

Digital roadmap and overview of smart water technologies



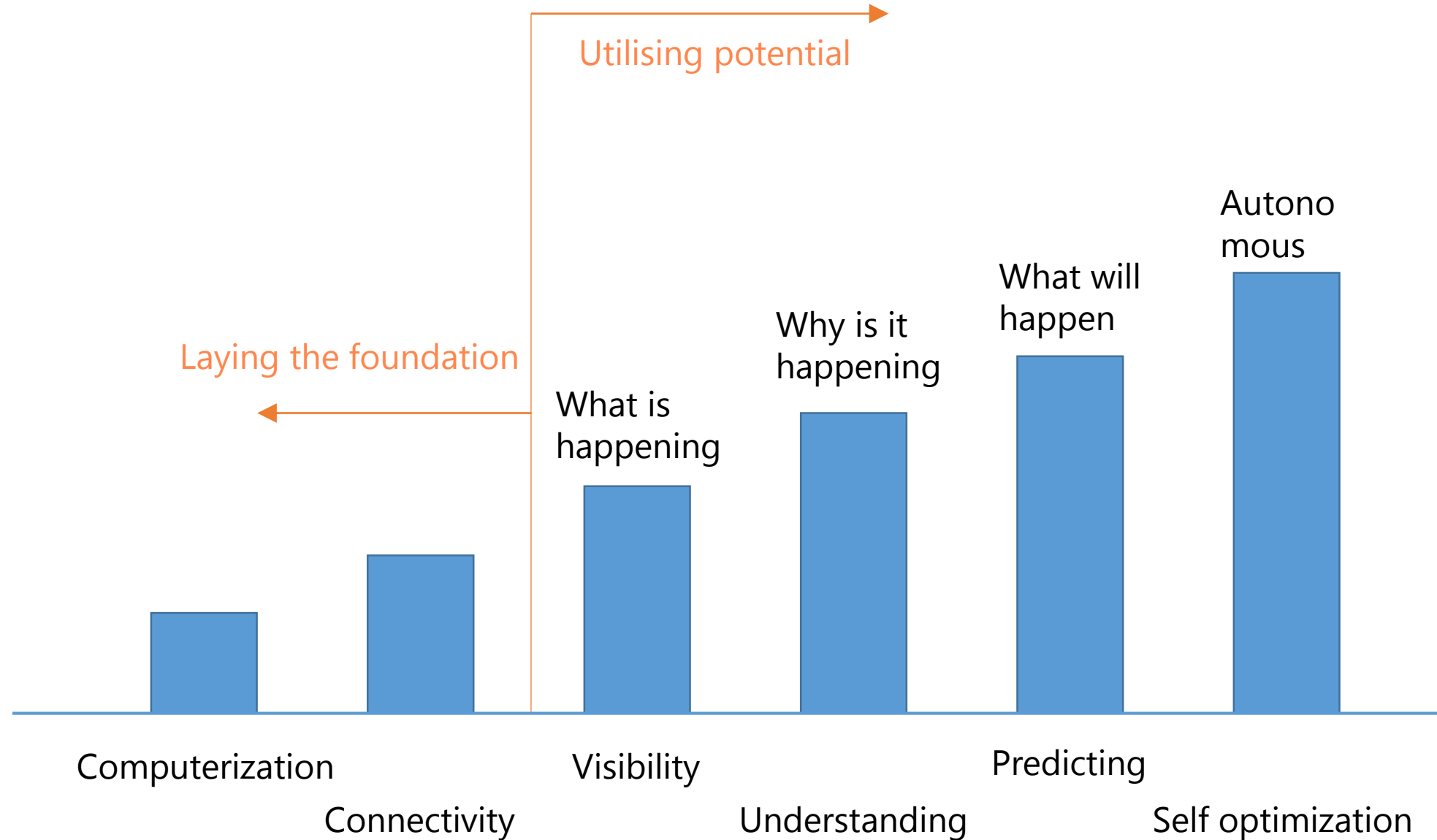
Daphne Voss – Senior Water Engineer – EIB – JASPERS

Leon Schmid – Water Engineer – EIB - JASPERS

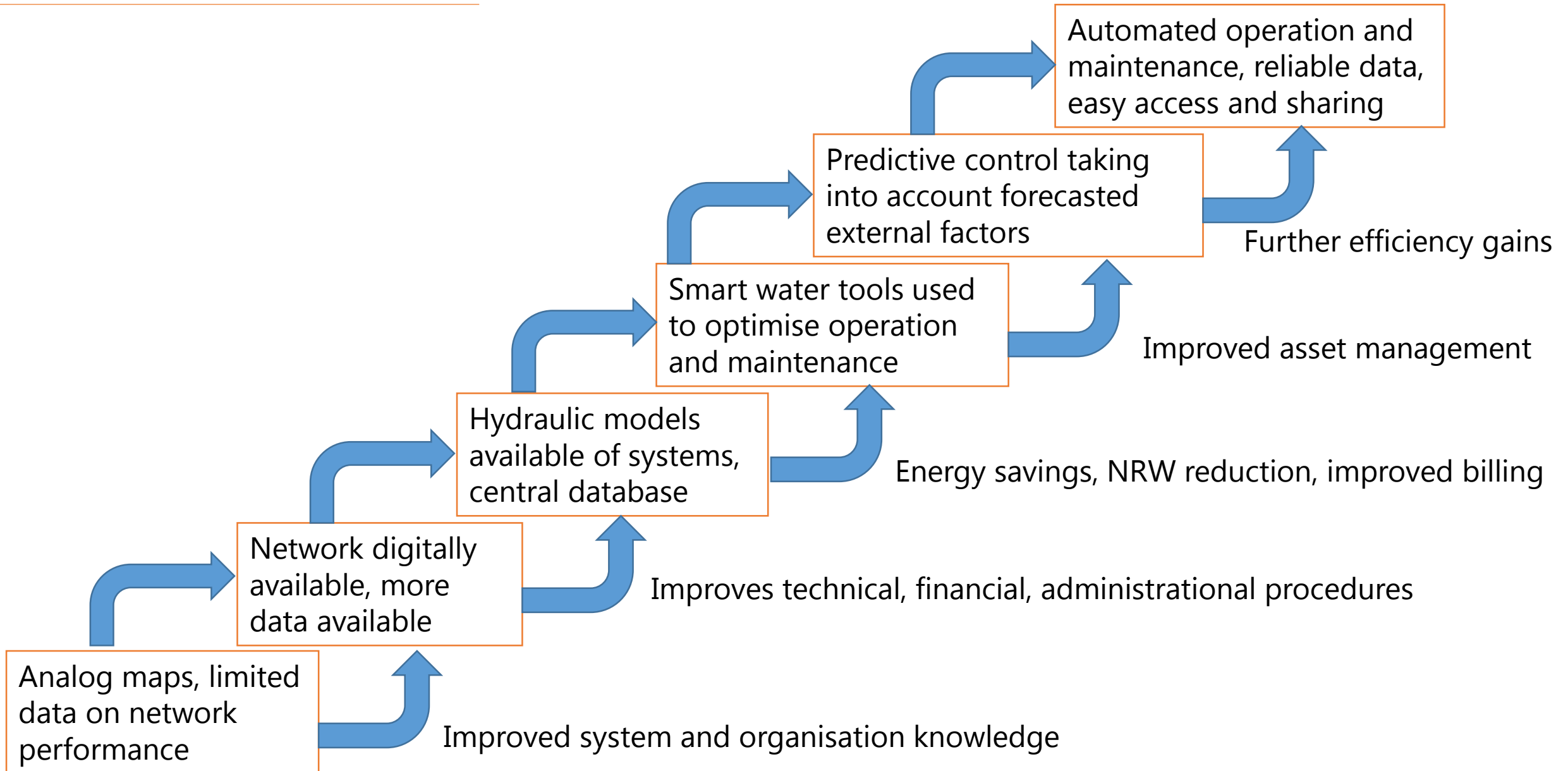
Topics for this presentation

- **Digital Transformation**
- **Digital Roadmap**
- **Internet of Things (IoT)**
- **Big Data Management**
- **Machine Learning and Artificial Intelligence**
- **Smart Non-Revenue Water Reduction**
- **Smart Asset Management**
- **Digital Twins**

Digital Transformation

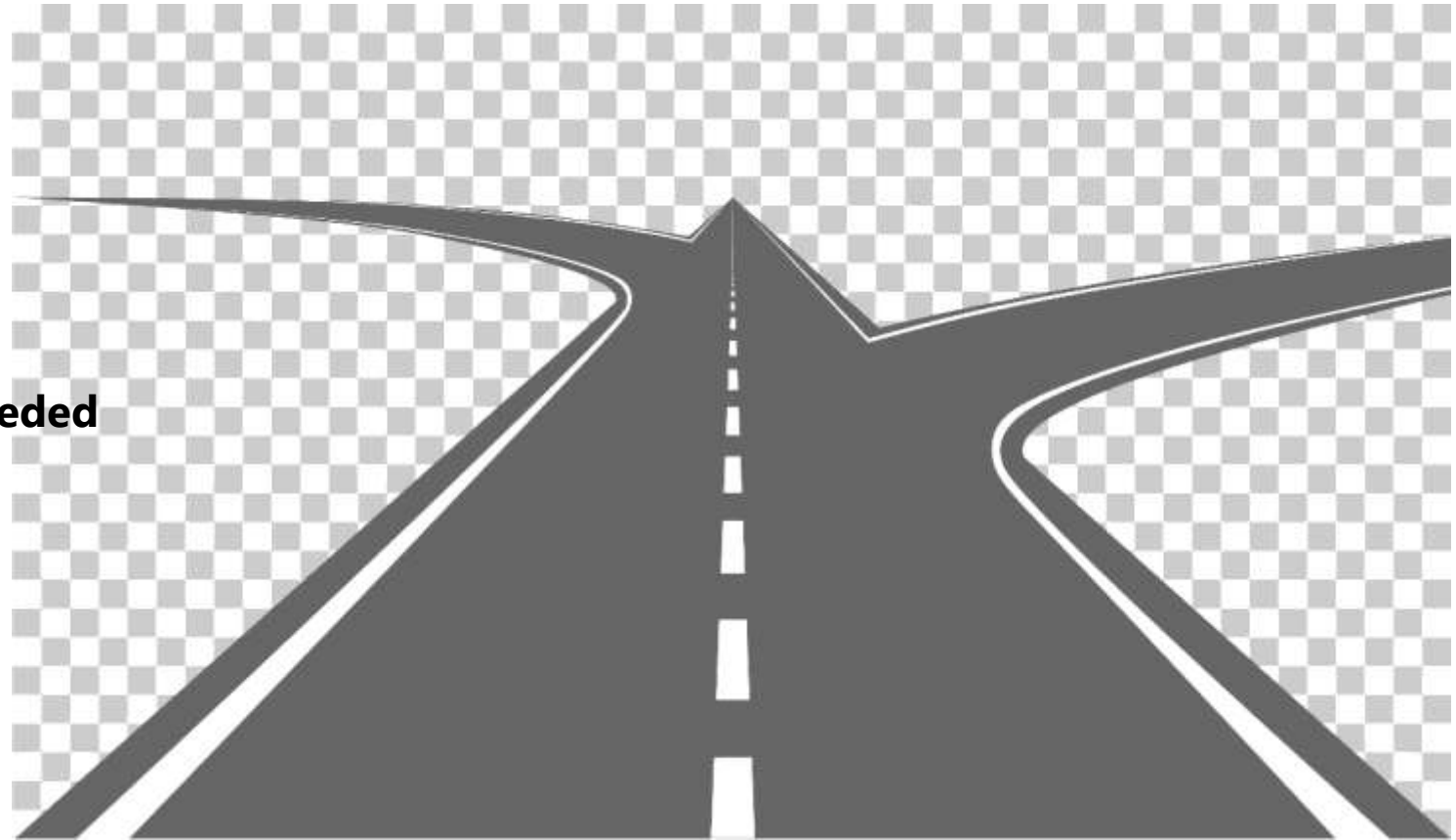


Levels of digitalisation



Digital Roadmap

- **Start from your existing situation**
- **Determine the long term perspective**
- **What needs to change?**
- **Where can digital solutions help?**
- **How do these fit in the organisation?**
- **Determine the actions and resources needed**
- **Determine dependencies**
- **Set priorities**
- **Prepare an implementation plan**
- **Start with rewarding projects**
- **Build capacities**



Important considerations

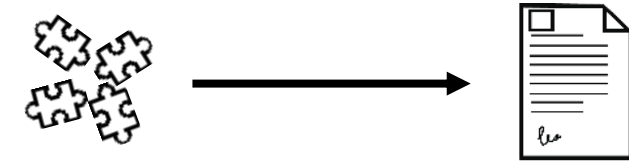
- **Support from senior management is essential**
- **Include staff in the transformation process**
- **Changes in the skill set of staff may be necessary**
- **Digital transformation impacts processes within the utility**
- **Digital transformation is unique for each organization**
- **Cyber security has to be taken serious**
- **Digitalisation is a continuous process**
- **Digitalisation is an important tool to meet the objectives of every water and wastewater utility**



Big Data Management

What it is and can do

- **A system to handle vast amounts of data**
- **A system to optimise the access to data**



Benefits

- **Better overview and use of collected data**
- **Better understanding of the system**
- **Detection of deviations from typical measurements**
- **More accurate predictions**
- **Key enabler for smart water tools**

Important considerations

- **Determine which processes need which data**
- **How to find and deal with unreliable data**

The Internet of Things (IoT)

What it is and can do

- **Part of the Internet**
- **Network of sensors and other devices or software**
- **Facilitates (real-time) use of the data in applications**



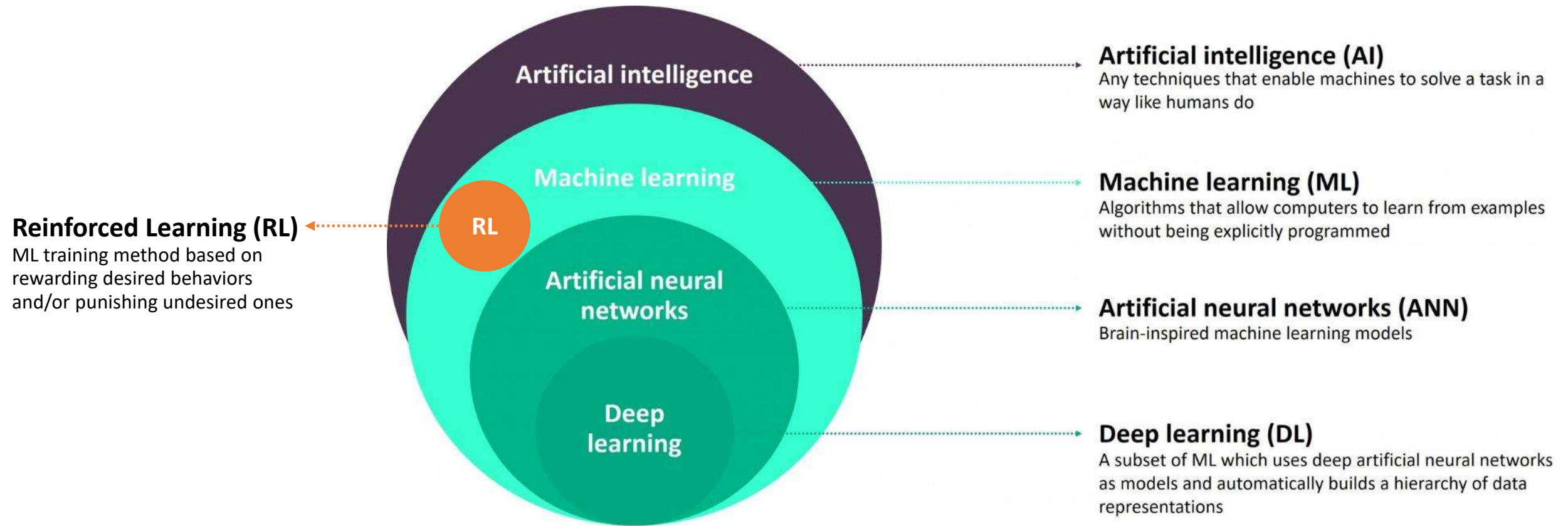
Benefits

- **Allows easy sharing of data**
- **Key enabler for smart water tools, e.g.:**
 - **Real-time water consumption known by consumers and utilities**
 - **Real-time signal of potential leaks**
 - **Real-time overview of sewage flows.**

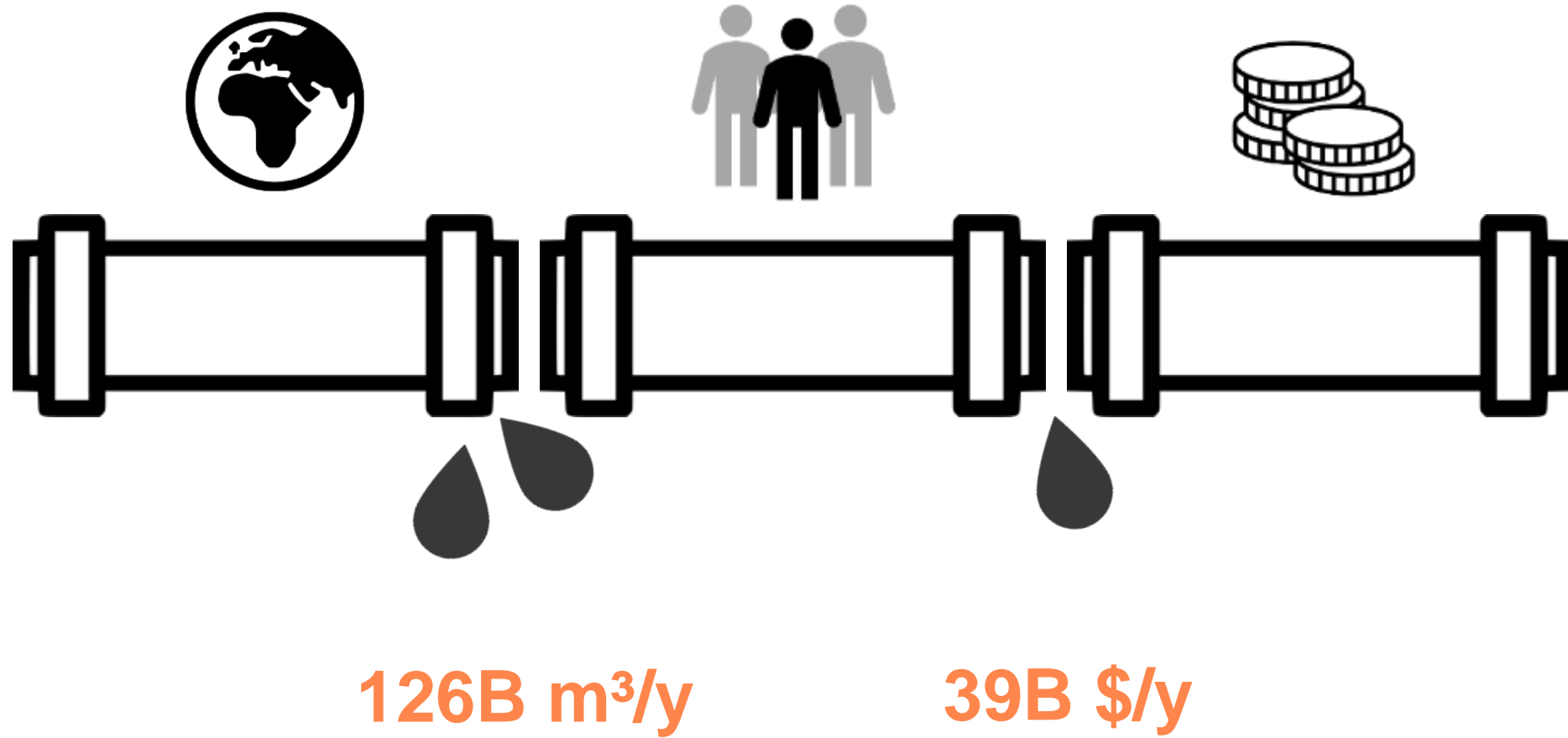
Important considerations

- **Data security**
- **Device management**
- **System integration**
- **Big Data management**

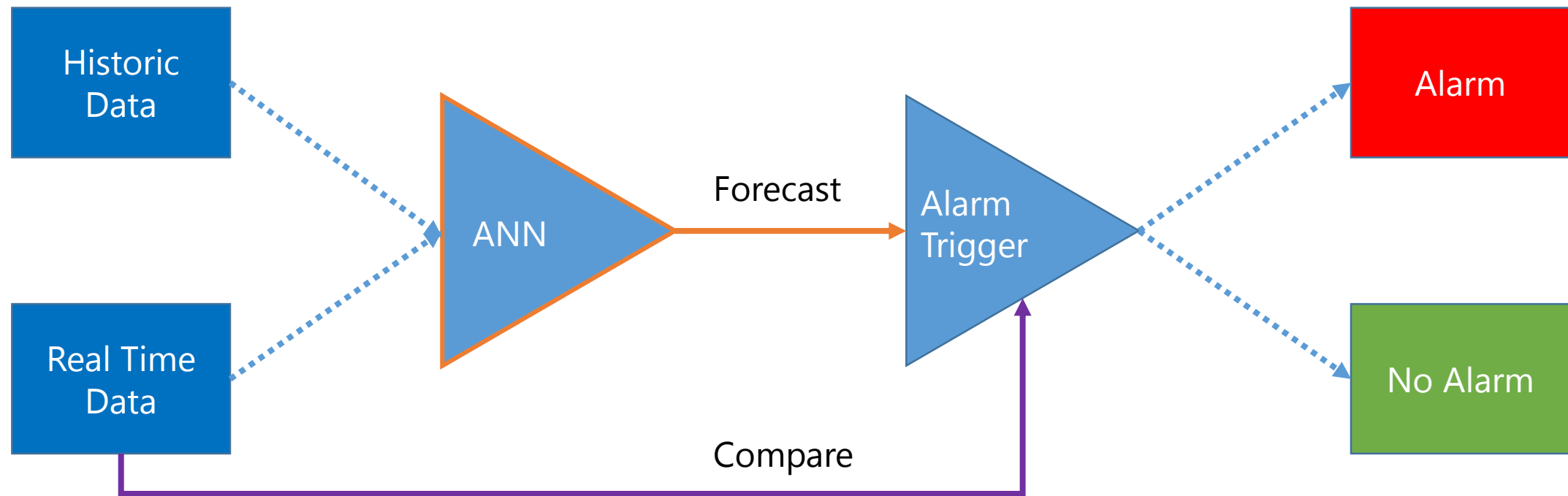
ANN, ML, RL, AI



Non-Revenue Water



Event Detection Systems



Smart Pressure Management

Pressure Management



- **Model Predictive Control**
- **ML assisted Software**
- **ANN assisted Software**

- **NRW reduction**
- **Reduction of surges and excess pressure**
- **Lower pipe failure rate**
- **Extended network lifespan**
- **Energy saving**
- **Improved customer satisfaction**
- **...**

Smart Active Leakage Control

Active Leakage Control

- **Non-acoustic (Gas, Video, Infrared, etc.)**
- **Listening stick / acoustic loggers**
- **Satellite Imagery**



ML assisted
Software

- **NRW-reduction**
- **Less infiltration from sewers**
- **Higher accuracy in leak detection and localisation**
- **Fewer undetected leaks**
- **Fewer work hours required**



Smart Asset Management

What it is and can do

- **Shifting focus from construction to rehabilitation and Asset Management**
- **AI-assisted software can prioritize assets better and take into account more factors including past events**
- **Case Study of a City in North America**
 - **77% reduction in pipe replacement costs**
 - **4X reduction in failures**



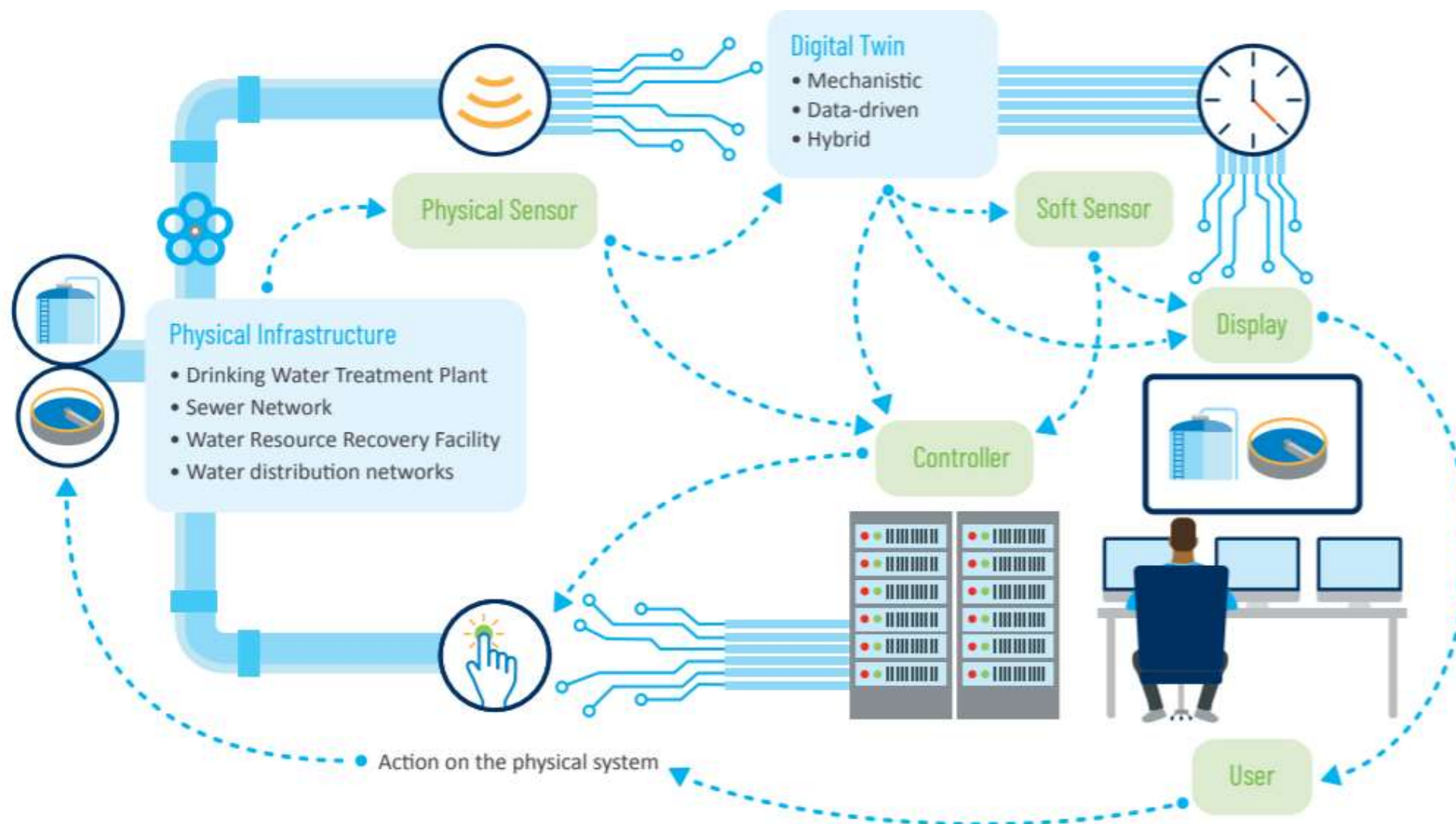
Requirements:

- **Data**
 - **IoT, Smart devices, Satellite imagery, Soil, Land use, etc.**
- **Smart software**

Benefits:

- **Prioritisation of replacements and key assets**
- **Minimisation of premature replacements**
- **Reduce large breaks**

Digital Twins





Please visit JASPERS websites
for more information about our
activities and projects:

<http://jaspers.eib.org/>

www.jaspersnetwork.org

Non Revenue Water

System Input Volume (Produced or Purchased Water)	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non Revenue Water (NRW)
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Meter Inaccuracies and Data Handling Errors	
		Real Losses	Leakage in Transmission and Distribution Mains	
			Storage Leaks and Overflows from Storage Tanks	
			Service Connection Leaks up to the Meter	

More Information



For info or further questions on this webinar please contact the JASPERS Networking Platform team:

jaspersnetwork@eib.org

JASPERS Networking Platform:

www.jaspersnetwork.org

JASPERS Website:

jaspers.eib.org

