



Reuse, Recovery and Resource efficiency.
Innovations in urban wastewater treatment

Final Conference “Water in the circular economy -
Innovations for urban water treatment”

Brussels, 30th May 2017

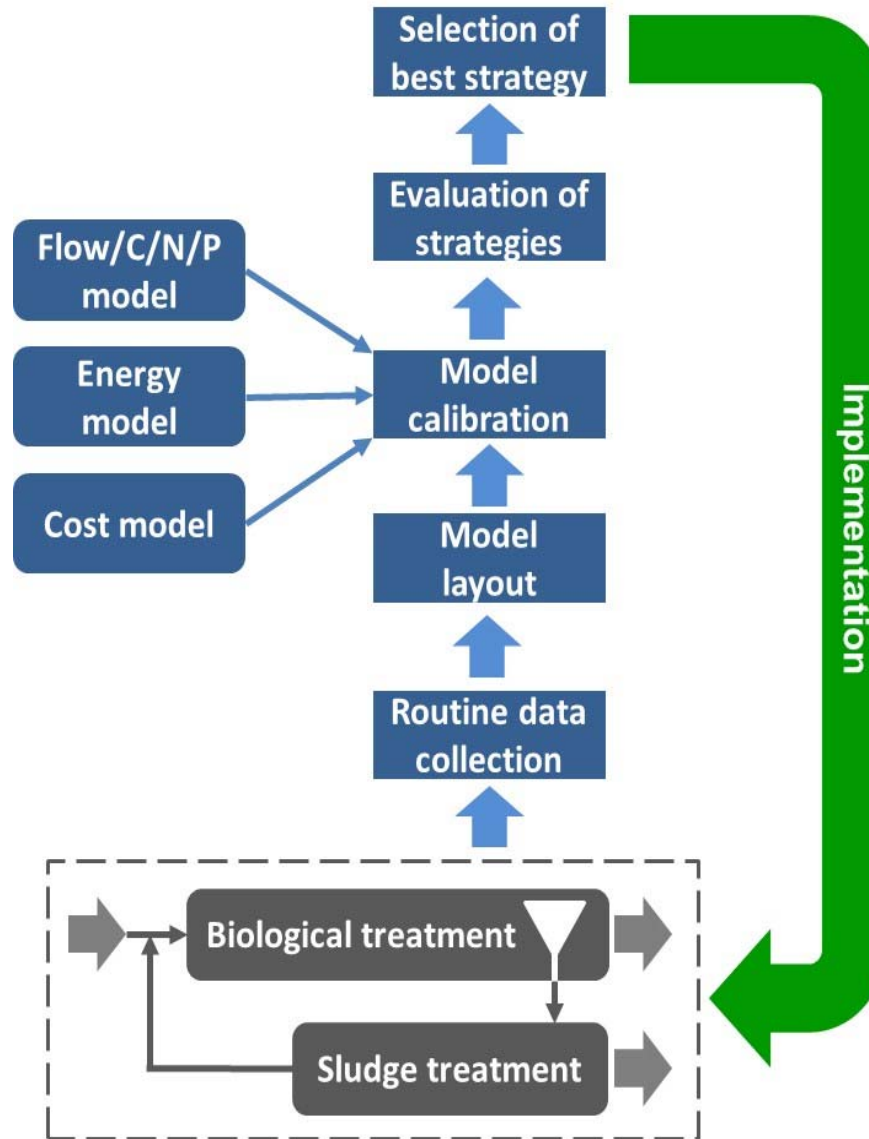
Whole-plant modeling of the Girona WWTP

Francis Meerburg, Aquafin (Belgium)

www.r3water.eu

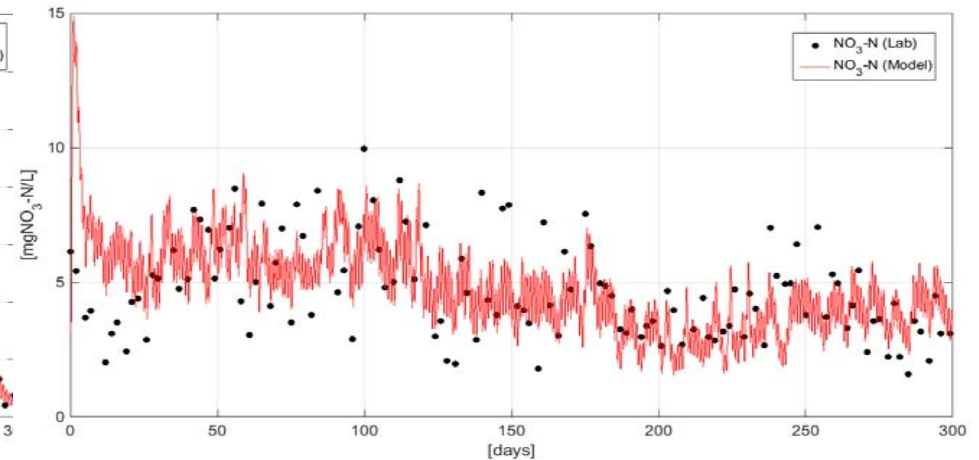
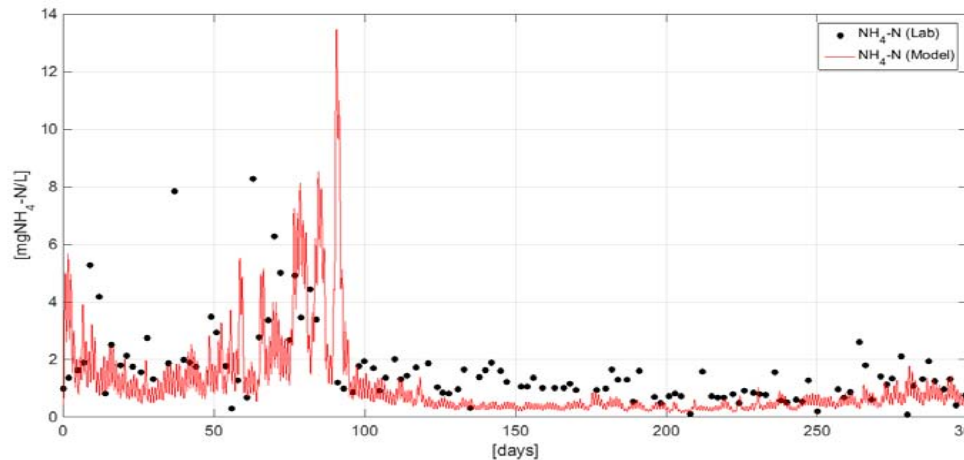
This project has received funding from
the European Union's Seventh Programme
for research, technological development and
demonstration under
grant agreement No 619093



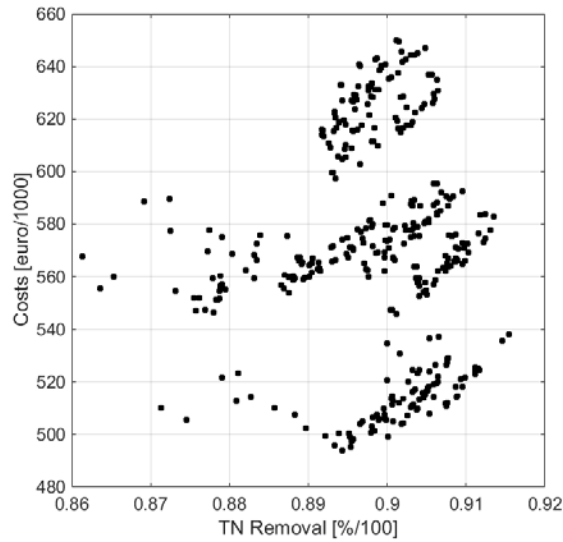


Dynamic calibration

Parameter	Unit	Model 2013	Reality 2013
NH4-N	mgNH4-N/L	1.0	1.5
NO3-N	mg NO3-N /L	4.8	4.5
PO4-P	mg PO4-P /L	0.2	0.2
Nitrogen removed	%	88.9	88.9
Phosphate removed	%	97.8	98.4
SS	mg SS /L	5.6	5
Sand Prod	ton/year	270	250-300
Primary Sludge Prod	ton/year	2040	2032
Sec. Sludge Prod	ton/year	2040	1940
Air Flows	m ³ /hour	9633	
Total Power	kWh	4328000	4092000
Total Cost	Euro/300 days	567300	



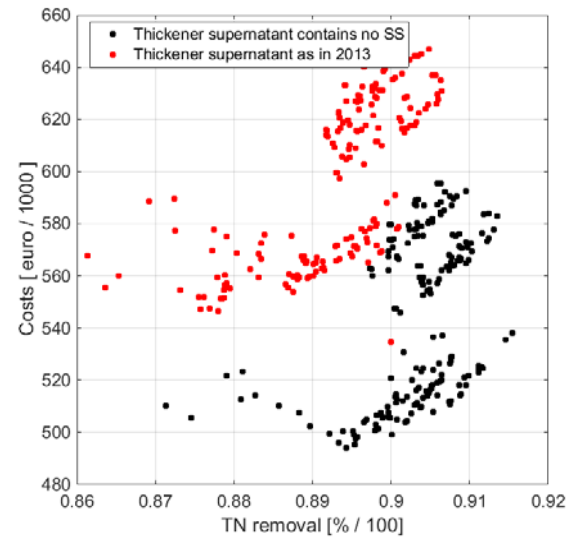
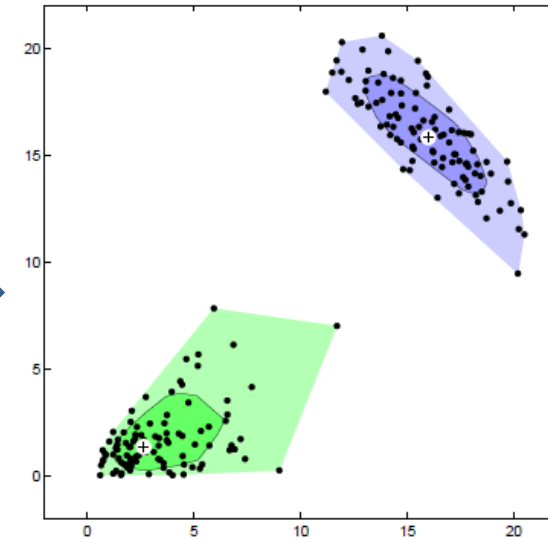
Exploration of scenarios

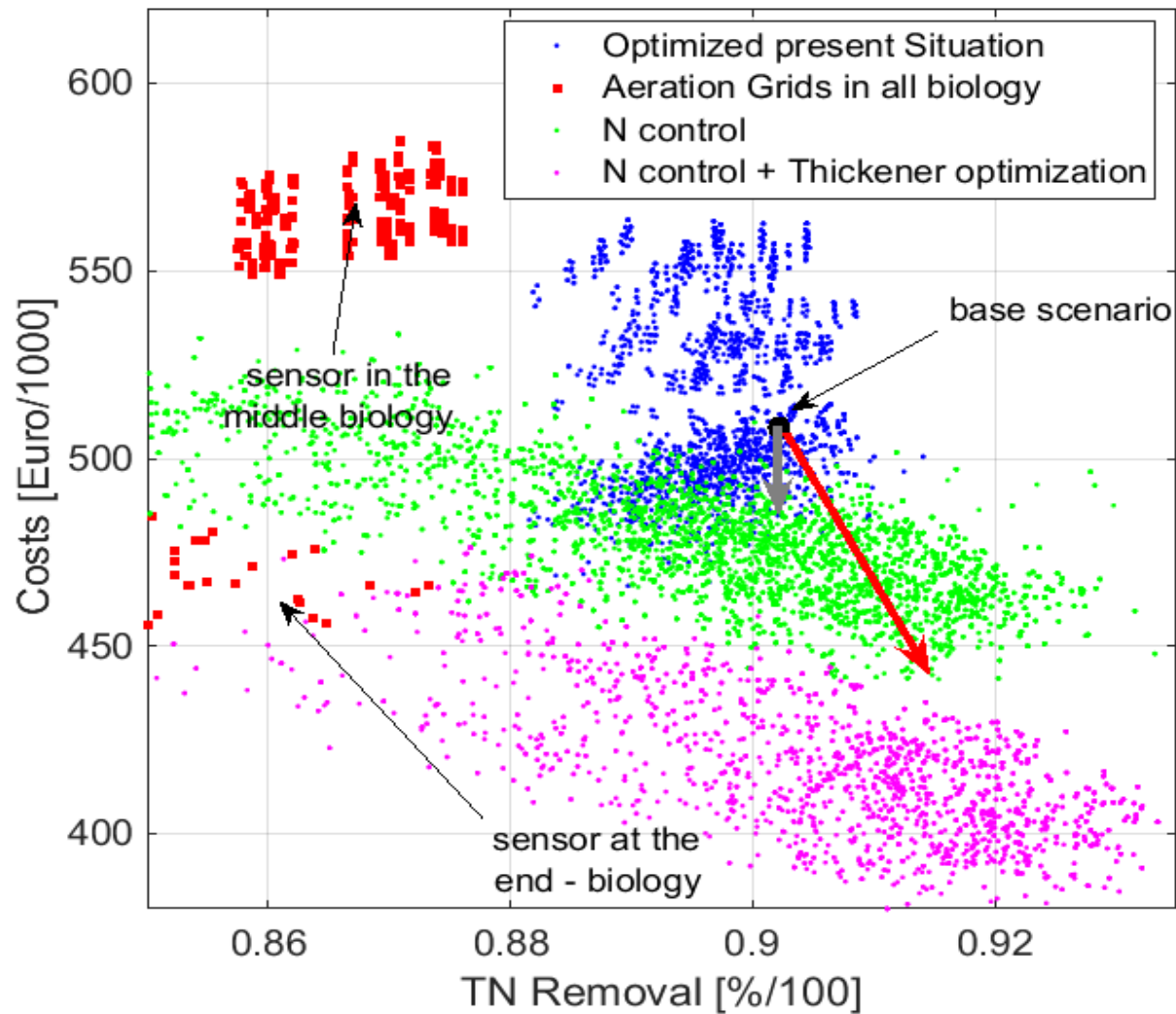


- A = [0; 0.25; 1]
- B = [100; 120; 140]
- C = [B1; B2; B3]
- D = < C
-

Bagplot
for outlier selection

Parameters sensitivity and
role





<i>Scenario description</i>	TN	Cost	Comment
	<i>% Removed</i>	<i>+1000 Euro</i>	
Process operation improvement			
<i>Thickener</i>	+1.0	-60	Excluded from all other scenario's/
<i>MLSS reduction</i>	+1.5	-5	Reduced of 600 <u>mgSS/L</u>
No Investment Costs foreseen			
<i>Optimization</i>	+(0.0-0.3)	-(15-25)	External recycle, improved blower control, MLSS
Investment Costs foreseen			
<i>N on-line control</i>	+(0.5-1.0)	-(55-65)	External recycle, improved blower
<i>Re-arranging grids</i>	-(2.5-3.5)	-(35-50)	200 diffusers are placed from AER1 to NOAER3
<i>N on-line control</i>	+(1.0-2.0)	-(110-125)	External recycle, improved blower +MLSS +Thickener

Scenario description	TN % Removed	Cost +1000 Euro	Comment
<p>Take home:</p> <ul style="list-style-type: none"> - Whole-plant modeling is an important tool for plant optimization - Advanced scenario analysis required to avoid local optima and select best scenarios 			
re-arranging grids	-(2.5-3.5)	-(55-50)	200 diffusers are placed from AER1 to NOAER3
N on-line control	+(1.0-2.0)	-(110-125)	External recycle, improved blower +MLSS +Thickener



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