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COPENHAGEN, DANEMARK: A CITY RESILIENT TO FLOODING

PREPARE THE CITY FOR FUTURE CLIMATE CHALLENGES

To turn Copenhagen into a flood resilient city, Veolia through its Danish subsidiary Krüger, developed a modelling and management tool, STAR Utility Solution™.

Those smart and adaptable software solutions are based on the deployment of a smart grid connected with a weather surveillance system and help to prevent the discharge of wastewater into the environment during stormy weather.

KEY DATA

- 90% elimination of the overflow situations per year
- 93% reduction in the investment needed to achieve the same outcomes as with standard storage basins solution
- 10-15% less energy needed to treat wastewater achieved at a plant already controlled by PLC
- and online measurements corresponding to 10-12% reduction in green-house-gas emissions
- 1/3 less pollution from the overflows running into the sea around Copenhagen.

INNOVATIONS

- STAR Utility Solution TM is a modelling and control tool managing the flow running into the network and the three wastewater treatment plants connected with a weather surveillance system developed by the Danish Meteorological Institute to predict raining occurrences.
- The tool allows real-time control of the network (optimization of the floodgates, pumps and weirs) and switching the wastewater treatment plants to "rainy weather mode" to prevent overflow.
- The weather warning enables to plan ahead the systems to put in place during heavy rainfalls and the safety measures for the inhabitants several hours before they occur (6 to 12 hours).
- The solution allows enhancing existing infrastructures while significantly limiting investments compared to what would have been needed for the creation of new infrastructures on the network.

STAKEHOLDERS

- The City of Copenhagen,
- The Danish Meteorological Institute (DMI),
- The Technical University of Denmark (DTU), Utility company for network (HOFOR)
- Utility company for wastewater treatment plants (BIOFOS),
- Krüger (filiale de Veolia).

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IMPLEMENTATION

▶ The Copenhagen's resilience to flooding project is part of a major initiative launched in the 1990s by the public authorities. From the beginning, Krüger, subsidiary of Veolia, was an important and active player, deeply involved in finding solutions.

▶ The «Star Utility Solutions™» has been implemented by Krüger between 2012 and 2013, after a giant storm had caused a lot of damages in 2011. That event increased the City's focus on climate change and resilience to flooding.

Cooperation between operators and engineers, training and execution of pilot tests contributed to a successful implementation despite prior differing opinions.

One of the challenges was to combine the recommendations of all stakeholders involved: public water services, local authorities, research centers and residents.

RESULTS

/// Environmental results

- Improve the city's resilience to flooding (90% of the overflow situations per year were eliminated). Less pollution from the overflows running into the sea around Copenhagen (1/3 less).

/// Social/societal results

- An effective tool to plan the measures to be taken during a heavy rainfall event before it occurs. Bathing water in the Harbour District.

/// Technical

- An early warning system able to forecast floods 6 to 12 hours before they occurred.
- An optimization of the existing wastewater treatment plants and network control systems.

FINANCIAL ASPECT OF THE OPERATION

/// An accurate estimate of the saving in terms of reduction of costs related to flooding is hard to present. However, the flood in 2011 amounted to 700 million euros and a reduction of only 5% owing to a flood-warning system would have saved Copenhagen the cost of 35 million euros.

KEY DATA

→ **Smart investment in infrastructure dedicated to rainwater and wastewater management**

→ **Less energy needed to treat wastewater (10-15%)**

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