

EIP Water – Action Group (AG100)

Concept note on Water Reuse

Version: June 2015

1 - Purpose

1.1 - Objective of Action Group (AG100) “Real Time Water Quality Monitoring”

The main goal of the Real Time Water Quality Monitoring (RTWQM) Action Group is **to foster solutions to water challenges based on online water quality monitoring technologies and affordable monitoring strategies.**

The Real Time Water Quality Monitoring (RTWQM, <http://www.eip-water.eu/RTWQM>) concept includes sensors and analysers that measure water quality parameters (physical, chemical or biological) within a reasonable time and working in an autonomous way with very minimal maintenance requirements. In addition, the RTWQM concept also covers the retrieval, transmission, processing and validation of raw data, in order to convert them into useful information.

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1.2 - Rationale for this document

The present document is a concept note elaborated by the RTWQM AG100 with the aim to collaborate with the EU initiative on water re-use (DOC WD/2015-1/5).

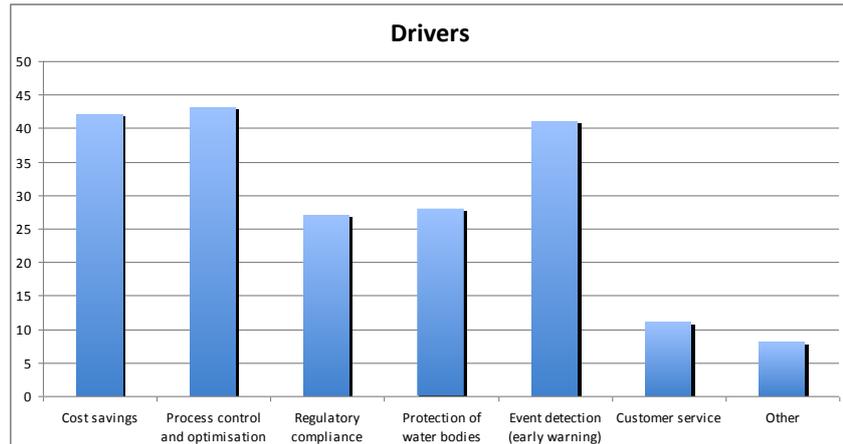
RTWQM AG100 is also actively collaborating with the revision of the Drinking Water Directive (DWD; 98/83/EC), and has developed a white paper on the issue of water quality monitoring under the DWD, which also touches on other types of water-related monitoring.

2 - Analysis of market drivers and existing barriers

During 2014, a market study was conducted in the scope of RTWQM AG100, based on the survey and the experience from more than 70 partners and water experts.

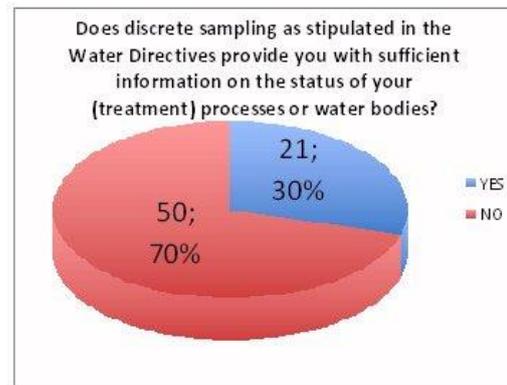
2.1 - Drivers RTWQM

The preliminary analysis point out that today the main drivers for RTWQM technologies are: treatment process control and optimization involving cost savings, and early warning detection of pollution events.



2.2 - Market barriers to RTWQM solutions

On the other hand, 70% of the answers point out that the current water sampling strategies stipulated in the water directives are not properly representing the real status of the water bodies and treatment processes. And this pattern is common for the 3 water sectors under analysis: protection of water bodies, drinking water supply and waste water treatment (including water reclamation). (Note ¹)



In the RTWQM Action Group two main market barriers have been detected as the result of a preliminary assessment and pending further analysis:

- **there is a common feeling about the current monitoring regulations defined in the water directives being a barrier for the adoption of innovative monitoring technologies**
- once the innovation technology is ready to market, there are still huge entry barriers that prevent the new product to reach the customers, often related to the current public procurement procedures.

3 - Analysis of the current water sampling strategies

This section is applicable to the following water Directives:

- EU Water Framework Directive (2000/60/EC)
 - Annex V for monitoring
- Urban Waste Water Directive (91/271/EC)
 - Annex I Section D for monitoring
- National Water Reuse Directives from:
 - ES: RD 1620/2007
 - IT: DM 185/2003, etc

¹ The online water quality monitoring requirements for Industrial Water are not directly considered, but they will be analysed in collaboration with the EIP Water Action Group: Industrial Water Re-use and Recycling (InDuRe, AG045)

3.1 - Common pattern for quality monitoring in the current water directives

The monitoring requirements defined in the water directives are following a set of common steps:

- Specify the minimum sampling frequency
- Specify the water quality parameters to be monitored
- Specify the physical/chemical/biological analysis method

The following table represents the applicability of online monitoring techniques to each one of the directive requirements:

Monitoring requirement	RTWQM applicability	Comments
Minimum sampling frequency		RTWQM technologies can provide sampling frequencies from minutes to hours, in any case higher than discrete manual sampling.
Quality parameters		Not all the required quality parameters can be monitored online.
Analysis method		Definitely, the online monitoring methods will often be different from those specified for laboratory.

Thus, the major barriers to online monitoring are:

- The specification of compulsory laboratory analysis methods.
- The fact that available online monitoring technologies are not taken in consideration when defining the quality parameters.
- The absence of alternative monitoring indicators, measurable online, that may support conventional parameters.

3.2 - Use of discrete sampling vs online monitoring

The following table represents the applicability of the 2 monitoring methods (online vs discrete) to the monitoring drivers identified in section 2.1:

Driver for monitoring	Online monitoring	Discrete sampling	Comments
Process control and optimization			Real time control of process parameters which is highly valuable for operators/stakeholders. Possibility to establish control loops.
Event detection / early warning			Online monitoring can provide real-time information on incidences, something that can be highly treasured by managers and operators. Faster and easier decision making
Protection of water bodies			One sample per month cannot describe the complex dynamic phenomenon inside the rivers and lakes. However, it might be convenient for groundwaters.
Regulatory compliance			Different function: online monitoring is to have immediate information and make decisions, absolute precision might not be needed; lab and discrete sampling are mandatory to comply with regulations
Cost savings			The higher investment costs related to online monitoring may be recovered over time, and possibly result in a lower specific cost per determination with respect to discrete sampling.

Summing up, online monitoring is the more convenient solution for process control and early warning against pollution events, but it is not convenient for the directive compliance. Moreover its long term cost/benefits are promising (at least for some parameters) with respect to traditional techniques.

4 - Minimum quality requirements for water reuse (DG ENV / JRC Workshop on Water Reuse)

Regarding the information note from the EC (WD_5_Information note_Water Reuse):

“Considering the supported expressed about the establishment of minimum quality requirements for water reuse, DG ENV requested the JRC to prepare the technical background of a Commission proposal on those. As a kick-off for this development a 2-days technical workshop will be organised in Brussels to discuss the possible scope and **outline of minimum quality requirements and technical guidelines**, as well as the coordination of the work to be developed with existing initiatives.

The workshop will focus on:

- The approach for EU minimum quality requirements for water reuse
- Type of reuse applications
- **Water quality parameters and monitoring**
- Risk assessment and management framework”

The RTWQM AG100 is willing to contribute to this initiative, in special with the aspects related to the identified barrier: “Difficulties in specifying and selecting effective monitoring techniques and technologies for the whole system”⁽²⁾.

4.1 - Application of RTWQM to the Water Reuse guidance initiative

According to the reference document⁽³⁾, the main aims of the reclaimed water quality monitoring are:

- The verification of “the ultimate quality of reclaimed water being supplied”
- And the “responses to incidents or emergencies that can compromise the quality of reclaimed water. Such responses protect public and environmental health, and help to maintain user confidence in reclaimed water”

Thus, the **early warning** component is crucial for the adequate performance of the processes, and this warning function will never be fulfilled by specifying discrete sampling strategies and laboratory analysis methods. In the limit, if the solution is to increase the sampling frequency, the method will not be sustainable in terms of efforts and costs. Timely response in emergencies is as relevant as accuracy of the produced data, therefore real time automated tools should be coupled to conventional sampling and analyses, that may serve as backup and confirmation of the values measured online.

4.2 - Conclusions and recommendations

The main aim of the RTWQM AG100 is to provide sustainable online monitoring solutions for the control of water treatment and the protection of water quality, including reclaimed water. Summing up, from the RTWQM AG100 we suggest:

² Water Reuse in Europe Relevant guidelines, needs for and barriers to innovation. Pg 41. L.Alcalde, B.Manfred. JRC 2014

³ Water Reuse in Europe Relevant guidelines, needs for and barriers to innovation. Pg 39. L.Alcalde, B.Manfred. JRC 2014

- To foster the collaboration with EU initiative on water re-use (DOC WD/2015-1/5), and in special with regard to potential and **effective combination of water quality monitoring methods (conventional sampling/analysis + online monitoring)**
- To seize the opportunity of ongoing innovation projects, such as R3water (<http://r3water.eu/>) and others linked to the RTWQM AG100
- To encourage the water reuse experts in charge of the EU initiative on water re-use **to take into consideration the available online monitoring technologies** (market ready or under innovation projects) when defining the relevant quality parameters.

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