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Smart Water Management

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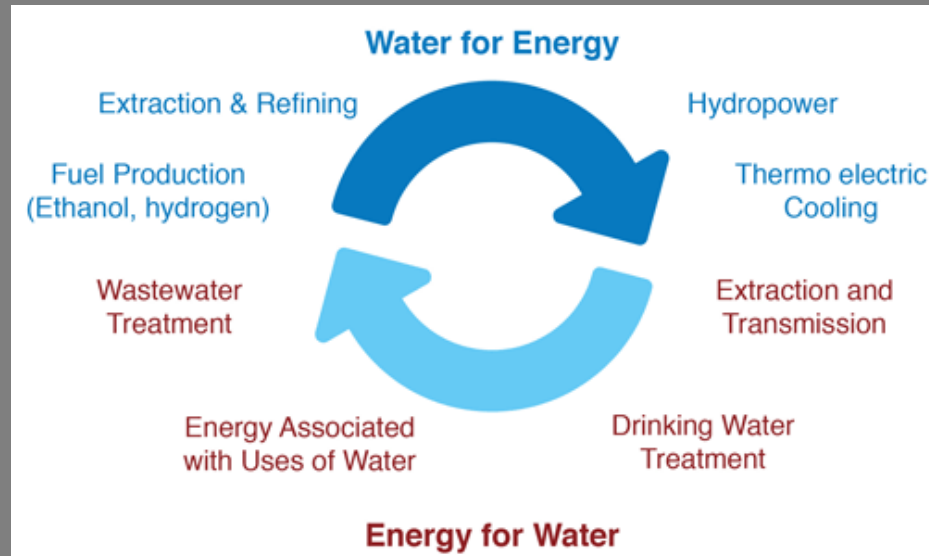
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Smart specialisation

Biological processes, water and energy

- Large infrastructure systems
 - Water supply
 - Wastewater treatment
 - (Organic) waste treatment

Water–energy nexus



Source: Water, Energy and Climate Change: A Contribution from the Business Community. World Business Council for Sustainable Development. 2009

<http://voxxglobal.com/2011/03/the-energy-water-nexus-an-emerging-risk/>

Water infrastructure

- Challenges in managing water infrastructure



Minimise **water consumption** and preserve water quality

- water losses within the network (30-40 % !)
- reduced consumption at clients

Minimise **energy consumption**

- pumping
- water distribution

Minimise **operating costs**

- maintenance costs due to aging water infrastructure, pipe burst events

ICT Water

- ICT technologies:
 - Sensor networks
 - Cloud Computing
 - Geographical Information System
 - Semantics
- Functionalities:
 - **Real-time** and increased granularity water data
 - **Better management** of water facilities
 - **Consumer involvement**

Distributed Water Infrastructure



http://www.kolektorsinabit.com/resources/files/pdf/Katalogi/Katalogi_EN/BF_brosura_ENG_koncna.pdf

Smart water metering

- Advanced Metering Infrastructure
 - Meter
 - Portal/Display
 - Collector/access point
 - Central unit
- Smart Water Meters within the water grid
 - Ground water reservoirs
 - Water treatment facilities
 - Homes and businesses
 - Factories
 - Wastewater treatment
 - Grey water resources

Smart Water Meter



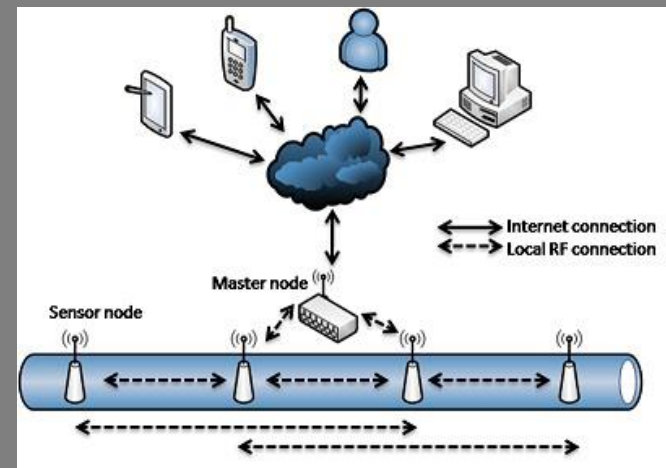
Smart instrumentation

- Smart Water Quality Monitors
 - Multi-probe sensors for hydraulics (pressure, flow), acoustics (hydrophone), water quality (pH, ORP, conductivity)
 - Wireless sensing node for sampling and transmitting data within the network
- Smart Pumps
- Smart Valves



<http://www.nrf.gov.sg/innovation-enterprise/singapore-technologies-innovations-showcase/physical-sciences-engineering/waterwise-water-monitoring-system>

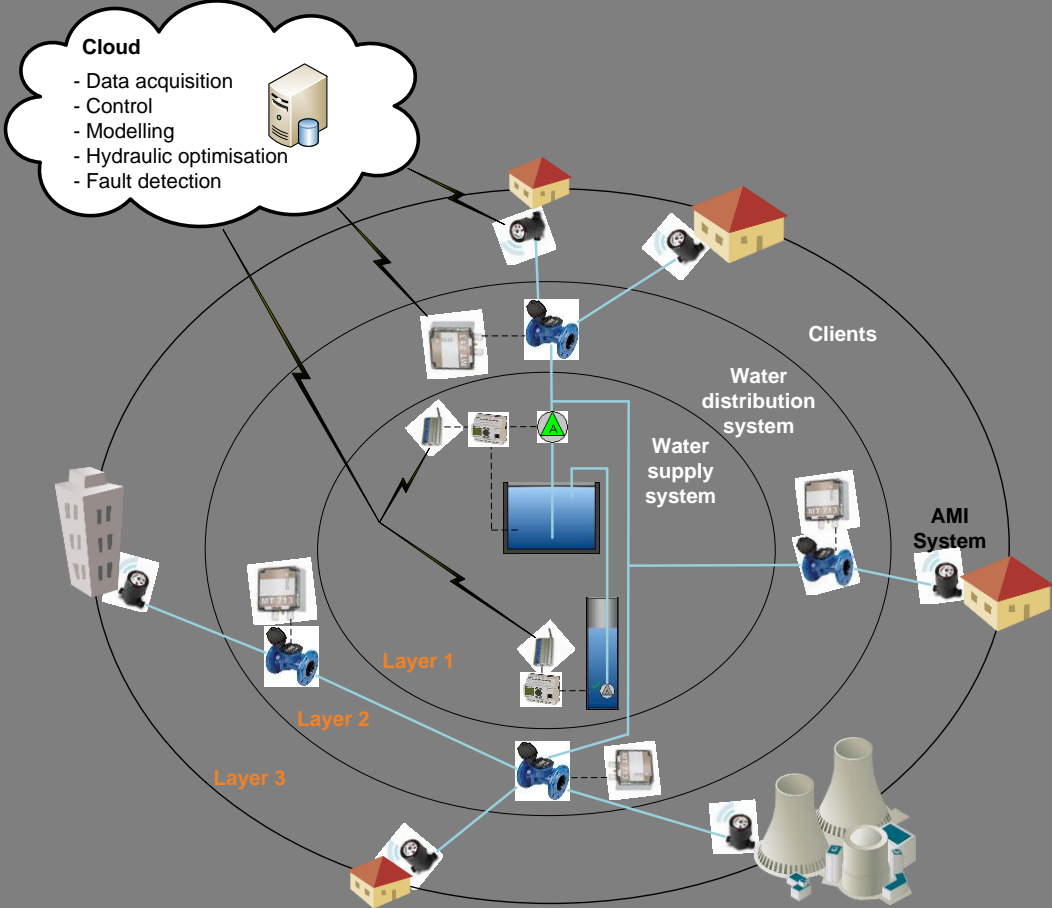
Smart Pipes



<http://www.mdpi.com/2224-2708/3/1/64>

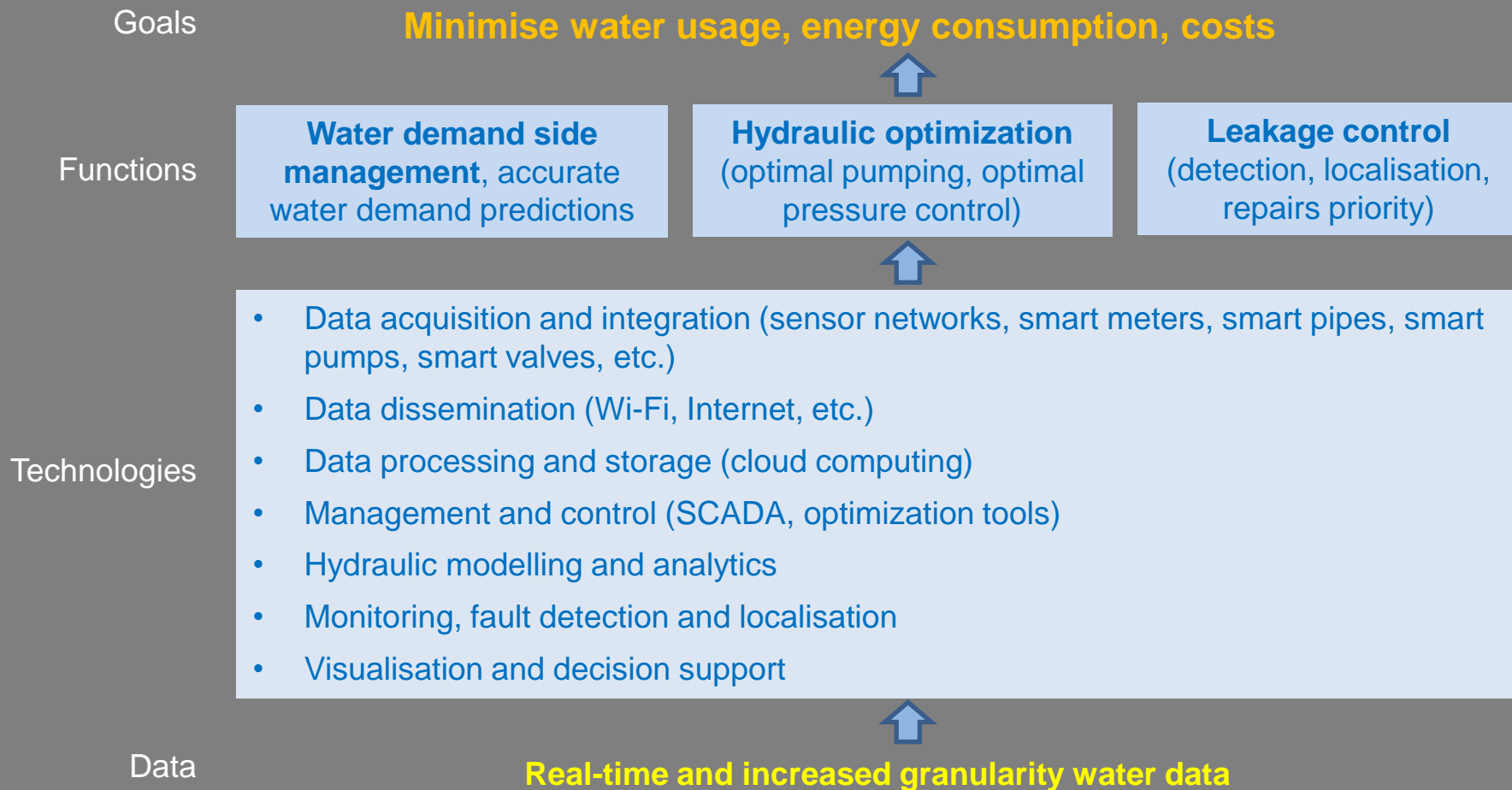
Next generation water management systems

Smart water grid



Smart Water Grid

Functionalities and technologies

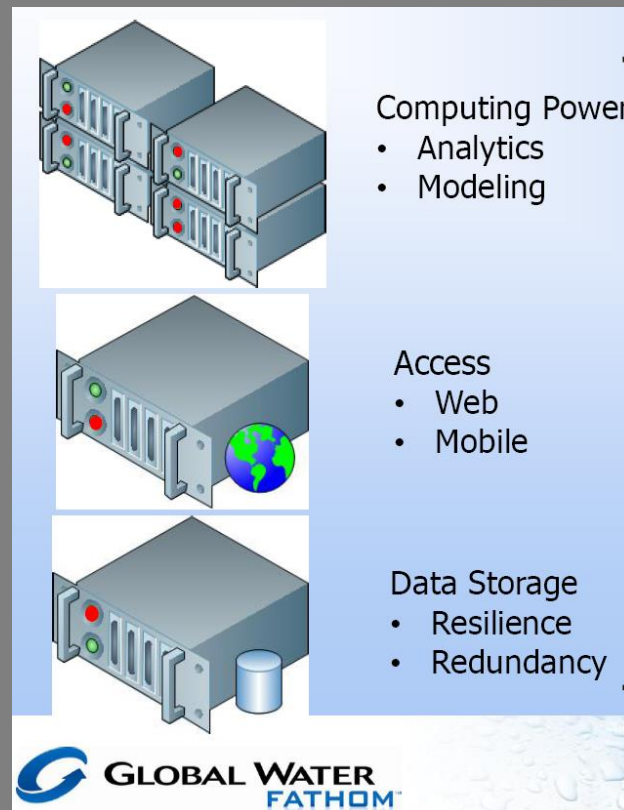


Smart Water Grid

Cloud Computing

- Collecting and sharing information by converting the data to services for different players within the water grid
 - utility companies
 - customers

Cloud Computing services



<http://watercluster.org/wordpress/wp-content/uploads/2013/07/Fathom-presentation-Trevor-Hill.pdf>

The 2020 Global Water Market Analysis

Source: Frost & Sullivan: Sustainable Water Treatment Technologies in the 2020 Global Water Market, May 2012

- **Smart Water Solutions (Smart Water Grid and Smart Water Metering)**
 - **Global Smart Water Grid Market** – strong growth, especially from 2015 onwards, by 2020:
 - 29% Smart water grid solutions
 - \$22.2B total market value
 - 14,4% CAGR 2010-2020
 - **Smart Water Meters** in 50 % Households by 2020 in Europe
 - \$7.8B market revenue (Europe)

Smart specialisation

Challenges

- Large investments in water and wastewater infrastructure in Slovenia
- New legislation addressing wastewater nutrient requirements coming into force in 2016
- Solutions and services for SE/global market



JP CČND



Smart specialisation

Project areas

- **Water distribution system** –
 - model-based hydraulic optimization aimed at low energy consumption and leakage detection
 - a 3-layer system integration
- **Wastewater treatment** - advanced control for low energy consumption and quality control
- **Bioenergy** - optimization of biogas production and preventing reactor failure in biogas plants and wastewater treatment plants



"There is a water crisis today. But the crisis is not about having too little water to satisfy our needs. It is a crisis of managing water so badly that billions of people - and the environment - suffer badly." World Water Vision Report

Thank You

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