



Presentation from
**2015 World Water
Week in Stockholm**

www.worldwaterweek.org

© The authors, all rights reserved

Cost savings through smart real-time operation

Morten Rungø – mor@dhigroup.com

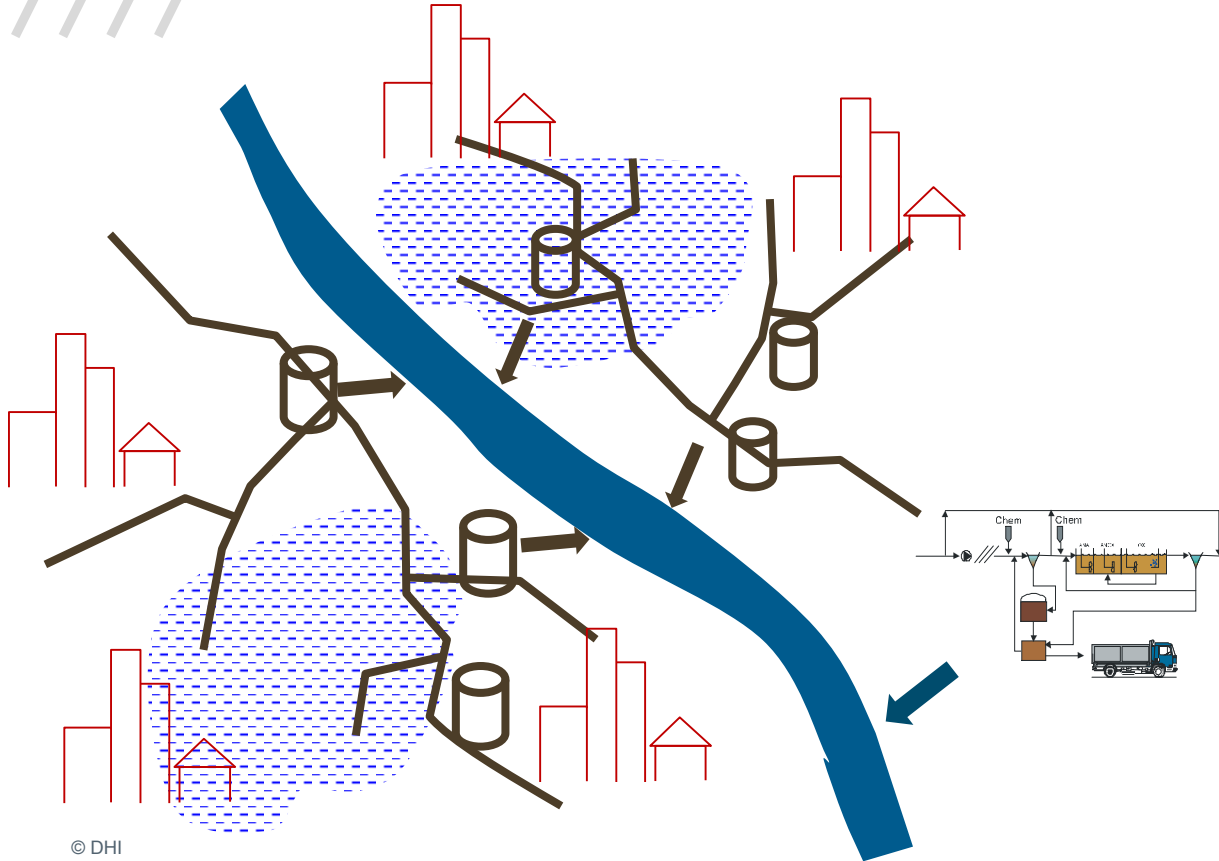


Reduced operational and capital expenditure

- Reduced Opex
 - Consumption energy, chemicals, etc
 - Effluent taxes
 - Man power
 - Maintenance
- Reduced Capex
 - Rehabilitation less costly
 - Postponed investments
 - New infrastructure less costly



Waste/Storm Water Control



Aarhus – Denmark



...Located by the Sea



... Second largest city in Denmark



...310,000 inhabitants



... European Cultural Capital 2017 - RETHINK Aarhus

Project drivers



...Rapid city
development



...Integrating
water into the
urban space



...New housing
area on the
harbor front



... Recreational
use of water

Expected project outcome



...Bathing water in Lake Brabrand (hygienic)



...Improved water quality/partly bathing water in River Aarhus

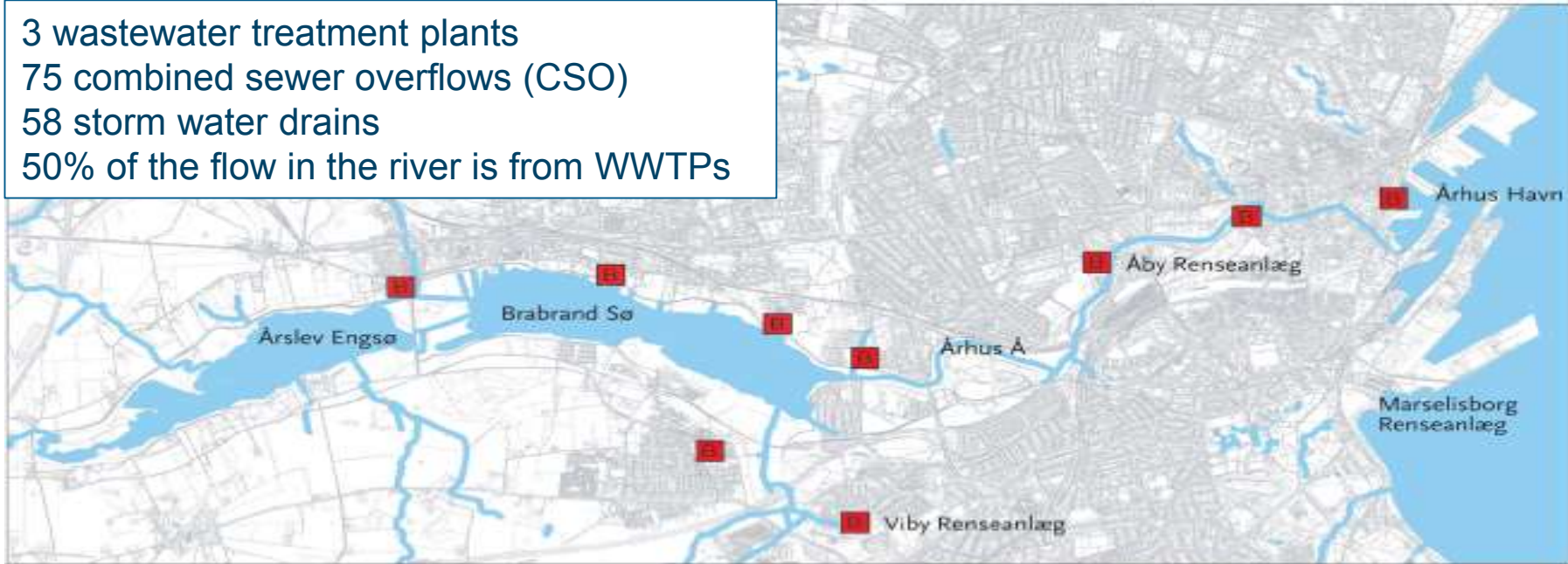


... Bathing water in the Harbour (hygienic)



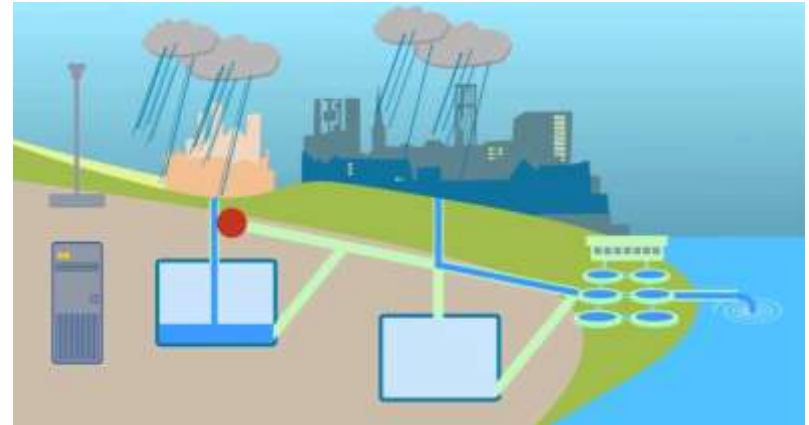
Overall challenge – Recreational water is receiving water

3 wastewater treatment plants
75 combined sewer overflows (CSO)
58 storm water drains
50% of the flow in the river is from WWTPs

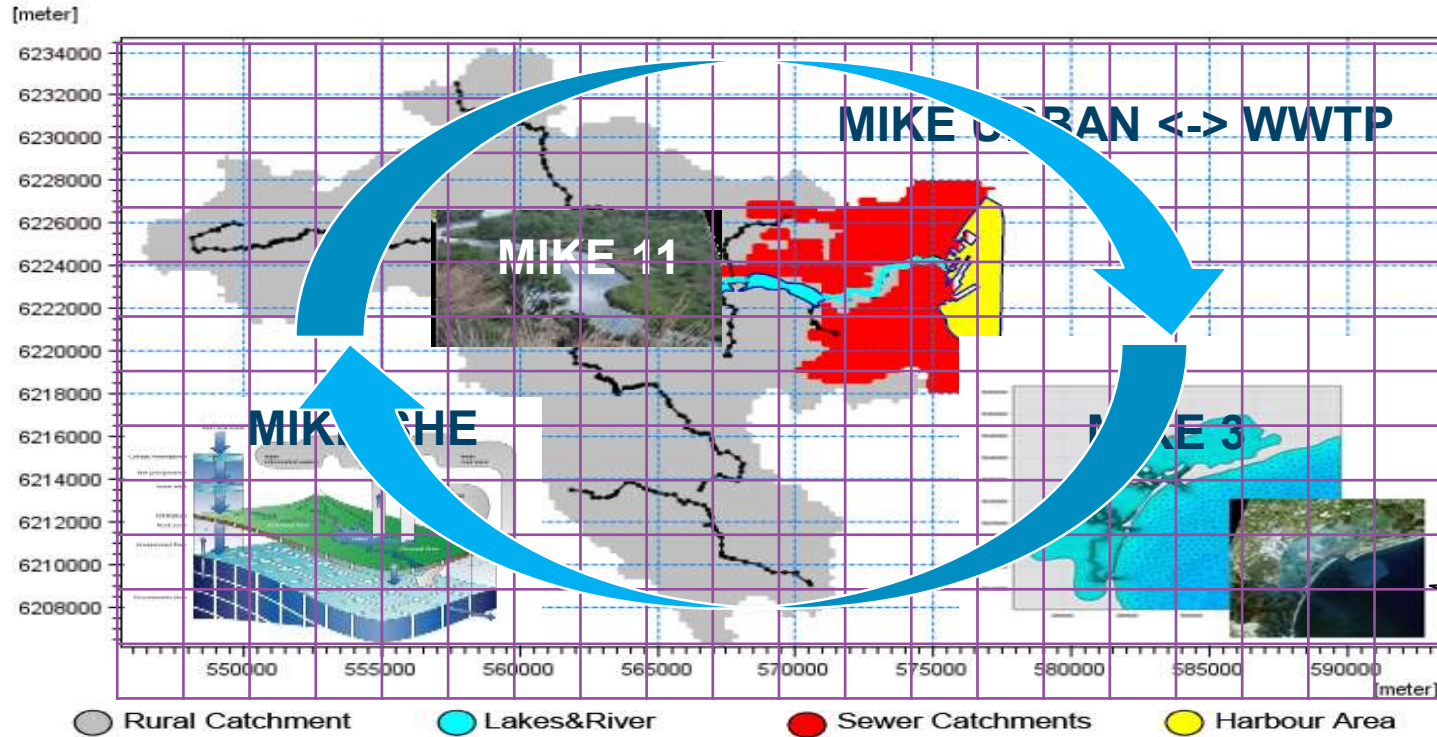


Solution - 50 mill. EUR project 2009-2013

- Infrastructure investment
 - 9 retention basins
 - Disinfection at WWTPs and basin
 - Increased hydraulic capacity at WWTPs
- Optimized control System
 - Integrated real time modelling/control (sewer system/WWTP)
 - Early Warning System



Automated Integrated Modelling and Control



Distributed rainfall from DHI Radar

Saving in Capex



- Ordinary and larger retention basins 79 million EUR
- Controllable and smaller retention basins 45 million EUR
- Control and warning system 2 million EUR
- Total 47 million EUR

- Saving 32 million EUR
40 %

<http://www.youtube.com/watch?v=pHqm8v55R9k>

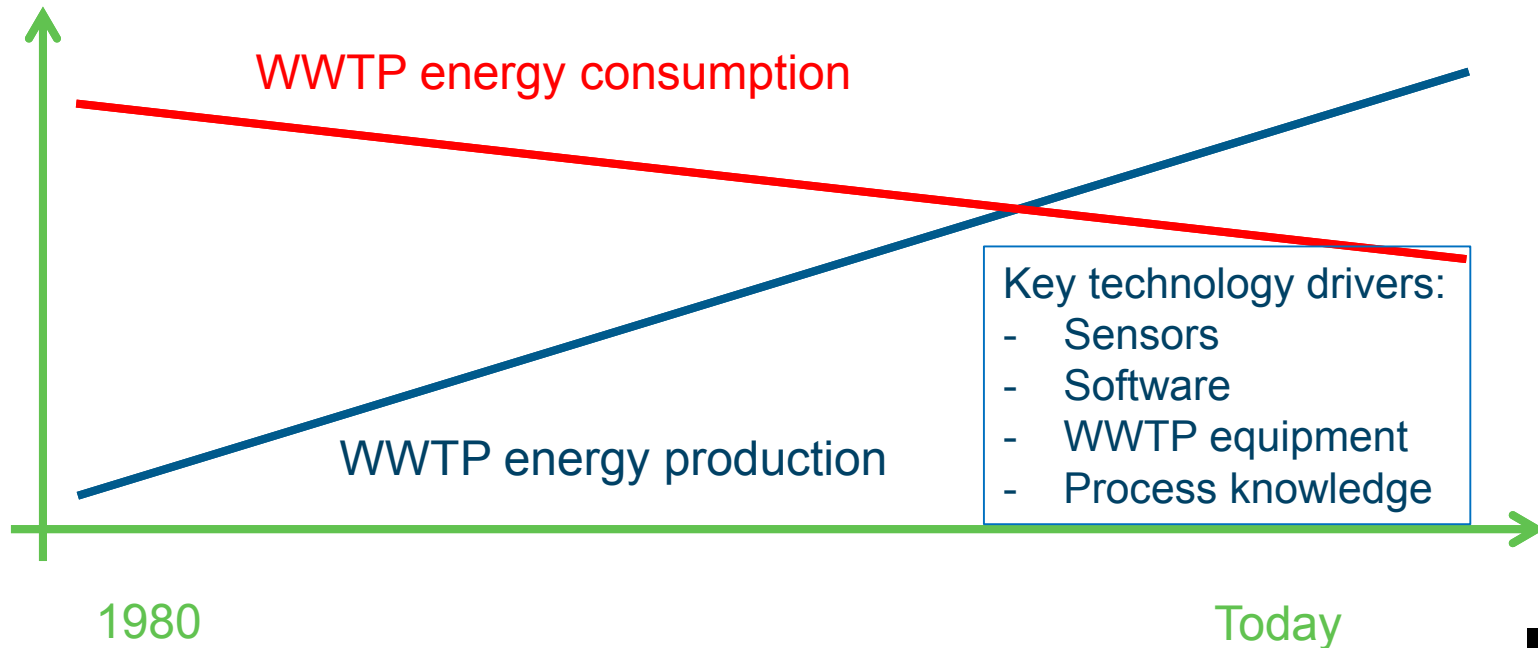
Smart Release DSS, Gold Coast, Australia



“The Seaway Smart Release Project is enabling us to meet future needs for recycled water release.”

*Guillermo Capati, Group Manager
Integrated Total Water Cycle Planning
Allconnex Water
Queensland, Australia*

History of WWTP energy consumption in DK



Real Time Process Control System for Wastewater Treatment Plants

Aarhus Water, Denmark

Economic results: Process Optimization - Aarhus Water	Unit	Wastewater Treatment Plant				Total
		Marselis	Egaa	Viby	Aaby	
WWTP size	PE	200,000	120,000	83,000	84,000	487,000
Reduction of use of resources - energy and chemicals	EUR/year	73,000	31,000	40,000	132,000	276,000
Reduced effluent values - lower effluent tax	EUR/year	114,000	19,000	27,000	2,000	162,000
Increased capacity - depreciation time 25 years	EUR/year	54,000	50,000	132,000	27,000	263,000
Total	EUR/year	241,000	100,000	199,000	161,000	701,000
Return of investment	Years	1.0	1.5	1.6	0.9	1.2

Value

- Increased process stability
- Extended the capacity – postpone investment in new
- Saved energy and chemicals
- Decreased effluent values

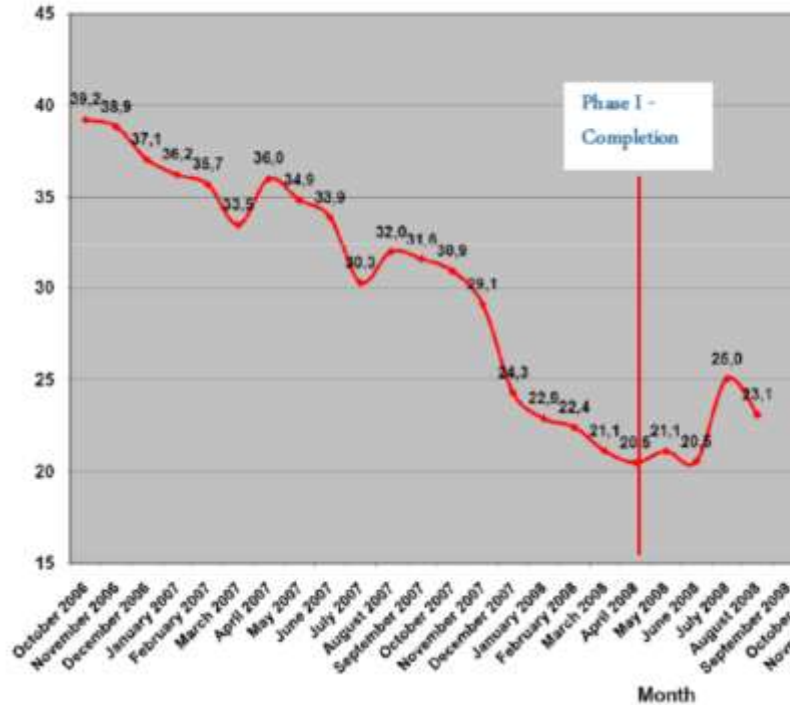
Smart WWTP – technically and visually



Coming WWTP, Hillerød, Denmark

Capacity building and long-term commitment is a prerequisite

Seremban NRW % Development



Source: EnviDan / DanWater



Thank you