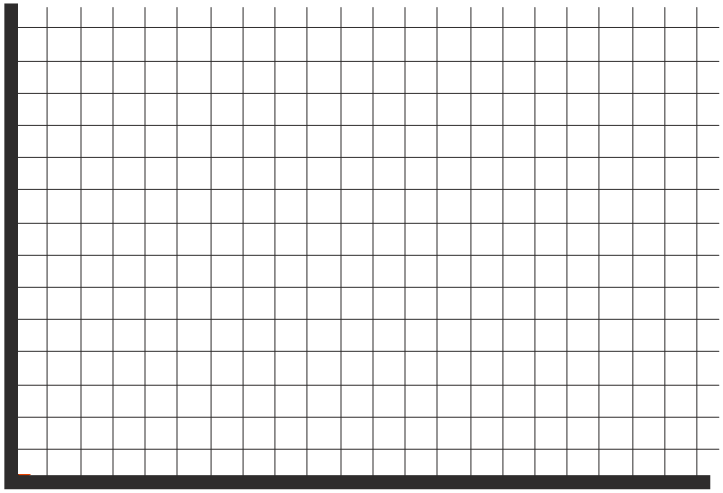
The Mechanical Disadvantage

Keeping mechanical water meters accurate is a never ending task that takes time and money. The truth is that the majority of Water Utilities do not provide sufficient services to keep meters operating at peak performance.

The result is that many Utilities have a prolific underperforming Water Meter population!

Operational Costs

- **Testing Costs**
- **Repair Costs**
- **Replacement Parts Cost**



Measure accurately and frequently !

Modern and innovative Electronic “Non Mechanical” water meters have replaced legacy mechanical water meters that wear and subsequently lose accuracy, requiring expensive and repetitive maintenance.

Non mechanical electronic meters do not wear and remain perpetually accurate with minimal operational maintenance !

- Superior range of flow and perpetual accuracy measurement.
- Measure Reverse flows as accurately as Forward flows.
- Have Separate Registers for Forward, Reverse and Net Flow Totals.
- On board, user definable, Data Logging of Flow (and pressure)
- Remote two way communications using existing Data Networks.
- Logged Data automatically collected every 24 hours.
- Simple installation and set up (relatively).
- Industry Standard Encoder and Pulse Outputs (Forward and Reverse)
- Multiple Power Supply Options including Renewable Energy!
- Buryable measuring Sensors

IP 68

NSF Certified to NSF/ANSI 61

OIML

- **Measure accurately and frequently !**

Use the right equipment !

- Do not confuse Process Metering with Zone/District Metering !

Water process equipment is designed for the management of Quality, not management of Distribution !

These are all golf clubs, so why are they different ?

Use equipment designed for the job at hand !

- **Collect measurement data daily !**

Identifying loss early can avert disaster !

- Finding and fixing small leaks sooner has its benefits !

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Cost of fixing sinkhole swells to $5M; One eastbound lane opens to ease commute

BY NECO COCKBURN, OTTAWA CITIZEN SEPTEMBER 13, 2012

- Collect measurement data daily !

Automate data collection !

Data Network (Cellphone) System

Zone / District Meters

GSM/SMS Network

Utility Computer

Smart Phone

Two way communications enable automated data reporting and "on demand" information requests.

Key requirements for effective water management by measurement :-

- **Measure at the right places !**

Apply a Zone/District Metering System !

- **Measure accurately and frequently !**

Use the appropriate, modern metering technology !

- **Collect measurement data daily !**

Use an automated data collection system !

Thank you

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Product Manager – Solid State Water Meters

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