

For Smart Distribution Network Management in Japan

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1. Introduction

With dwindling national population and aging system components posing major challenges for sustainable water supply in Japan, it's essential for utilities to carry out more efficient distribution network management. In this relation, the Japan Water Research Center has been actively researching smart water system, studying potential areas for ICT integration and related benefits, having described once an "ICT-based water supply system in future". This paper discusses our field experiment concerning smart metering system.

2. Method

Smart water meter (AMR type) was installed at all the 106 premises in a village's DMA along with water pressure gauge on 30 fire hydrants. Then minute-by-minute water usage data were collected for 40 days and the result was analyzed together with distribution volume over the same period.

3. Result

During the data collection period we detected water hammers. Owing to the minute-by-minute usage data, its cause was identified to be abrupt inflow and interruption of water entering storage tanks at some premises. Therefore by adjusting the inlet valves adverse impact on distribution network was minimized (Figure 1). In addition, we successfully demonstrated the potential of putting the similar type of distribution network into practical use and their expected benefits.

4. Thought

Using ICT was confirmed effective to some extent to overcome difficulties with distribution network management. Also, close monitoring of changing water demand allowed us to confirm that smart meters would increase efficiency of network management and customer satisfaction.

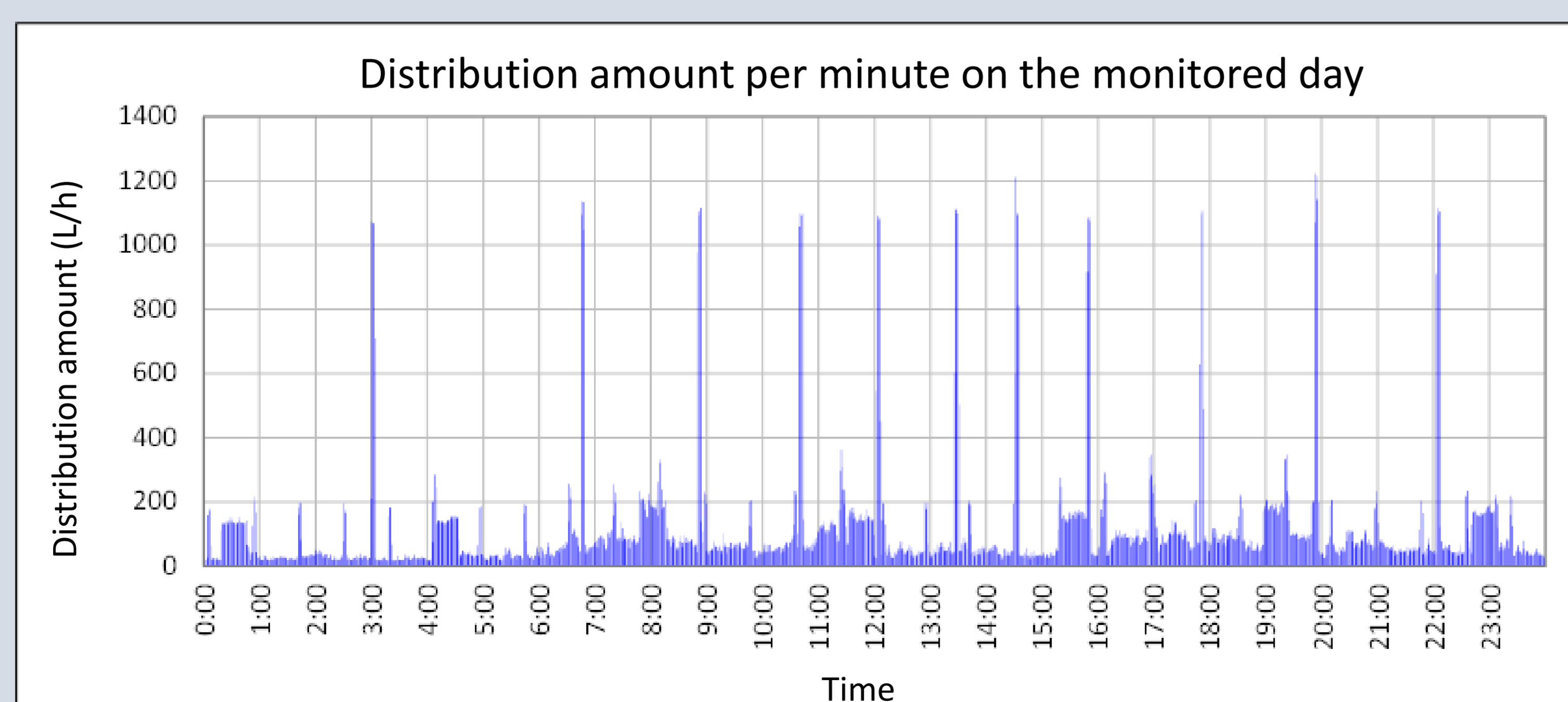
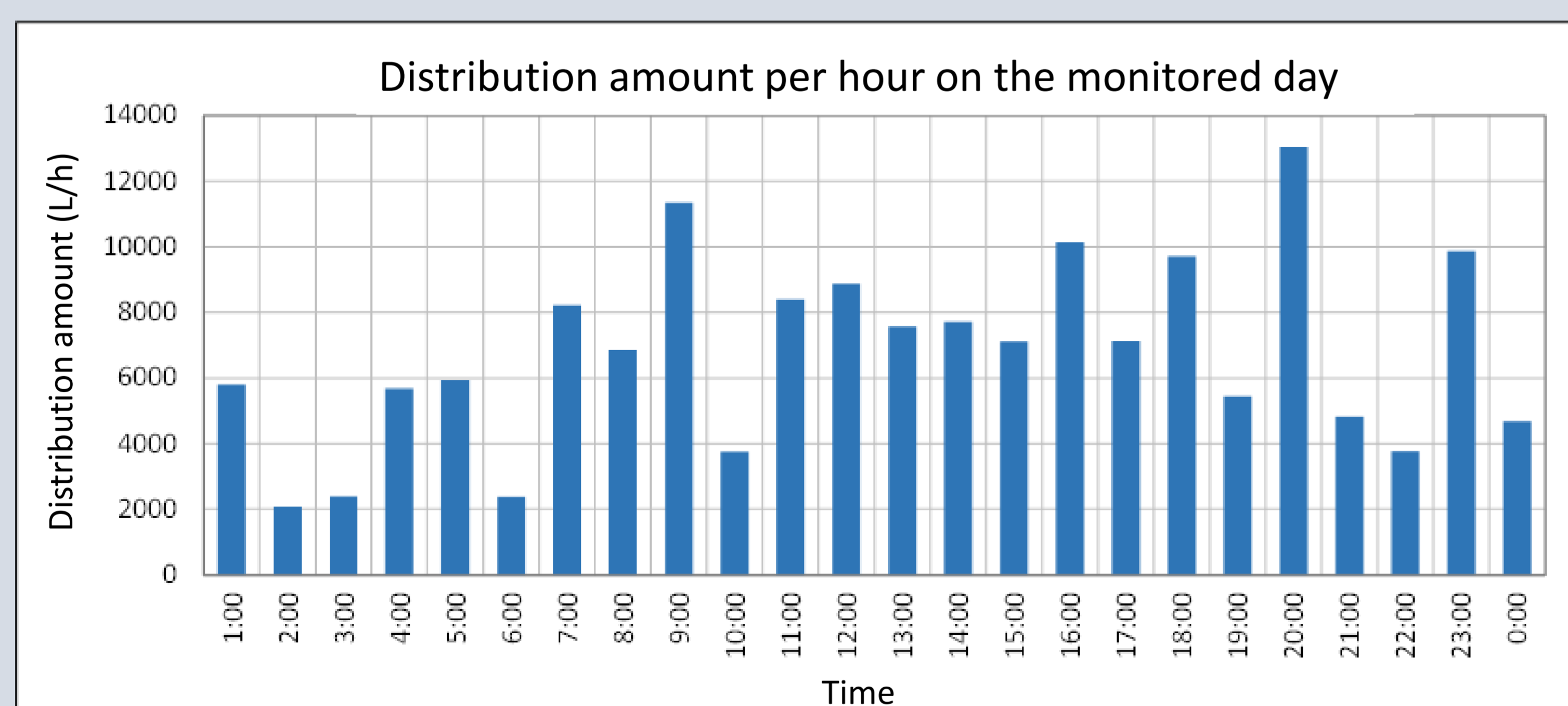
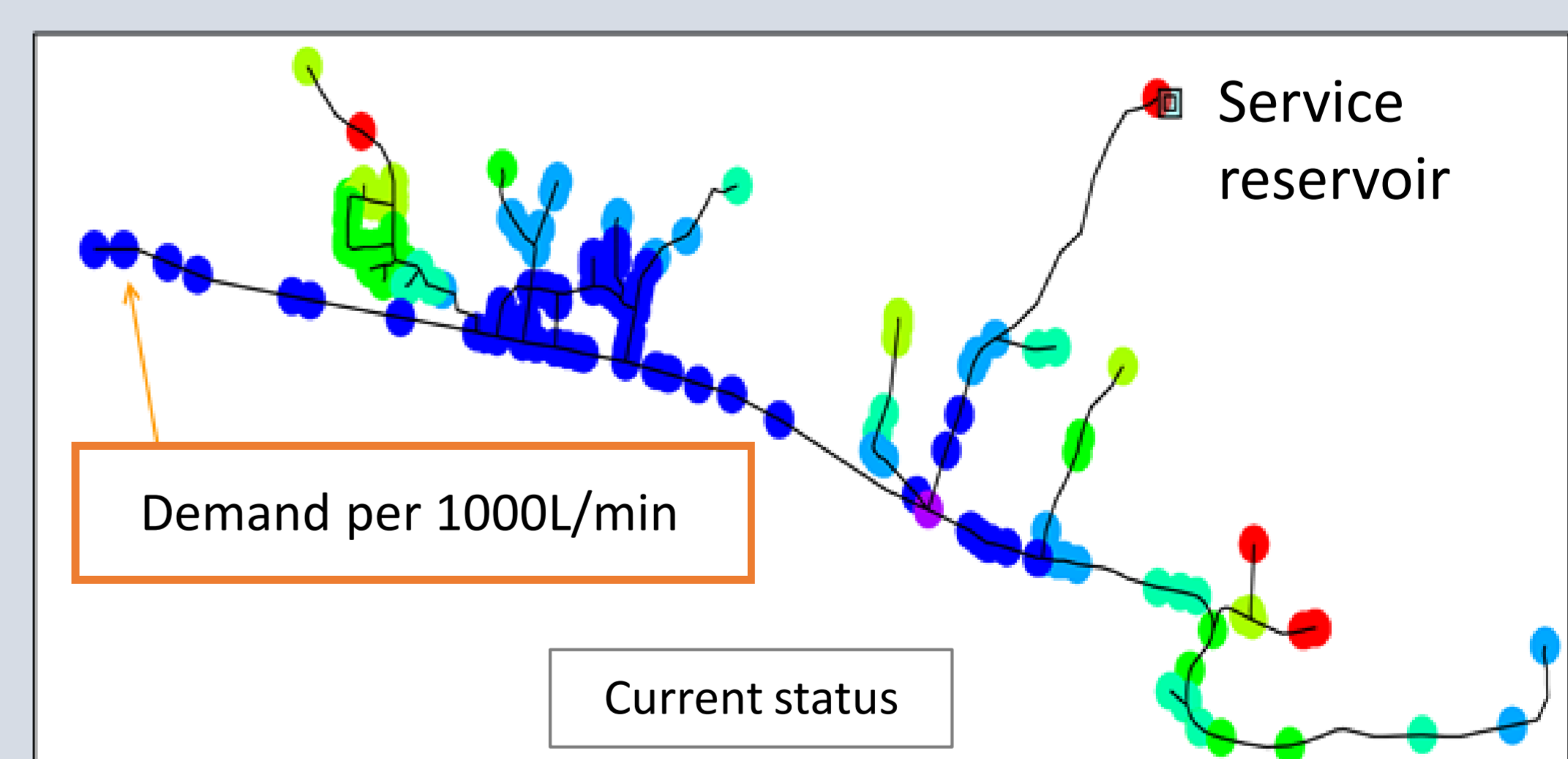


Figure 1. Example of monitoring and understanding the amount of water consumption by smart meters



→ Adverse impact on the distribution network was minimized by adjusting the inlet valves of the storage tanks on the consumer premises

About Japan

100% penetration rate of conventional mechanical meters is considered the biggest reason why smart meters are rarely used in Japan as they limit values of smart metering system. With electricity industry set to install smart meters nationwide by 2023, however, it's now necessary to consider whether water, electricity and gas industries could share metering system for enhanced efficiency.