



ITU Regional Workshop on “Prospects of Smart Water Management (SWM) in Arab Region” Khartoum-Sudan, 12 December 2017

ITU standardization works on SWM

Gopi Garge





Agenda

- Focus group on Smart Water Management (SWM)
- Objectives
- SWM Technologies and Tools
- Gaps in standardisation
- Conclusion

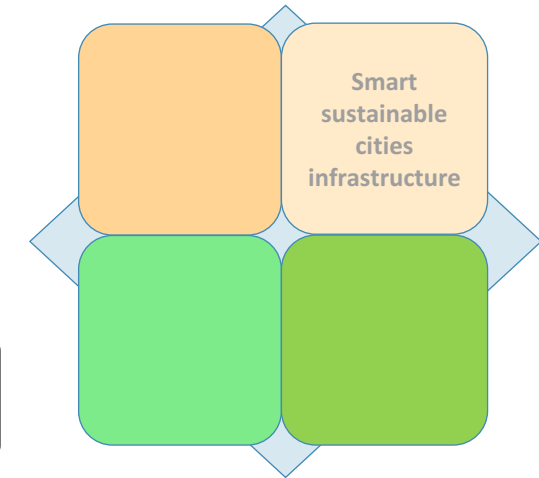
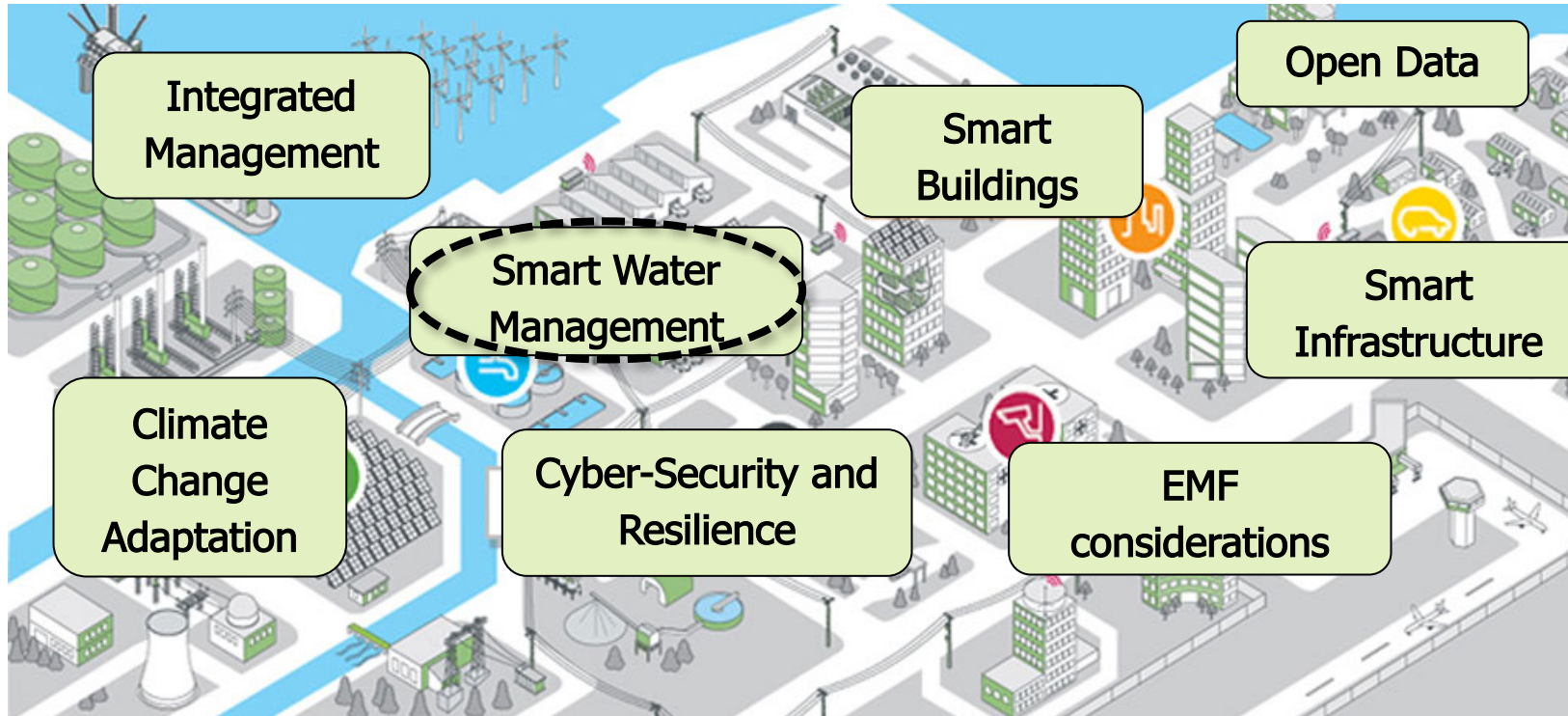




ITU-T FG-SWM

- Focus Group on Smart Water Management (FG-SWM)
- Established at the ITU-T TSAG meeting in Geneva, 4-7 June 2013
- Charter
 - Activities in SWM and Technical Specifications – Regional, National, and International
 - Roles of ICT in SWM
 - Map key stakeholders in ICT and SWM
 - KPIs for impact of ICT in SWM
 - Methodologies for estimating impact of ICT on water conservation
 - ICT applications for SWM, interoperability and scalability
 - Address standardisation gaps to identify work items for ITU-T SG5 (Env and Climate Change)
- Completed March 2015
- **ITU-T Y.4550-Y.4699 – Smart water management in cities**

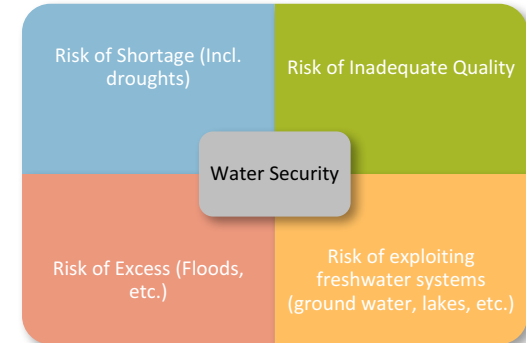
Areas of WG2 TRs



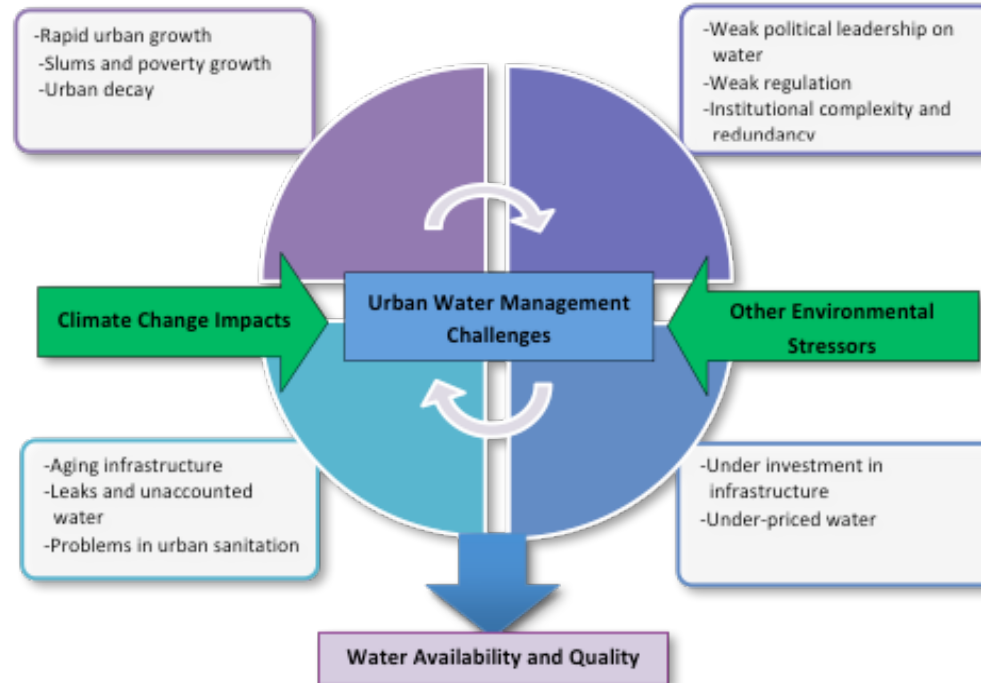
Source: Cristina Bueti, **Overview of the activities of ITU-T Focus Group on Smart Sustainable Cities**

Water Management - Context

- Water Security
 - *Tackling water-related challenges from an integrated, holistic perspective, considering both acceptable levels of risks, as well as their potential consequences (economic, environmental, social) on urban stakeholders*
- Urban water management challenges
 - Rapid Urbanisation
 - Governance & Leadership
 - Investments
 - Water utilities & infrastructure
 - Water availability & quality
 - Climate change



OECD report "Water Security for Better Lives"



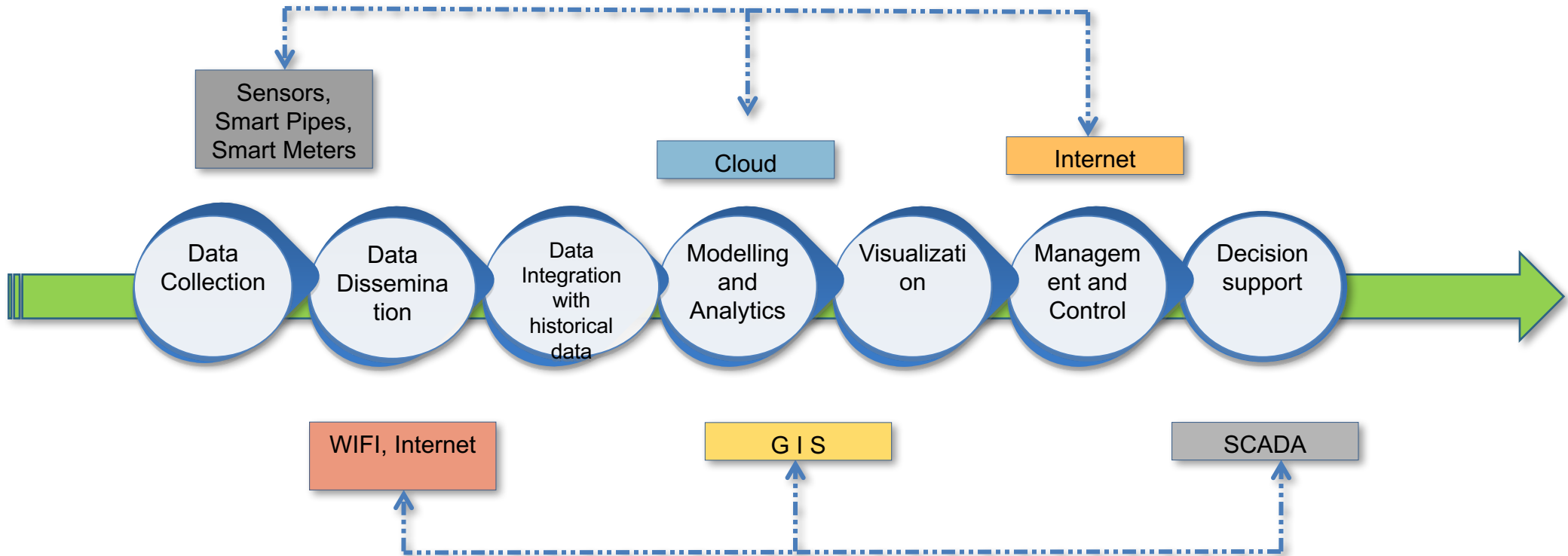


To Achieve..

- Access to Water & Sanitation infrastructure & Services
- Manage rain, storm and waste water and run off policies
- Mitigate floods, droughts and water-borne diseases
- Safeguard water resource from deterioration

Source: ITU-T Focus Group on Smart Sustainable Cities: *Smart water management in cities*

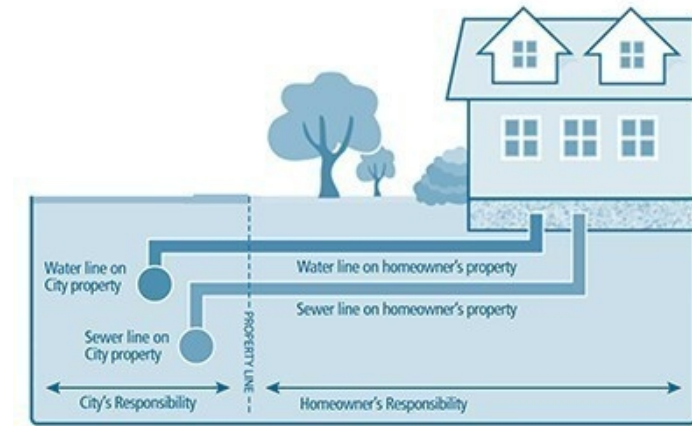
SWM Technologies & Tools



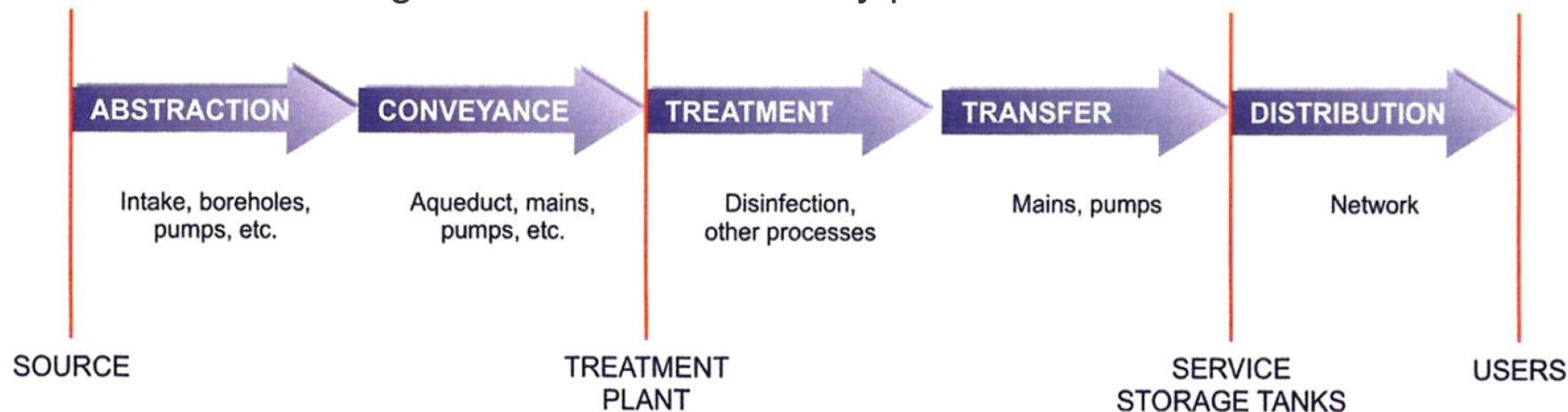
Source: ITU-T Focus Group on Smart Sustainable Cities: *Smart water management in cities*

SWM Characteristics

- Architectural similarities with Smart Grid
- Provider domain and user domain; each have their own concerns
- Somewhat similar delivery network infrastructure with metering (AMI)
- Monitoring at provider end as well as monitoring at user end
- User data sharing and actuation control by provider?



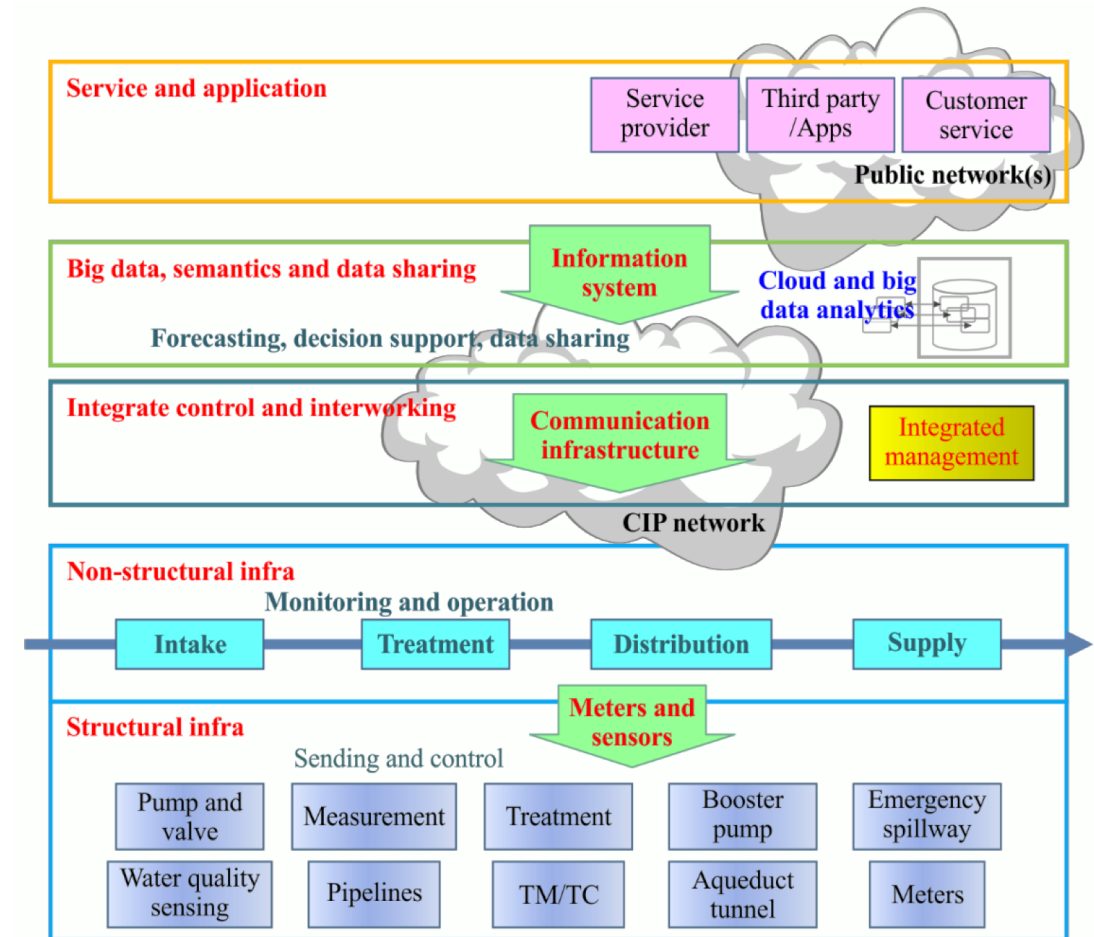
Source: pnewswire.com



Source: Đurin, B.; Margeta, J. Analysis of the Possible Use of Solar Photovoltaic Energy in Urban Water Supply Systems. *Water* **2014**, 6, 1546-1561.

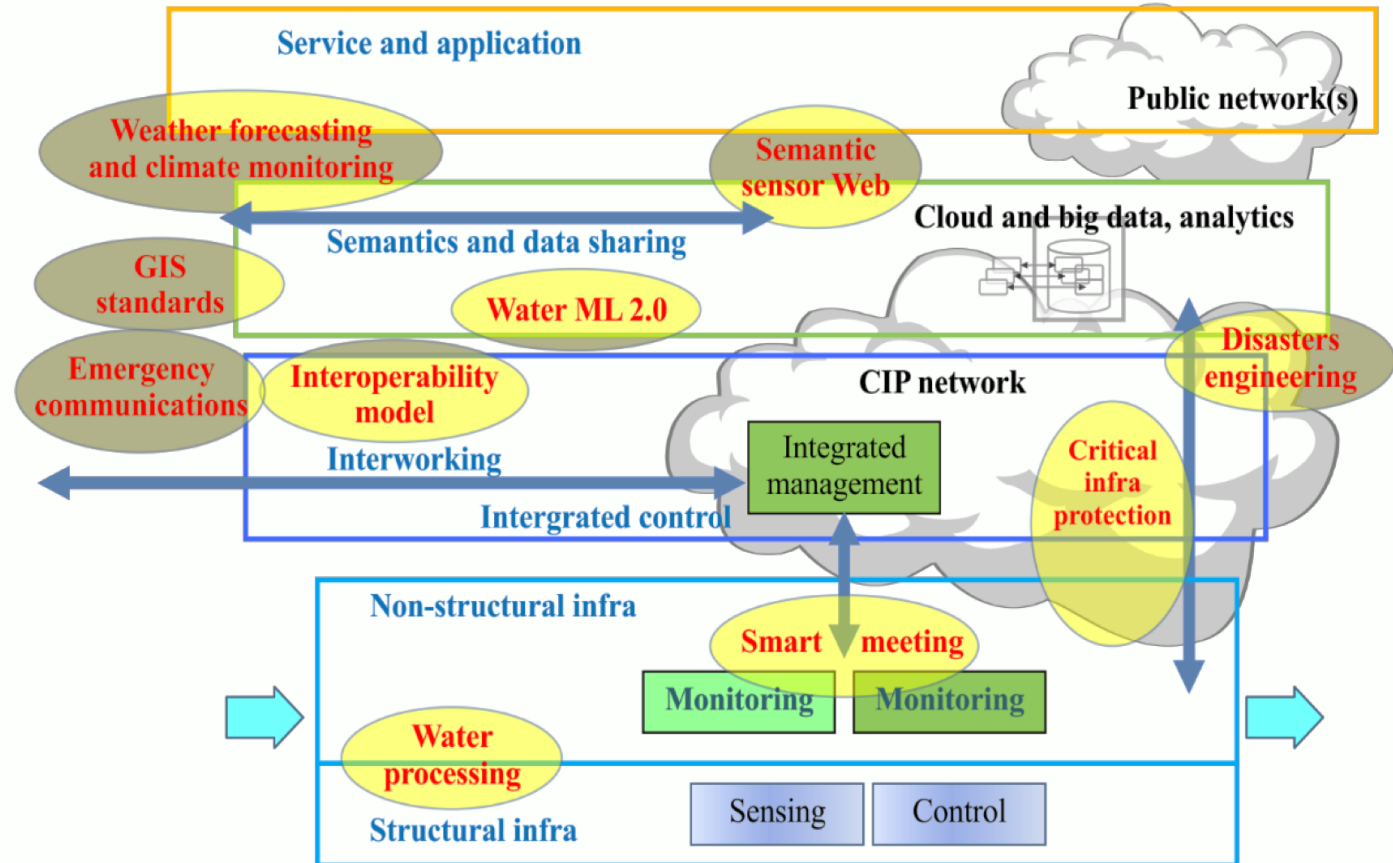
Standardisation gaps

- ITU-T L-series Recommendations – Supplement 14
- ITU-T Y Suppl. 36 , ITU-T L Suppl. 16 (SWM – technologies and functions)
- Layers in the conceptual model
 - Water Infra Layer
 - Structural infra layer
 - Non-structural infra layer
 - Tools - Meters and Sensors
 - Integrated control and interworking layer
 - Communication infrastructure
 - Critical infrastructure Protection (CIP)
 - Semantics and data sharing
 - Information Systems
- Three layers addressed in this supplement



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- Interworking and integrated control
 - Emergency communication
 - CIP & disaster Engineering
 - Interoperability reference model
- Water management infrastructure
 - Smart metering, AMI
 - ISO/IEC for water processing JTC1
- Semantics & Data sharing
 - Water ML
 - Semantic sensor web and platform
- Service and Application
 - Climate change and weather monitoring for forecasting
 - GIS



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SDOs & activities relating to SWM standardisation



Architectural Category	Technical Area	SDOs	Activities
Integrated control and interworking	Emergency Communication	ITU	WRC646 / Narrowband PPDR
		ITU-R WP5A	Broadband PPDR ¹ M.2015 M.2009 M.2219
		IEEE	802.16, GRIDMAN ²
		OMA	PTT over Cellular
		3GPP	D2D(device to device), ProSe (Proximity based service), GCSE (Group communication), IOPS (isolated E-UTRAN for public safety), MCPTT(mission critical PTT)

¹ - Public Protection and Disaster Relief

² - Greater Reliability In Disrupted Metropolitan Area Networks





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Architectural Category	Technical Area	SDOs	Activities
Integrated control and interworking	Disaster Engineering and Critical Infrastructure protection	NIST	SP-800-53 - Information security for industry network, SP-800-82 - SCADA & industrial control system security
		NERC	CIP 001-4-009-4 - Reliability/ Security measures for CIP
		NRC	10CFR 73.54 & RG5.71 - Cyber security for CIP
		ISA	ISA-99 FR1~FR7 - Industrial control security
		ISO	IWA6:2008 - ISO International Workshop Agreement: Crisis situations



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Architectural Category	Technical Area	SDOs	Activities
Integrated control and interworking	Interoperability model	NIST/SGIP	PAP - Identifying priority issues & action plan for interoperability of smart grid
		ITU-T	SWM - Categorization of stakeholders
Big data, Semantics, and Data sharing	Water ML	OGC/ISO	Water ML 2.0 part 1, ISO 19156 - Water data sharing /inter-operability
		WIRADA ¹	WDTF - Water data sharing /inter-operability
	Semantics Sensor Web, and platforms	OGC	SWE - Enable sensors applications via the Web
		IETF	GEOPRIV – URI for geo-location

Water Information Research and Development Alliance, Water Data Transfer Format (Australia)



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Architectural Category	Technical Area	SDOs	Activities
Big data, Semantics, and Data sharing	Semantics Sensor Web, and platforms	W3C	RDF/OWL - Resource description/ Web ontology
		WatERP/ FP7	Semantics platform - Water management with semantic data
Water management Infrastructure	Smart metering, AMI	CEN (OMS/FIG AWA/KN X/ZVEI)	ENI 3757 - Data transmission between smart meter and data concentrator.
	Water processing	ISO/IEC	TC5, TC23/SC18, TC30, TC113, TC138, TC147, TC153, TC207/SC5, TC211, TC282, PC253



Conclusion

- FG SWM is under ITU-T SG 5
- Works with FG SSC, also under ITU-T SG5
- ITU-T SG20's outputs will benefit SWM immensely, specifically layers:
 - Integrated control and interworking
 - Big data, Semantics, and Data sharing
- ITU-T SG20 - IoT and its applications including smart cities and communities (SC&C)
- Identification of the SSC ecosystem partners for SWM and defining a reference architecture for interoperability and data sharing is critical



Thank You





Backup slides

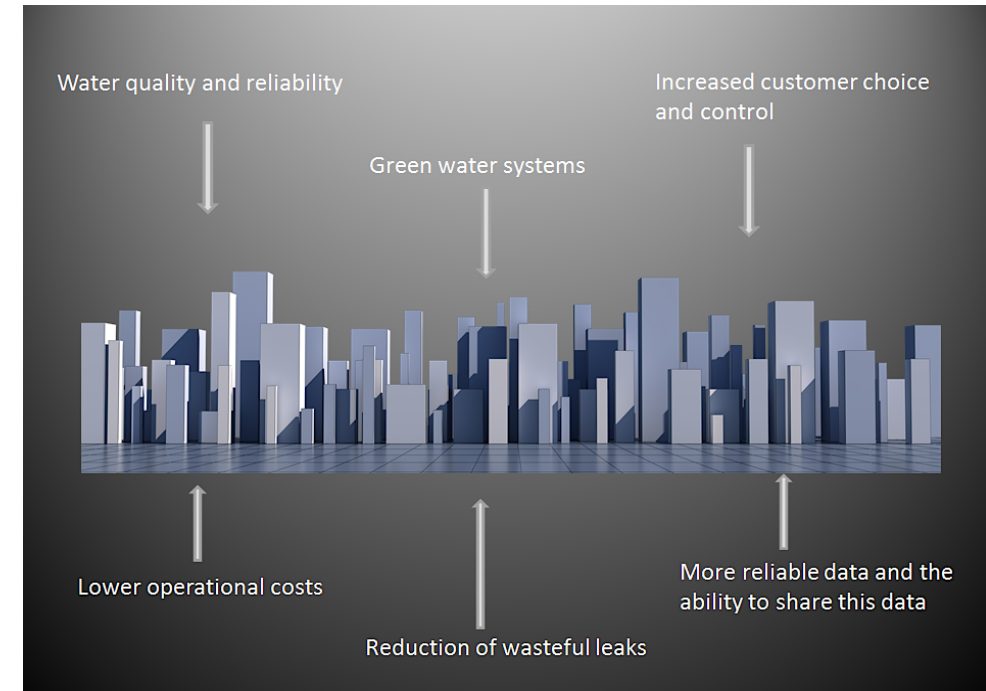


SWM technologies:

- Sensors and sensor networks
- Smart pipes
- Smart metering
- Communication modems
- Geographic information systems (GIS)
- Cloud computing
- Supervisory control and data management (SCADA)
- Models, optimization tools and decision support
- Web-based communication and information system tools

SWM integration:

- Intelligent solutions in urban water management
- Remote monitoring solutions to urban wastewater management technologies for urban flood management
- System tools





SWM technologies in literature



TR7/WG2 – multi-service infrastructure

- TR7/WG2 – multiservice infrastructure
 - *How should ICT infrastructure be planned for a new city given that it has to be both smart and sustainable?*
- TR9/WG2 – Integrated management for SSC
 - access and integration of city information resources;
 - network service of the model of city analysis and decision-making;
 - typical applications of comprehensive management and smart decision-making

