



Using Big data to estimate precision, degradation, errors and costs of water customer meters

(in collaboration with [Baseform](#))

Thesis proposal


Conceição Amado



Motivati

- Water is one of the most important substances on earth
- All plants and animals must have water
- If there was no water, there would be no life on earth





The water utilities provides drinking water and wastewater services to residential, commercial, and industrial sectors of the economy.

According to the World Bank, water utilities worldwide lose approximately **EUR 14 billion annually** due to various water losses

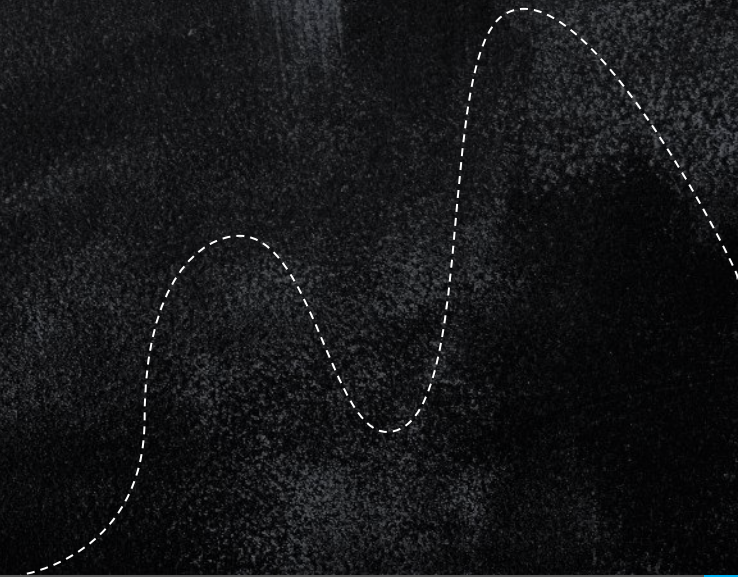


“ The public water supply service has annual losses of around **184 million cubic meters**, warned the Water and Waste Services Regulatory Entity (ERSAR) in the 2023 report on the sector. “

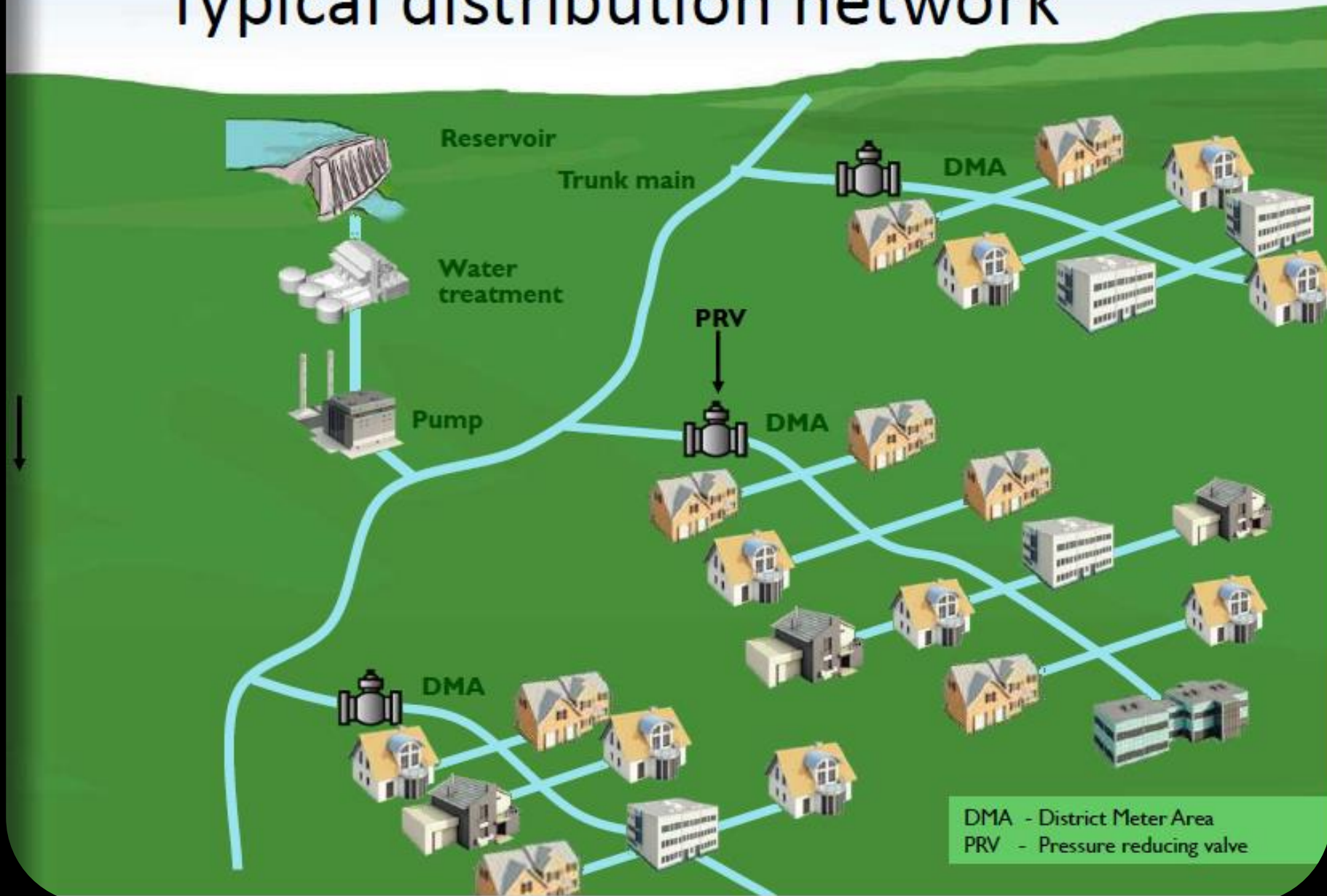




**Mathematics and
Artificial intelligence
help to reduce water
loss in global supply
networks**

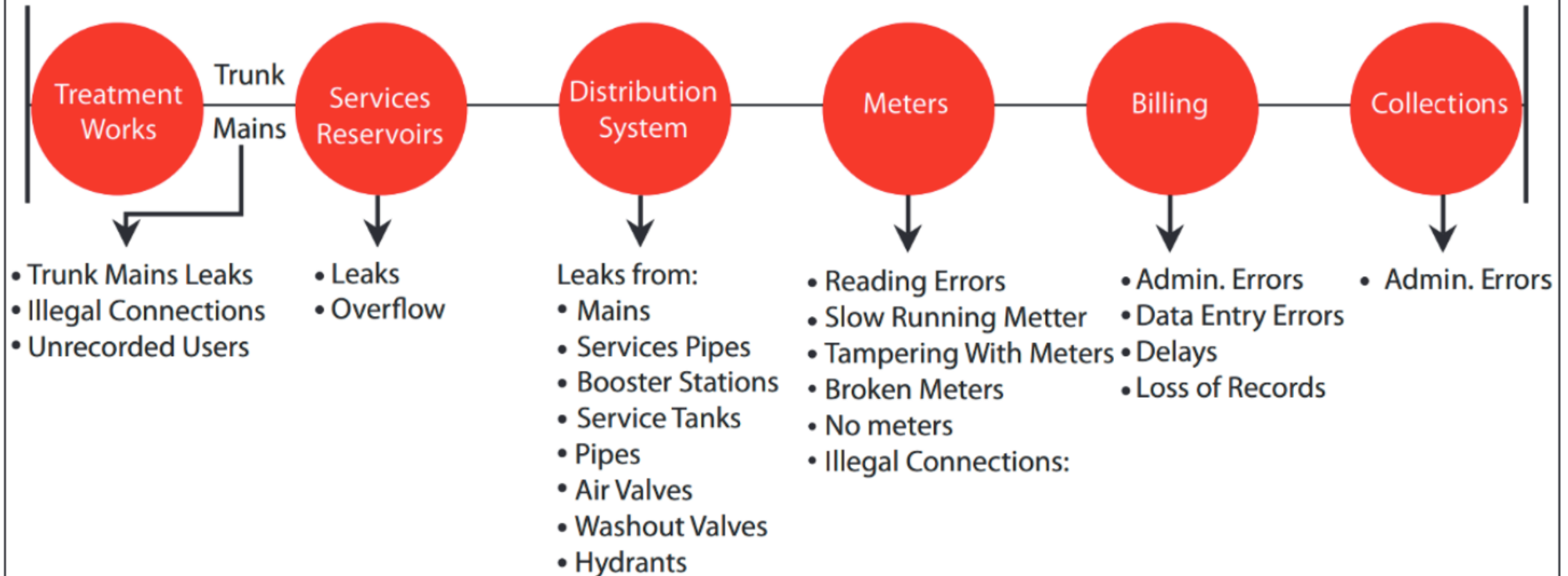


Typical distribution network



Physical losses

Commercial losses

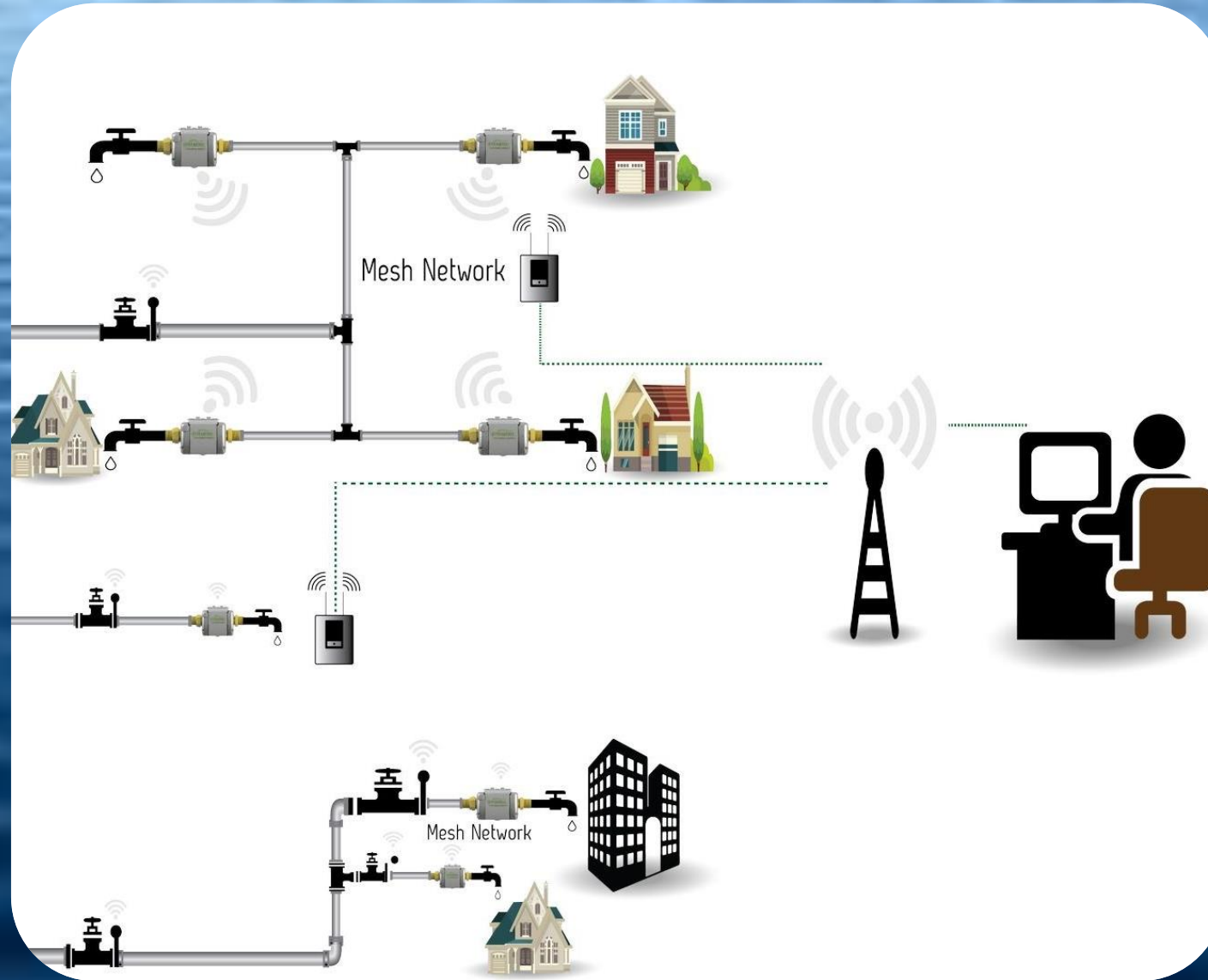


Water meters

- Water meters are essential for effectively managing water systems to promote water preservation
- Nevertheless, they frequently display metering **inaccuracies** as a result of various factors such as
 - type
 - dimensions
 - age, and
 - operating conditions
- Moreover, the accuracy of water meters tends to decrease over time, presenting concerns for utilities

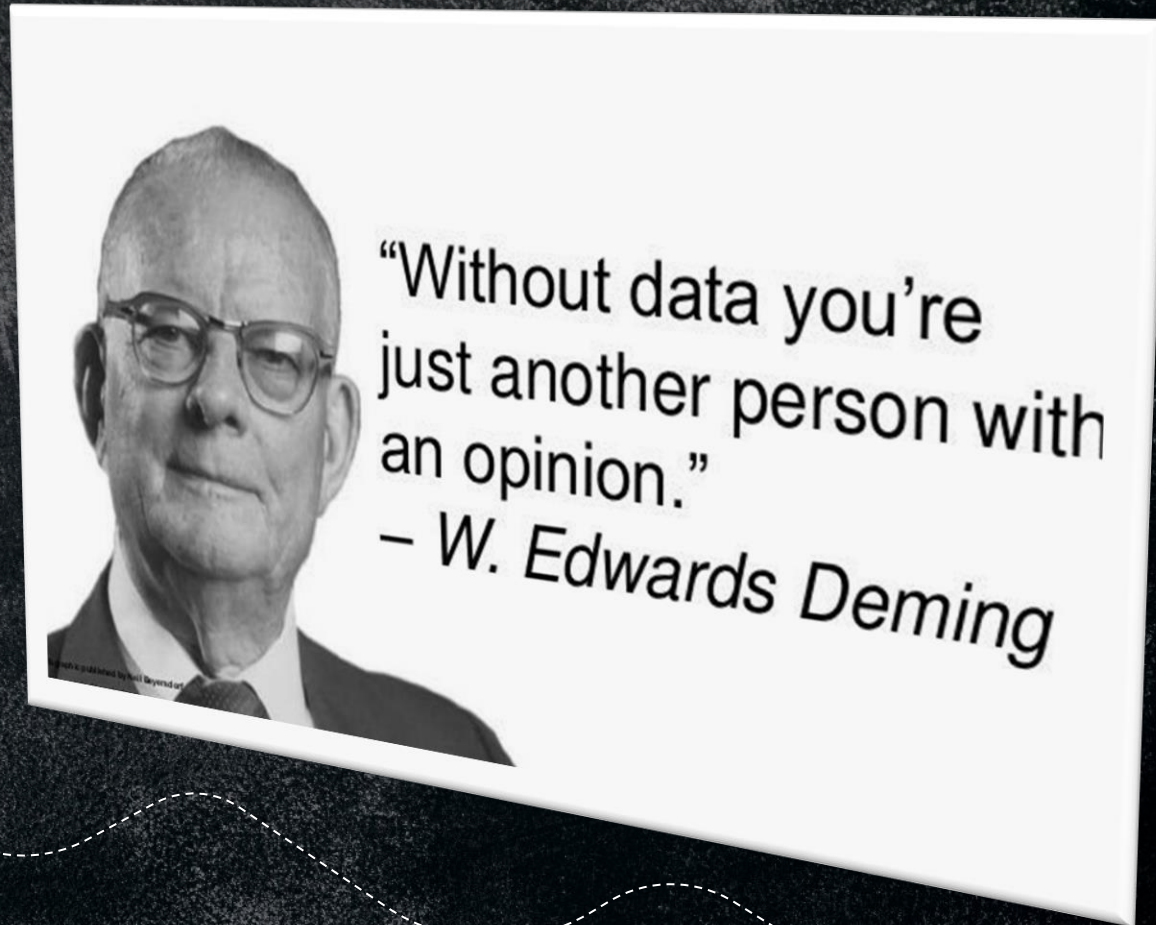


Smart Water meters



<https://www.sh-meters.com/news/advantages-of-nb-iot-smart-water-meters-55396563.html>

In God we trust.
All others bring data.





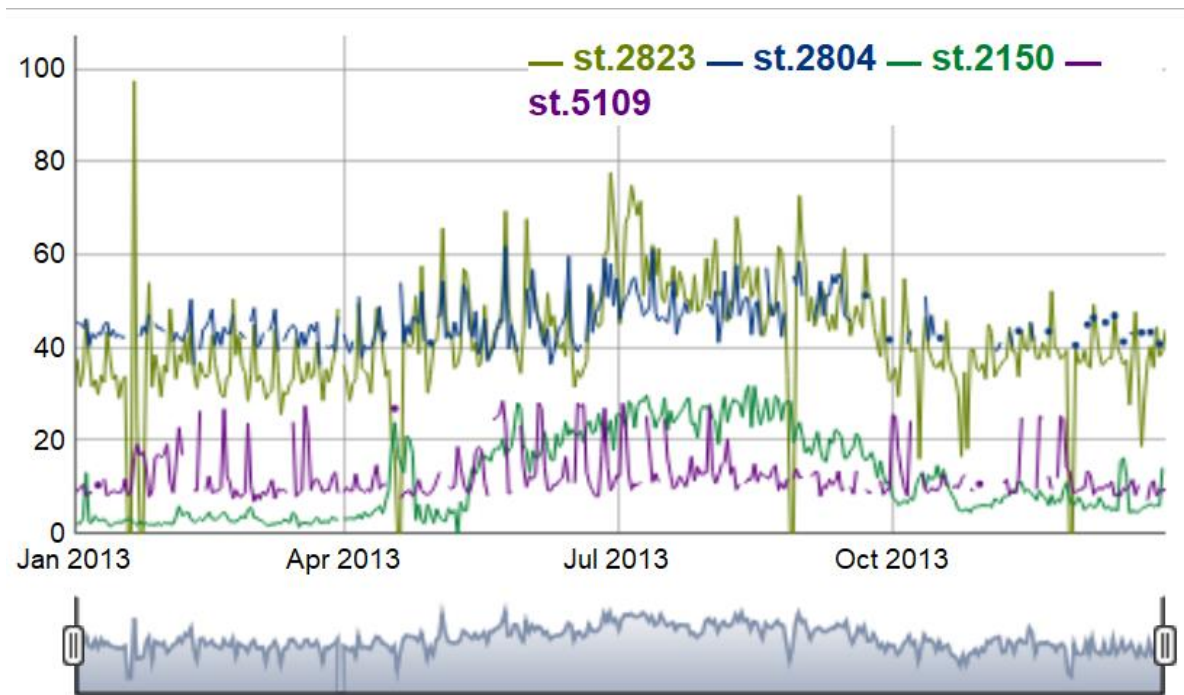
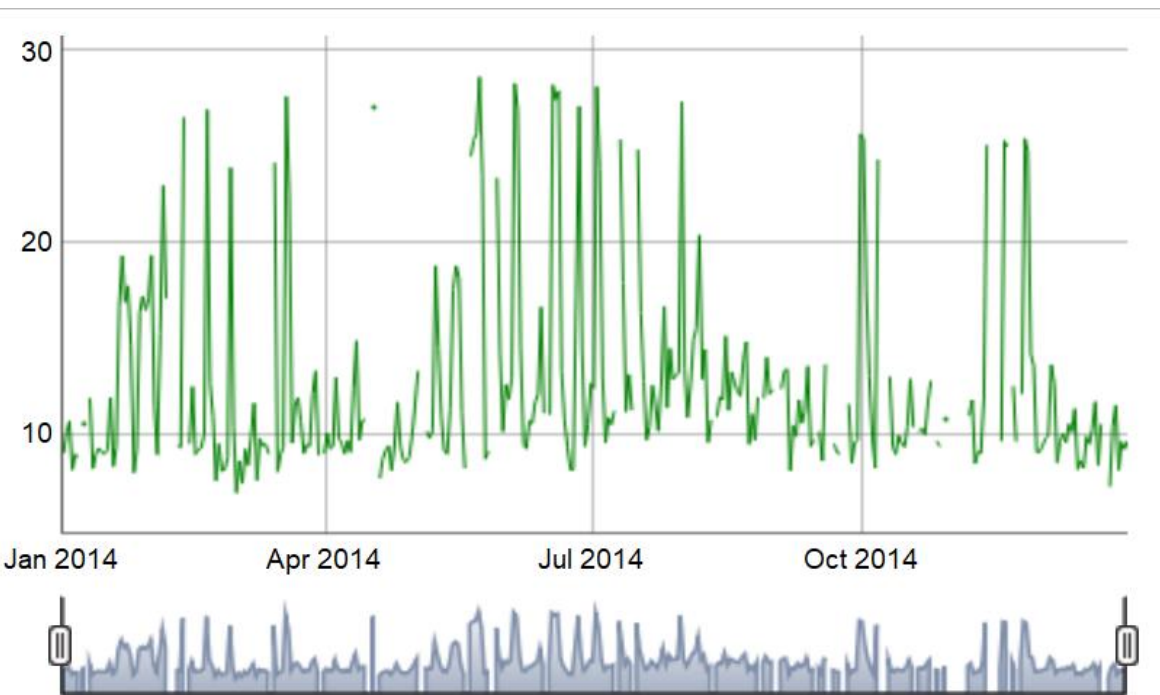
Is necessary less expensive, easier, and more accurate water flow rate measurement systems



The water meter measurement error depends on two factors:

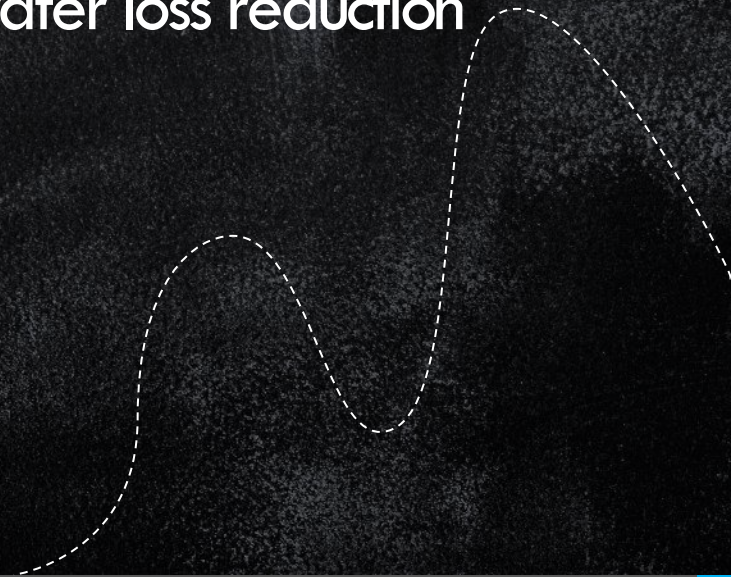
- characteristic error curves of the meters**
- and the water consumption patterns of the users**

DATA





In conclusion, AI- and maths-driven solutions (statistics/data science/machine) can boost water utility profitability, sustainability, efficiency, and water loss reduction





Mathematics and Artificial Intelligence
open unimaginable new opportunities...

Who knows where you will
be in 10 years?





See you soon!

Conceição Amado

✉ Conceicao.amado@tecnico.ulisboa.pt

