ERICSSON

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Using smart technology to monitor Stockholm's water systems

an Ericsson case study

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Company details

Headquartered in Stockholm, Ericsson is a global leader in delivering ICT (Information and Communications Technology) solutions, with customers in 180 countries and over 40% of the world's mobile traffic carried by Ericsson networks. **http://www.ericsson.com/**

Summary of action

Ericsson is actively seeking opportunities to address water, environmental and climate related issues by applying Information and Communications Technology. One such project, called Water Monitoring Networks, involves Ericsson in collaboration with city officials and university researchers to create a connected water quality monitoring system throughout Stockholm. It is part of the Digital Demo Stockholm initiative gearing towards making Stockholm the world's "smartest city" by 2040.

Program rationale

By viewing global challenges as business opportunities for sustainable solutions, Ericsson positions itself as a technology brand actively working to create positive global impacts. With the Water Monitoring Networks project, Ericsson has the chance to design and implement a cellular communication network of water quality sensors, which municipalities and the water utilities can use to rapidly detect and pinpoint changes in water quality due to e.g. potential pollution or discharges. This allows cities to take early mitigation measures and steer resources where they are needed to minimize operational costs and increase process efficiency.

Program approach

Ericsson is collaborating with, the City of Stockholm, the Royal Institute of Technology, Stockholm Water, Stockholm University, Linköping University and Telia Company on the Water Monitoring Networks project. Further on, Vinnova (the Swedish Innovation Agency) has co-funded parts of the development of the solution. After consultation with the city and the water utility, Ericsson recognized an opportunity to enable real-time water quality monitoring using a massive system of IoT (Internet of Things) sensors located throughout Stockholm's entire water system. The network is monitoring basic water quality parameters such as conductivity, pH, temperature, dissolved oxygen, and oxidation-reduction potential. In addition, big data analytics are used together with development of water modelling algorithms that will be able to filter through the sensor data and give bigger picture information about water quality changes. Such changes could alert the city and the water utility to events such as an algal bloom or a discharge of contaminated industrial wastewater, while giving them information about where and when it occurred.

The sensors are being deployed in three phases:

1. Source water: monitor changes to water composition and detect pollution in lakes & rivers, such as Lake Mälaren (Stockholm's water source).
2. Distribution network: monitor proxies for bacteria contamination in freshwater.
3. Sewage water: monitor the sewage and stormwater system to detect pollution.

The project is currently in its first phase, connecting Lake Mälaren using cellular 4G LTE communications technology. The intent is to continue with the other two phases and switch over to narrowband IoT (NB IoT) communications technology to make the sensors more effective for longer and over larger areas.

Results & Benefits

- Addressing the global lack of water quality data.
- Collective action across sectors to find solutions to shared water challenges in Stockholm.
- Predictability and early warning for water quality changes.
- Ease in identifying changes in water quality parameters because of IoT wireless technology.
- Manual sampling for laboratory analysis can be directed to specific locations where changes in water quality appear.

Lessons learned

This project is an innovative step towards improving city and utility responses to water and climate events, so the lessons learned will inspire continued investment in resilient urban spaces.

- By partnering with the end users of their technology, in this case the city of Stockholm and its water utility, Ericsson has been able to get direct feedback throughout the project and as a result is able to deliver a better product that fits the needs of the city and water utility.
- Working together with the universities has also improved the process, as any algorithms or water quality modelling systems produced will be based on innovative and peer reviewed research.
- There is a gap in the water quality sensor markets, such that effective sensors do not yet exist at a price point that would encourage cities to invest in these systems. However, the sensor developers are investigating devices with affordable costs and reasonable quality.

What next?

Ericsson is still in the early stages of project implementation, but the Water Monitoring Networks project has potential for implementation in other cities where water quality is of concern, particularly in developing countries. Beyond this initiative, Ericsson is well-positioned to develop an integrated set of urban planning tools that cities could use to monitor changes in water quality and air quality, as well as monitor traffic, transportation, and human mobility. Ericsson is also developing tools to accurately detect and gather information on weather (such as rainfall) in real time using Microwave links.

Sources

- https://www.ericsson.com/thinkingahead/the-networked-society-blog/2017/10/19/can-iot-save-peoples-lives/
- https://www.ericsson.com/thecompany/sustainability_corporateresponsibility/technology-for-good-blog/2017/02/08/connecting-water-quality-sensors-to-the-cloud/

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BAFWAC was jointly launched by CDP, CEO Water Mandate, SUEZ, and World Business Council for Sustainable Development (WBCSD) in December 2015. The initiative commits companies to analyze and report water-and-climate-related risks and impacts, and to implement collaborative response strategies along the value chain.

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