JWRC
Japan Water Research Center

Smart Water Metering in Japan

Japan Water Research Center

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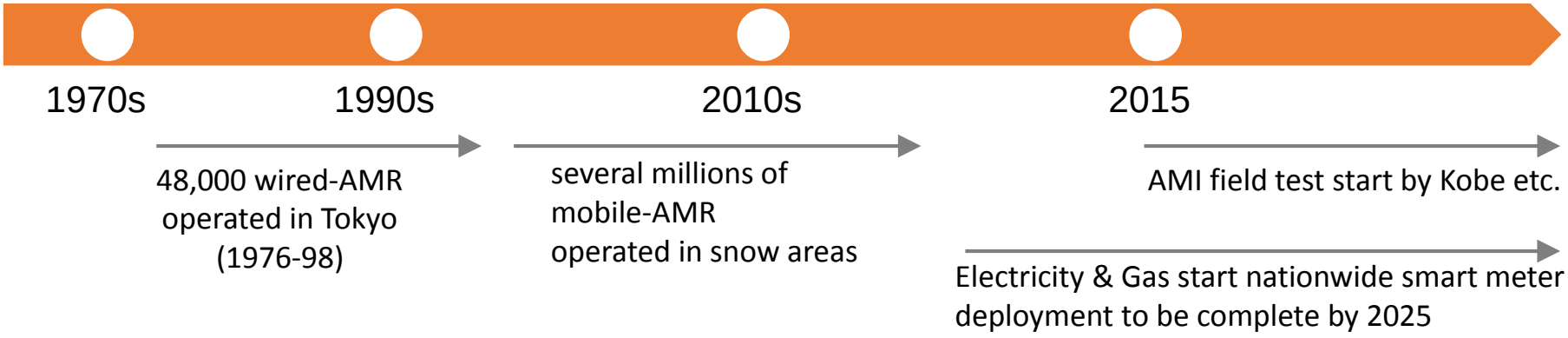
AMR : Automated Meter Reading
AMI : Advanced Metering Infrastructure

Overview of Smart Water Metering in Japan

Water supply

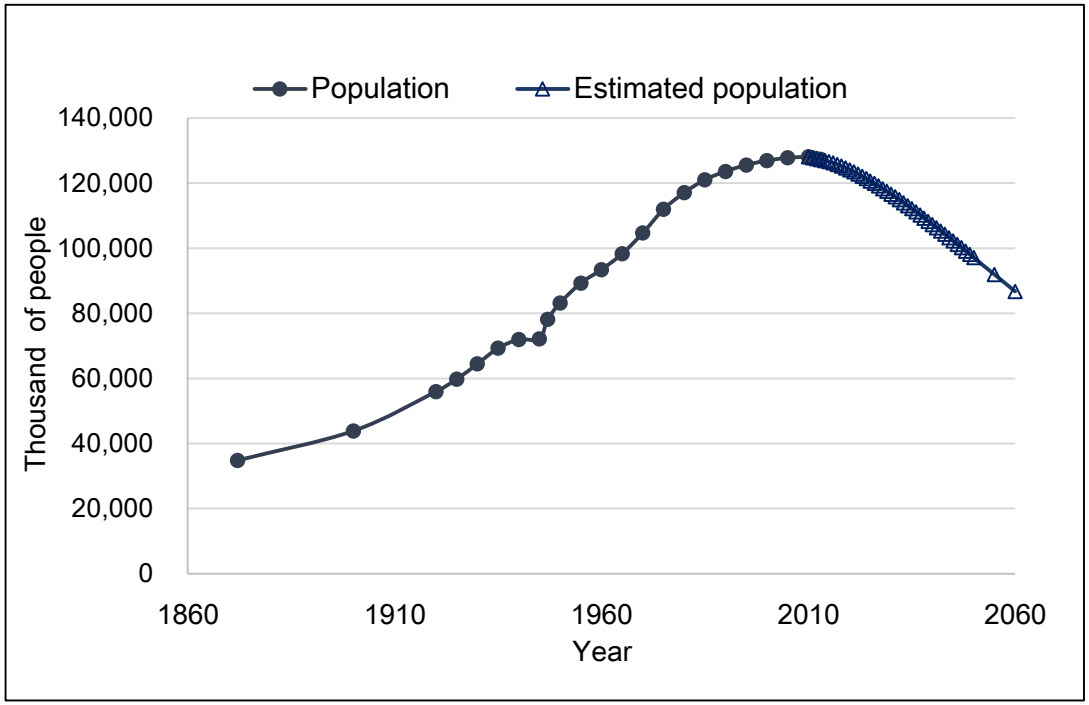
- Population decline impacting supply demand and utility revenues
- 97% water supply coverage = 97% meter penetration
- Meters reads normally done manually every 2 months
- AMR adopted in heavy snow areas and by some progressive utilities
- 1,400 large water supplies (serving > 5,000 people) = difficult to have one standard system
- Limited number of utilities engaged in AMI field tests



Necessity & Potential Benefits of Smarter Metering

Necessity

Population decline: difficult to project "reduction in demand"
→ Important to understand individual water use accurately and more frequently



Population trend and projection in Japan
(Source: National Institute of Population and Social Security Research)

Benefits

- Better planning of system downsizing and infrastructure renewal
- Better demand forecast per distribution block and time of the day
- Effective pressure control
- Prompt leakage detection on service and distribution mains

Current Status of Metering Efficiency – AMR (1)

Automated meter reading adoption very limited. Why?

- With 97% of properties already metered, new installation would involve large initial cost
- Manual reading is so common (70% of total) that its outsourcing is affordable.
- Bimonthly reading being a long-standing practice, few utilities are motivated for more frequent data collection (reading for billing, not for management planning!)

Current Status of Metering Efficiency – AMR (2)

A. Period
B. No. of properties
C. Objective
D. Remarks

Hokkaido **Sapporo**

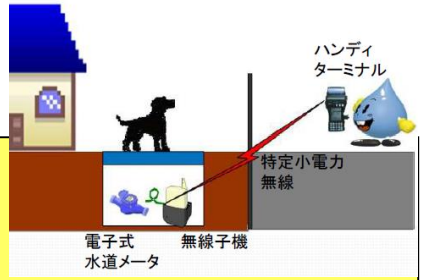
A. Since 1998
B. 56,000 properties
C. Heavy snow area; Improved reading efficiency
D. Meter reading by mobile device

Wakayama **Koya**

A. Since 2000
B. 1,700 properties
C. Improved reading efficiency
D. Automatic remote reading via cable

Nagano **Tateshina**

A. Since 1996
B. 2,600 Properties
C. Improved reading efficiency
D. For water and gas using cable broadcasting



Tokyo

A. Since 2010
B. 57,000 properties
C. Mitigate reading difficulty, Improved efficiency
D. Meter reading by mobile device

Source: Made by JWRC

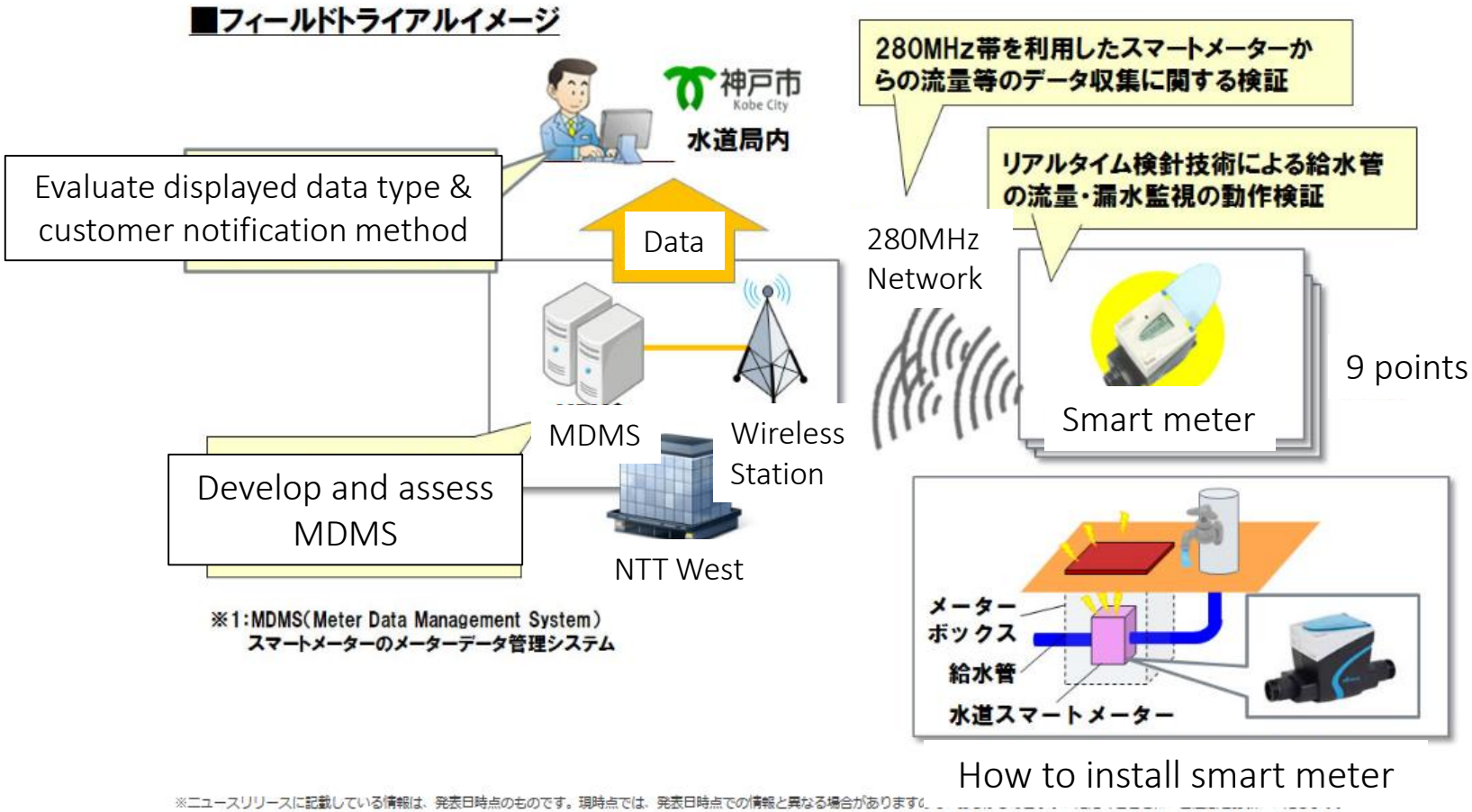
Current Status of Metering Efficiency – AMI (1)

	Tokyo Waterworks Bureau	Yokosuka Waterworks Bureau	Yokohama Waterworks Bureau
Period	Sep 2014 – Jan 2016	Apr 2016 – Mar 2019	Apr 2015 – Mar 2016
What to do	1. Visualization of water use at property through in-house device and Internet 2. Email alarm to customers about unusual water consumption	Smart meter installed at 200 properties using wireless communication (u-bus air); assess technology and data processing	Smart meter and electric meter installed at apartment buildings; connect both to the same transmitter and compare efficiency and reliability between property-visit reading and of wireless automated reading
Partner	• NTTPC Communications • OKI (Oki Denki Kogyo)	• Daiichi-Kankyo Corporation	• Tokyo Gas • Hitachi

Source: JWRC's 1st smart water metering committee

Current Status of Metering Efficiency – AMI (2)
[Example] AMI field test by Kobe Waterworks Bureau

[Remote data collection of water flow] (Once wireless station approved - Mar 2017)
Smart meter installed at 9 points; 280MHz wireless network



Source: Website of Kobe waterworks Bureau (published July 2015)

Issues & Concerns of Smarter Metering (1)

Q. What would drive smart water meter use? (96 respondents; mostly water utility staff)

52% cost-related

19%	Lower cost driven by technology development
19%	Cooperation with elec. & gas industry
14%	Reliable financial & cost-benefit assessment
11%	Safe & optimized data transmission system
10%	More examples of actual installation and use
10%	Mitigation of security risks
8%	Standardization of related meter specifications
8%	Longer statutory meter use period
1%	Human resource development

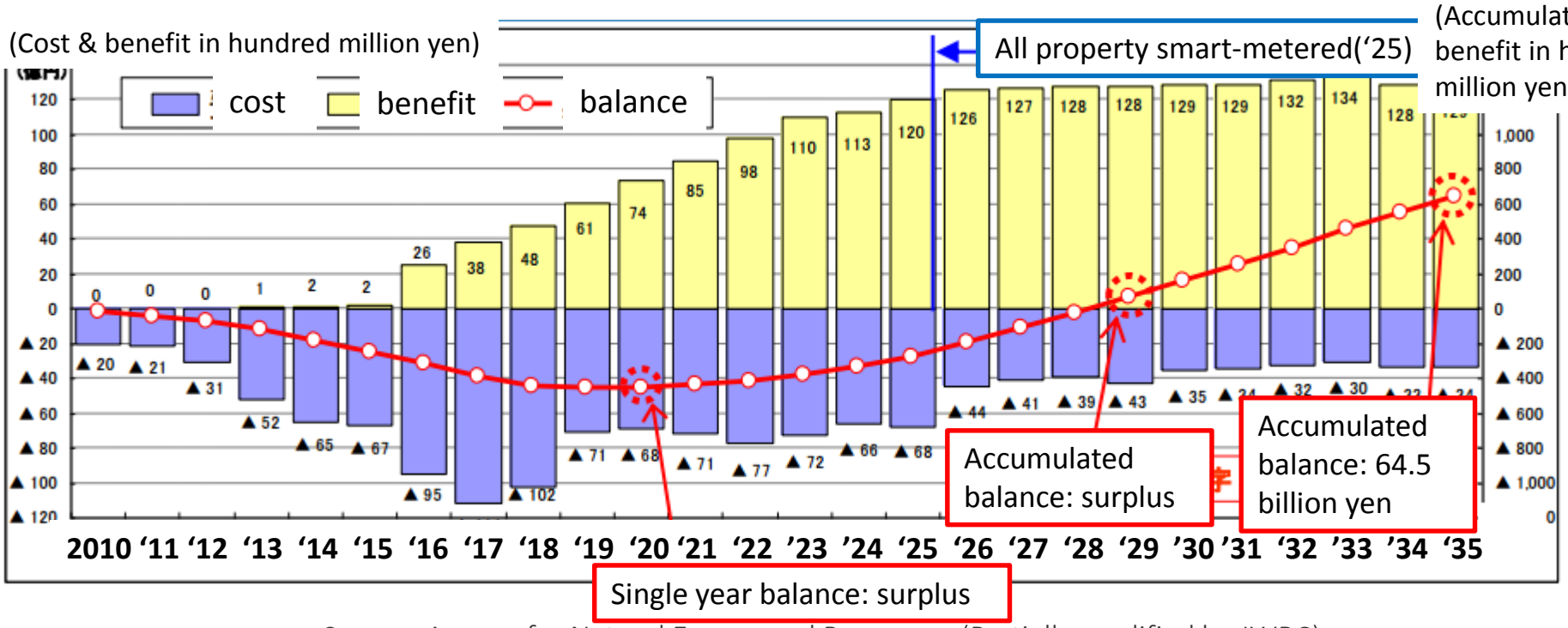
Source: Questionnaire responses from attendees of JWRC's 5th smart water meter study group

Issues & Concerns of Smarter Metering (2)

Water utilities concerned about cost-benefit aspect: Electric industry expects positive impacts

Cost-benefit analysis by Kyushu Electric Power Co.

- Improved metering efficiency starts generating benefits 10 years after installation begins
- In 2035, accumulated balance reaches 64.5 billion yen surplus (= 79.6 million AUD)



Source: Agency for Natural Energy and Resources (Partially modified by JWRC)

Smart Water Meter Study Group

Activity

JWRC organized a smart water meter study group for 3 years until March 2015, inviting speakers from national government, utilities and corporations (6 times, 100 attendees each).

http://www.jwrc-net.or.jp/kenshuu-koushuu/handout/smartmater.html

Objective

- Understand current situation and related technology
- Provide opportunities for public and private entities to share and discuss related information
- Have a better idea of how smarter metering for water supply could be achieved in Japan

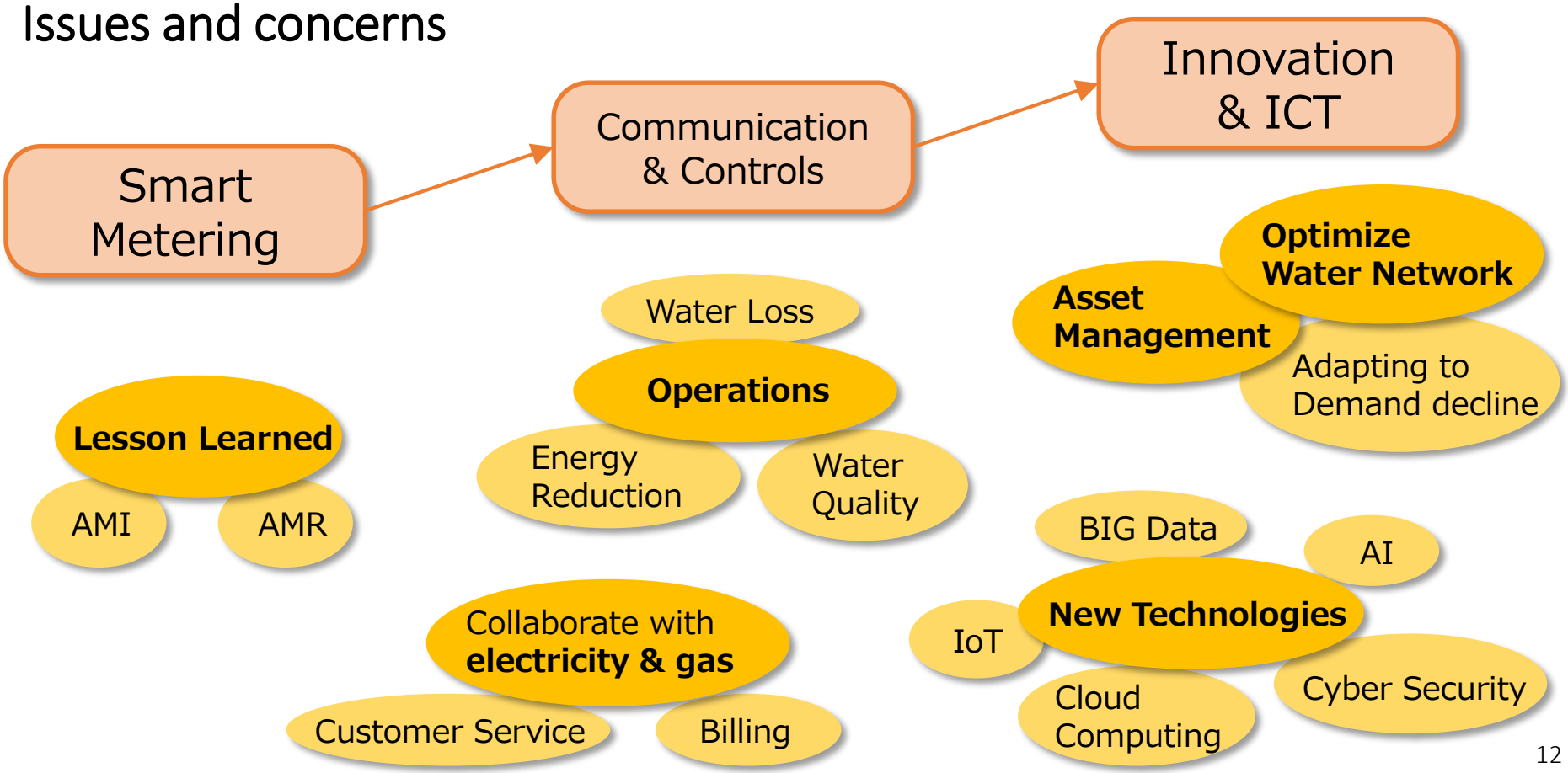
Discussion topics

1. Current metering practice
2. ICT Technology
3. Benefits of smart metering
4. Challenges for smart metering

Smart Water Metering Committee

In November 2015, JWRC set up a smart water metering committee with water utilities conducting AMI/AMR field tests to share progress and discuss potential standardization.

Issues and concerns



Conclusion

- Government plans a nationwide roll-out of smart meters to electricity customers by 2025
- AMI field tests for Smart Water Metering are going to start
- There are concerns about roll-out benefits of smart water meters as most properties are already metered and new installation would involve large initial cost
- Water Metering Committee looks into case study projects, reporting on how smarter system could benefit utilities in terms of system downsizing, demand forecasting, effective pressure control and prompt leakage detection