Smart Water Networks:
Integrated Metering, Leak Detection, and Network Management Solutions

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The BlueTech® Tracker Webinar series continued in June with *Smart Water Networks: Integrated Metering, Leak Detection, and Network Management Solutions* moderated by Heather Landis, an O2 Environmental TAG Partner. There is considerable hype around the term "smart water", but it is often mistakenly used to indicate simply advanced water metering. This webinar brought together panelists from the Smart Water Network (SWAN) Forum, IBM, Global Water Resources, and American Water to share their expert insights into the innovation going on in the smart water space.

Smart water networks are about a lot more than meters.

Guy Horowitz of Takadu and the SWAN Forum kicked off the session by explaining what the term smart water network means from the perspective of SWAN. He clarified that the sensing tools (e.g. flow meters, pressure meters, etc.) and network operation control systems that are commonly recognized as the "smart" part of the network are just the tip of the iceberg. The information is transferred by collection and communication systems, organized in management and display systems, and synthesized with information from many other sources and ultimately analyzed towards actionable information. In other words, it is about a lot more than smart meters.

Increased availability of data and the quality of the analysis is now leading to leak detection through mathematical modeling and improving customer awareness, resulting in demand side reduction.

Geoff Riggs from IBM discussed the exponential growth in smart water network in specific areas such as increasing numbers of sensors and meters, higher frequency of sensor and meter readings, optimization of these systems, and increased integration of all the systems involved. Mr. Riggs explained as the amount of knowledge grows and the fusion and analysis of this knowledge improves, potential leaps forward such as leak detection using mathematical modeling of flow and pressure data become possible. Guy Horowitz also noted that this enhanced utilization of existing data is more cost-effective than online installed acoustic leak sensors. Mr. Riggs illustrated the impact of the growing amount of knowledge and the increasing fusion and analysis of this knowledge graphically in the Figure 1 below. In a case study in Dubuque Iowa it was possible to save 200 acre-feet (246,700m^3) of annual water consumption through consumer awareness and leak detection. That water conservation equates to approximately $191,000 in savings for a small community of 60,000 people.

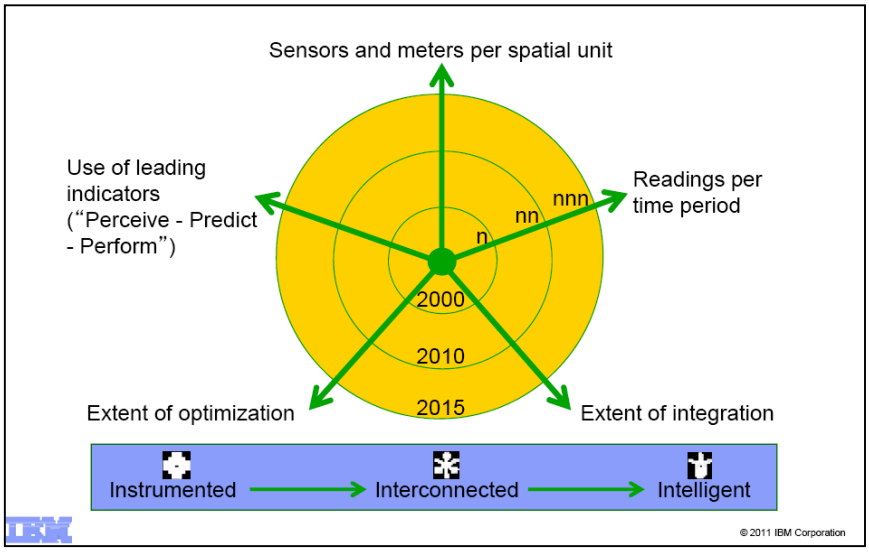

Figure 1

It is critical that data from many sources be synthesized together

Jason Bethke, of Global Water Resources, presented the reasons why a water utility would get involved in advanced metering infrastructure. Some of the identified drivers for utilities to adopt new technologies include water scarcity, constricting municipal finances, energy price increases, the rising cost of treating water, and an aging infrastructure and work force. Mr. Bethke also noted that the crucial element of smart water is actually the data fusion: the ability to integrate information coming from many independent systems such as SCADA, GIS, and CIS, along with pressure and flow monitors. It is through the analysis of all of this information that the most significant operational optimizations can occur.

Knowing the variable cost of energy and adjusting network operations can allow utilities to make significant energy savings and the ability to shutoff service to households leads in improved bill collection.

Paul Gagliardo, of American Water, expanded on this with a real example, describing how, by using detailed information about the cost of energy as it fluctuates throughout the day, and using the inherent flexibility within the water system (e.g. when pumps are run at what rate, when aeration is performed), American Water is able to achieve significant savings in energy costs. Mr. Gagliardo also gave an example of how the installation of shutoff valves for individual households resulted in immediate collection of most outstanding bills just from the threat of shutoff. Mr. Gagliardo stressed that any major change operational procedures for the utility is a barrier to adoption.

While many of the innovations such as higher frequency of data collection appear to be only incremental changes, the panelists agreed that the combined effect can stack up to something that is truly game-changing. The fragmented smart water sector, with little standardization or interoperability (in terms of communication protocols, data formatting, and encryption), will continue to pose an obstacle. This represents a tremendous opportunity for anyone who emerges as a leader of all aspects if standards are not developed, or for numerous specialized leaders if interoperability across the industry is achieved.