DEMOWARE

Deliverable D7.3
Policy-makers dissemination report

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Abstract	This document sets out the dissemination to policy-makers carried out during the DEMOWARE project. This dissemination has consisted on specific liaison of project partners with the EC initiatives to encourage water reuse at EU level, and the organization of a "Water reuse governance" workshop held at Sabadell (Spain), on September 15th 2016.

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Executive Summary

This document sets out the dissemination to policy-makers carried out during the DEMOWARE project. This dissemination has consisted on specific liaison of project partners with the EC initiatives to encourage water reuse at EU level, and the organization of a workshop on water reuse governance held at CASSA (Water Company of Sabadell), Sabadell (Spain), on September 15th 2016. These initiatives have allowed the DEMOWARE partners to convey their inputs in the policy initiatives on water reuse, as well as the results from the project to be considered for the future instruments for guidance and standards for water reuse at EU level. At local level, the workshop organized in Sabadell promoted the water reuse practices among local administrations, thus reaching the ultimate goal of underpin water reuse management at local level.

1 Introduction

According to the DoW, the overall objective of WP7 “Dissemination“ is to ensure a high impact and knowledge of the project outputs to promote a wider understanding and awareness of water reuse practices among public administrations and end-users in order to increase utilisation of reclaimed water and include water reuse in an integrated water management.

Among the specific objectives, there are the promotion of the inclusion of water reuse practices on water related policies at EU level, and to facilitate the science-policy dialogue and debate across Europe on water reuse. In this context, and according to Subtask 72.1, it is important the organization of specific dissemination events aimed at involving European policy-making or policy supporting institutions (e.g. DG Environment, DG Agriculture) and other institutions to enhance their capacity to integrate water reuse in future policies in view of the Water Blueprint and the anticipated legislation on water reuse at EU level.

The opportunity to take action at EU level on water reuse with a view to increasing water reuse was identified in the 2012 Commission Communication "A Blueprint to Safeguard Europe's Water Resources". Water reuse for irrigation or industrial purposes is considered to have a potentially lower environmental impact and costs than other alternative water supplies (e.g. water transfers or desalination), but it is only used to a limited extent in the EU. Because of an inconsistent national legislation across Member States (MS) and a limited public awareness about actual risks and benefits, water reuse tends to be a costly practice subject to distrust from the general public; potential obstacles to the free movement of agricultural products irrigated with reused water is an additional risk deterring investments.

The European Commission organised a Public Consultation on Policy Options to optimise water reuse in the EU to evaluate the most suitable EU-level instrument(s) to foster water reuse, while ensuring the health and environmental safety of water reuse practices and the free trade of food products. The establishment of minimum quality requirements for water reuse received strong support from the public consultation.

On 2 December 2015, the European Commission presented the new circular economy package. It includes a number of actions to promote further uptake of water reuse at EU level, in particular as a measure to address water scarcity as an integral part of efficient water resources management. These actions are planned to be developed in 2016-2017 and will focus on overcoming the main barriers to the untapped potential for water reuse wherever it is cost-efficient and safe for health and the environment. In particular, the Commission announced that it planned to table in 2017 a legislative proposal on minimum quality requirements for water reuse in irrigation and groundwater recharge.

An Inception Impact Assessment (IIA) for this initiative was published by the Commission in April 2016 with the intention to inform stakeholders and citizens. This document describes the problem to be tackled and the objectives to be achieved, explain why EU action is needed and its added value. It elaborates on issues related to subsidiarity, possible policy options and the likely impacts of each option.

DG Environment (unit C1 – Water) is leading this initiative in the Commission and mandated the Joint Research Centre (JRC) of the European Commission to elaborate the basis for the proposal. JRC will issue by the end of 2016 a (technical) report proposing minimum quality requirements for reuse categories on agricultural irrigation and aquifer recharge covering the relevant aspects (e.g. water quality, application, monitoring). These requirements should ensure a high level of health and environmental protection and thus provide public confidence in reuse practices. This technical document may support a future EC legislative proposal on minimum quality requirements for water reuse in irrigation and groundwater recharge.

In parallel, DG Environment has been coordinating the development of Guidelines on Integrating Water Reuse in Water Planning and Management in the context of the Water Framework Directive (WFD). The principle of developing EU guidelines was included in the CIS work programme 2016-2018, under the mandate of the new Ad-hoc Task Group on Water Reuse.

In this regard, there has been a contribution to EC water reuse policy initiatives. DEMOWARE project recommendations were presented to relevant policy-experts groups, and project partners have been involved in the European Commission (EC) initiatives to promote water reuse in Europe. In parallel, a workshop on water reuse governance has been organized at Sabadell (Spain) to exchange and transfer knowledge on governance barriers in water reuse practices, according to Task 5.4. coordinated with WP7 activities.

2 Contribution to EC water reuse policy initiatives

Following the initiatives from the EC on water reuse, one workshop and one meeting were organized where some results from DEMOWARE demosites were presented, and also project partners were invited to contribute to the development of the minimum quality requirements for water reuse for agricultural irrigation and aquifer recharge, and also to provide input for the development of the guidelines for water reuse.

2.1 Public consultation on water reuse

The DEMOWARE project provided a joint input for the Public Consultation, organized by the EC, on Policy Options to optimise water reuse in the EU. The aim of the public consultation was to evaluate the most suitable EU-level instrument(s) to foster water reuse, while ensuring the health and environmental safety of water reuse practices and the free trade of food products. The joint input from the DEMOWARE project can be seen in Annex I.

The public consultation revealed that the design of an EU regulatory standard on water reuse was broadly supported, both by citizens, public administrations and the private sector.

Several face-to-face meetings with the responsible for the water reuse initiatives in the EC Directorate General Environment (DGENV), Mr. Thomas Petitiguyot, were taking place along the development of the guidelines, and the DEMOWARE project results have been closely followed by him.

2.2 Development of guidelines for water reuse

Project partners were invited by DG Environment to provide scientific input for the development of the *Guidelines on Integrating Water Reuse in Water Planning and Management in the context of the Water Framework Directive (WFD)*. A draft document of the guidelines was distributed to the DEMOWARE partners to gather their specific input, and the JRC was responsible to integrate all comments and convey them to DG Environment and the external consultant in charge of the guidelines. The comments provided are shown in Annex II. These comments were considered very valuable by both the EC-DGENV and the consultant and were taking into account for the development of the content of the guidelines. The DEMOWARE project was cited in the final text of the guidelines as one of the EU funded projects to promote water reuse, and there were also included descriptions of some of the demosites, as examples of water reuse practices in the EU.

In addition to this input, several partners from the DEMOWARE project attended a parallel meeting to the EIP Water Conference in Leeuwarden on February 9, 2016 organized by DGENV to present the draft of the guidelines. The DEMOWARE partners attending were Jos Frijns (KWR), Paul Jeffrey (UCRAN), Ulf Miehe (KWB) and Rita Hochstrat (FHNW).

2.3 Development of minimum water quality requirements for water reuse

2.3.1 Workshop titled "Water reuse in agricultural irrigation and aquifer recharge – Towards minimum quality requirements at EU level"

A technical workshop was organized jointly by DG Environment and the JRC in Brussels, at the DG Environment headquarters the 25th and 26th of June 2015. The title of the workshop was "Water reuse in agricultural irrigation and aquifer recharge – Towards minimum quality requirements at EU level".

The main objective of this workshop was to have a technical discussion on minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge, covering the relevant aspects (e.g. water quality, type of crops, application conditions, monitoring) and always taking into account ensuring appropriate health and environmental protection and thus, providing public confidence in water reuse practices. The workshop aimed to gather information on water reuse practices in agriculture and aquifer recharge in Europe and to discuss the contents of the technical document developing the minimum quality requirements for water reuse at EU level, a document that may support a future EC water reuse regulatory instrument.

2.3.1.1 Programme

The programme of the workshop is presented below.

Day 1 – 25th June

1. Welcome and opening session (14:00 - 14:15)
    - Welcome address (B. Gawlik JRC H1)
2. European Commission initiatives on water reuse (14:15 - 14:30)
    - The Commission initiatives on water reuse (T. Petitguyot ENV C1)
    - Objectives of the workshop (B. Gawlik, L. Alcalde Sanz JRC H1)
3. Approach for EU requirements on water reuse (14:30 – 17:30)
    - Presentations
        - ISO standards on water reuse for irrigation (Valentina Lazarova, Suez Environment) (10 min)
        - WHO guidelines on water reuse (Anders Dalsgaard, WHO) (10 min)
    - Discussion
        - Added value of an EU initiative and coordination with existing and up-coming standards
        - Purpose of EU requirements (management of health risks, environmental risks, nutrients recycling…)
        - Most appropriate framework for EU requirements (water quality, technology, risk assessment and management)

Day 2 – 26th June

4. Reuse applications: agricultural irrigation and aquifer recharge (9:00 – 11:00)
    - Presentations
        - Water reuse in agricultural irrigation (B. Molle, IRSTEA) (10 min)
        - Water reuse for aquifer recharge (E. Van Houtte, IWVA) (10 min)
    - Discussions

- Existing approaches regarding type of crops, irrigation technology and aquifer recharge methodology.
- Relevance of such typologies for EU context
- Need for further guidance

Coffee-break (11:00 – 11:15)

5. Water quality parameters and monitoring (11:15 – 13:30)

   - Presentations
     - Chemical parameters I – Chemical contaminants in treated wastewater including groundwater dimension (J. Drewes, TUM) (10 min)
     - Chemical parameters II – New and less-investigated pollutants (D. Fatta-Kassinos, NIREAS) (10 min)
     - Biological parameters (A. Forslund, UCPH) (10 min)

   - Discussion
     - Approaches regarding quality parameters and monitoring
     - Parameters to be considered and monitoring frequencies
     - Matrixes to be monitored (reclaimed water, sludge, soil, groundwater …)
     - Need for further guidance

Lunch (13:30 – 14:30)

6. Risk assessment and management framework (14:30 – 16:30)

   - Presentation
     - Risk assessment approach for water reuse (G. Medema, KWR) (10 min)

   - Discussion
     - Is the risk assessment approach a viable option at EU level?
     - Need for further guidance at EU level

7. Closure of the workshop (16:30 – 17:00) (P. Misiga ENV C1)

2.3.1.2 Participants

Renowned experts from the water reuse field were invited, among them several DEMOWARE project partners (see Annex III). DEMOWARE partners were attending the workshop due to its expertise on water reuse and the knowledge of the DEMOWARE project development by DGENV and JRC. The partners attending the workshop were Gertjan Medema (KWR), Alfieri Pollice (IRSA-CNR), Emmanuele Van Houtte (IWVA), Thomas Wintgens (FHNW). DEMOWARE partners Laura Alcalde Sanz and Bernd Gawlik (JRC) were attending as co-organizers.

The project partners participate in the discussion and there was also a presentation by Emmanuele Van Houtte (IWVA) of one of the demosites of the project, the Torreele demosite (Belgium) to show one of the most renowned sites in Europe for aquifer recharge with reclaimed water (indirect potable reuse).

The rest of participants affiliations are the following: Italian Institute for Health (ISS), Dept. for Water Resources, Institute of Iraklion, Hellenic National Agricultural Research Foundation (NAGREF), University of Copenhagen, World Helath Organization representative on water reuse issues for the EC, Technological

University of Munich, Chair of the IWA Water Reuse Specialist Group, NIREAS-International Water Research Centre, University of Cyprus, Netherland's Organization for Applied Scientific Research (TNO), SUEZ Environnement, Instituto Superior de Engenharia de Lisboa (ISEL), Leeds University, Institut National de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture (IRSTEA), German Federal Institute of Hydrology (BfG), French National Authority for Health , Spanish Desalination and Water Reuse Association.

Policy officers from DG Environment, DG Agriculture, and DG Santé (Health and Food Safety) were attending the workshop.

2.3.1.3 Discussion and conclusions of the workshop

There were several points of discussion among the participants regarding which would be the proper content of minimum quality requirements for agricultural irrigation and aquifer recharge. After the discussions carried out during the workshop, the following conclusions were derived for the implementation of the minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge to support a future EC water reuse regulatory instrument:

- Identify knowledge gaps, collect information to fill these gaps.
- With this in mind participants were asked to send any relevant material to the JRC – references and accessibility.
- Clarify the goal and the type of regulation that is desirable. What are we looking at protecting? What is the issue? How do we address it? The approach needs to recognise that there are various practices in Member States.
- Proposed legislation needs to take into account risks but the DALY approach is difficult to translate into policy terms.
- Multiple barriers approach was identified as suitable
- Need for a database on virus as input for risk assessment
- Take into account the existing guidance, management practices and information (i.e. WHO, Australia, California), and EU legislation.
- Distinction on requirements could be made based on the use, in particular for irrigation. The proposal should be realistic and very practical.
- Consult with practitioners on their expectations and needs. Information on the monitoring they conduct is also needed. Finally, the proposal needs their feedback to ensure that what is included is practical and realistic.
- Need to make farmers understand the positive / economic benefits from water reuse.
- The ongoing development of a guidance document for water reuse management needs to be coordinated with the proposal on minimum quality requirements. Both processes are interlinked.
- Public perception was highlighted by several participants as a key topic.

There is a need to adopt a focused approach. There is also a need to identify gaps of knowledge. The minimum quality requirements have to be realistic with the costs incurred. It has to be identified where there is already coverage from existing legislation and hence where no further action is required.

2.3.2 Meeting of the Ad-hoc Task group on water reuse

The 2nd meeting of the CIS Ad-hoc Task group on water reuse was hosted by the Spanish Directorate General for Water (Ministry for Agriculture, Food and Environment) in Madrid (Spain) the 17th and 18th of October 2016.

2.3.2.1 Programme

The programme of the conference is presented below.

DAY 1 – Monday 17th October 2016

13:00 **1- Opening**

a- Greetings by Spain

b- Tour de table

13:15 **2- Policy Background**

a- Update about EU initiative on water reuse

(T. Petitguyot, EC-DG ENV)

b- Q&A

13:30 **3- Member States experience in risk management with water reuse**

a- Water reuse in Portugal and use of multibarrier approach to prevent risks (A. Seixas and A. Rebelo, Portuguese Environment Agency)

b- International overview in Managed Aquifer Recharge and lessons learnt for water reuse (E. F. Escalante, Tragsa R&D)

c- Q&A

14:45 Coffee break

15:00 **4- Development of minimum quality requirements for water reuse**

a- Presentation of the technical development by the JRC (L. Alcalde Sanz and B. Gawlik, EC-JRC)

b- Discussion

17:30 **End of day 1**

DAY 2 – Tuesday 18th October 2016

9:00 **5- Exchange of information and experience on water reuse in:**

- **Innovation**

a- Activity in the EIP Water action Group WIRE (A. Battilani, COPA-COGECA (ANBI/CER))

b- Lessons learnt on indirect potable reuse from the DEMOWARE project (U. Miehe)

- **Industry**

c- Water reuse in the Chemical Industry: project E4 Water (Cefic)

d- Consideration for water reuse in BREFs and BEMPs (T. Petitguyot, EC-DG ENV)

11:00 **6- Field trip** *(incl. lunch)*

- Technical visit of water reuse facilities in Madrid with *Canal de Isabel II Gestión*

15:30 **7- Closure of the meeting**

2.3.2.2 Presentations

A summary of the presentations is presented below. The presentations can be found in *this page*.

Update about EU initiative on water reuse (T. Petitguyot, EC-DG ENV)

The promotion of water reuse at EU level stems from the 2012 Water Blueprint. Two studies followed this to develop policy options and assess their impact, together with a public consultation in 2014, which confirmed that some EU level action was needed. In September 2015 a roadmap was published and specific actions were set out in the December 2015 Communication on the circular economy. Importantly the promotion of water reuse needs to deliver high level of protection of health and the environment. Council is due to adopt (tomorrow) conclusions on sustainable water management, which calls on MS to take measures to promote reuse while ensuring a high level of protection of health and the environment.

Also the UN adopted the SDGs in September 2015, one is on water which includes targets, two of which mention water reuse.

The Circular Economy Action Plan included five actions on reuse: the development of guidelines to promote reuse in planning; development of minimum standards; inclusion of industrial reuse in relevant BREFs; support to innovation; and investments.

Under the CIS water reuse was previously undertaken in WG PoM (Working Group Programme of Measures), but for the current CIS work programme an ATG (Ad-hoc Task Group) on water reuse was foreseen. The TOR (Terms of Reference) for this was agreed in the June Water Directors meeting, and a workshop on the issue was held in Malta in March 2016. The participants of the ATG include many MS and interested stakeholders.

The TOR included these expected activities: production of guidelines (now published, but will be revised once any minimum standards are agreed); provide feedback to the JRC on the work on minimum standards; information exchange on other actions of the EC or of MS, etc.

On communication, there has been the 2014 public consultation. There will be a second public consultation in all EU languages later in October till January 2017, which will focus on minimum quality requirements for agriculture and groundwater recharge.

There will also be a promotion campaign from December to March, in the framework of the circular economy, to raise awareness for stakeholders and public policy makers, rather than the public. Articles and infographics will be produced. The list of target countries is being discussed, so feedback from ATG members is welcome. It is also important for ATG members to interact as the material is being produced, to comment on drafts, target the right media, events, organisations, etc.

Water reuse in Portugal and use of multibarrier approach to prevent risks (A. Seixas and A. Rebelo, Portuguese Environment Agency)

PT is relatively small and 75% of the population lives by the coast. Water scarcity occurs across 30% of the country, particularly in the south where there is also extensive tourism. In 1999 a National Action Programme to Fight Desertification was approved. Two concerns included were that RBMPs should contribute to addressing scarcity and that water reuse was part of the solution. The 2016 National Water Plan stresses that investments are needed, water pricing may be a problem, that cost-benefit analysis will probably not support individual decisions and water reuse benefits are limited to areas close to WWTPs. All RBMPs contain a supplementary measure to promote water reuse. Proposals for EU funds include some for reuse.

On public awareness, across 2015-16 there have been workshops and technical meetings bringing together a range of authorities and stakeholders. It is important to ensure coherence in approach across all issues (objectives, communication, etc.). This requires joint efforts.

Reuse is not allowed for potable uses. To reduce risks a multi-barrier approach is used. A qualitative risk assessment is made to determine the risk of contact and the severity of damage. A quantitative risk assessment is not used as there are not enough data to support this. The approach includes treatment levels, quality standards, application conditions, storage conditions and conditions to prevent risks for the environment.

On quality standards, for health surrogate parameters are used: E coli and helminth eggs and residual chlorine. For water resources: nutrients, microbiological parameters and chloroform. The water resources risk assessment uses a matrix approach, including different types/depths of aquifer, levels of infiltration, etc. Permits are given by the Environment Agency with conditions linked to reuse and measures within the multi-barrier approach together with a self-monitoring programme.

The presentation went through a detailed example of reuse for a golf course, for a natural lagoon ecosystem, for crop irrigation of carob trees and a hydroponic system for soft fruits.

International overview in Managed Aquifer Recharge (MAR) and lessons learnt for water reuse (E. F. Escalante, Tragsa R&D)

The development of guidelines for MAR water quality involved collection of international practice. For example, in ES there are more than 40 relevant regulations at different levels, so the context is complex. The review collected information from the WHO and 11 countries across the world. The presentation gives a summary of each. All of the data have been collated into a single table.

Some countries have specific regulation for MAR, but without specific standards. Spain has 6 standards, but Mexico 96. Across all sources there are 150 standards (nitrates is the most frequent). Some make distinctions based on the type of recharge. The presentation provides details of different approaches for a range of different types of parameters.

There is a strong connection between the technical solutions for MAR and their regulatory development. A common strategy for regulation is not possible, as it has to be adapted to circumstance. In each country any consideration for MAR also needs to look at its economic and technical feasibility.

Presentation of the technical development by the JRC (L. Alcalde Sanz and B. Gawlik, EC- JRC)

The focus of the technical work is on the two uses (agricultural irrigation and aquifer recharge) to ensure high level of health and environmental protection and full consistency with the EU regulatory framework. The work also considered the national regulations for those MS that have them and guidelines at WHO/ISO and non-EU countries. JRC has consulted a group of individual experts, and will consult with the Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) and the European Food Safety Agency (EFSA).

A risk assessment specifically for this document has not been performed and the version for discussion is not the final draft. There is not a full consensus of experts, so the content is the responsibility of the JRC. There are still issues to discuss and resolve.

The document follows a risk management framework as used by others, including sections on risk assessment for health and the environment, preventive measures and the multi-barrier approach, and monitoring. Sections on health and environmental risk discuss risks and develop risk matrices. Preventive measures are included, including treatment and additional measures. The document follows the WHO view on tolerable risk. It explains monitoring for microbiological (reference pathogens and indicator micro-organisms) and physic-chemical parameters, e.g. for different types of uses.

Reclaimed water quality criteria have to comply with the UWWTD and meet the EQSD (Environmental Quality Standards Directive 2013/39/EU). The point of compliance is after adequate treatment and the point of application (defined in the document for different uses).

The targets for individual parameters were provided in the presentation. Some issues are still to resolve, e.g. for E. coli the target values are identified, but not the percentage of samples that need to comply with those targets. Note that the document aims to set out the minimum quality for tolerable risks, but it is possible to be more stringent if necessary. It also sets out details for verification monitoring.

On physico-chemical parameters the biggest dilemma is that EU legislation on some key issues is under development. There are a number of parameters for irrigation and for aquifer recharge. The parameters vary across EU law, etc. There is also a challenge with compounds of emerging concern (CEC). Some are not regulated, some are in the Watch List. These include a range of biocides, pharmaceuticals, etc., including metabolites of these. They have impacts on the environment and can act in combination. A source control programme is recommended for any indirect potable reuse, including a detailed monitoring programme. The report provides two sets of substances – suitability criteria to assess suitability for use and also surrogate substances to determine if the treated water is stable.

On combined effects, time has come to move from a single compound approach to move to effect-based trigger values for different types of biological responses (details are in the presentation).

On antimicrobial resistance (AMR) and antibiotic resistance genes (ARG), these threats are important, but they are not specific to water reuse or particular to reuse. This is a priority topic for research, but they are

not necessary to address in the minimum requirements. It is of concern in some MS more than others, so the document sets out how it could be tackled as an optional approach (the presentation includes examples of the optional values).

Activity in the EIP Water action Group WIRE (A. Battilani, COPA-COGECA (ANBI/CER))

The WIRE (Water and Irrigated agriculture Resilient Europe) action group is under EIP water. The consortium represents more than 90% of the irrigated area of the EU, with more than 400,000 farmers directly linked and 1,500 companies. It has 5 action lines, including on addressing efficiency in irrigation. The aim of WIRE is to bridge agriculture and environment – letting farmers express their ideas in both arenas.

WIRE did an analysis of the bottlenecks for innovation in irrigation including for water reuse. These concern ensuring protection of health and environment (including soils) and the need for ongoing monitoring to ensure quality is maintain. So, if safety is ensured, reused water can be used for irrigation. WIRE is in contact with other groups (the presentation includes a list of several groups/projects), e.g. those looking at social acceptance of reuse in Costa Brava. Small decentralised reuse systems are also interesting as they ensure full reuse of water and clear links between producers and users.

The real time water quality monitoring group is examining online continuous monitoring. However, some online monitoring does not match some legal requirements for monitoring (e.g. where it requires a particular laboratory quality control), but it would provide continued confidence for farmers and it is important to consider how to address this type of innovation.

Lessons learnt on indirect potable reuse from the DEMOWARE project (U. Miehe, KWB)

This project is concluding in 2016, including much dissemination. The project has 26 partners and 10 pilot sites across the EU. Deliverables cover different issues, such as guidelines for monitoring, risk assessment, experiences in public involvement, etc. Case studies include agriculture, urban irrigation and indirect potable reuse. The presentation summarised these. Two specific cases were described covering indirect potable reuse.

El Port de la Selva, ES: this is via an infiltration scheme of about 700m in length. There was discussion about what is the point of compliance, so the project introduced several groundwater monitoring points (parameters detailed in the presentation). If these are compared with the numbers in JRC report, one finds that numbers are OK in the first monitoring point – so immediately after the vadose zone following initial infiltration. The presentation looked at the interpretation of risk assessment calculations for different parameters.

Vendee, FR: a greenfield study. This worked with risk quotients – looking at predicted environmental concentrations against different types of standards/targets for environmental and health risks. Some of the substances were found to present a risk before advanced treatment. So the project then looked at treatment options. Some substances still look like they are a risk, but this may reflect problems in knowledge of the behaviour of these substances, so using a risk assessment should lead to asking further questions for clarification. So risk assessment is a process.

Water reuse in the Chemical Industry: project E4 Water (Steven Van de Broeck, Cefic)

The presentation gave an overview of the European chemical industry. There are increasing water pressures in the sector, so there is emphasis on sustainable water use in order to be resilient for future changes.

Water is used for a wide variety of uses in the sector, in cooling, processing, products, cleaning, steam, potable uses, etc.

There is a need to think across all aspects of water use – sources, recovery, cascading use, reuse, etc. Companies are increasingly looking to see if they are using the right quality water for the right purpose, i.e. not requiring higher quality water than needed ("fit for purpose"). This often shows that reused water is sufficient for the required purpose. The presentation examined four projects:

- E4Water Project on eco-efficient water management in the chemical industry with six case studies where technologies were applied to examine industrial application. This has led to the application of water saving measures (about 40%). All of the case studies examined water reuse.
- Dow Benelux, NL site: here the main alternative water is brackish. So desalination was examined and it reduced freshwater intake by 3 million m3/year.
- INOVYN, BE: with symbiotic reuse. This is looking at a closed loop for chlorine production, but the EU legal framework for REACH poses some challenges.
- Procter and Gamble: for process loop closure and resource recovery. The waste water contains a lot of ingredients, so the company looked at extracting the valuable products and then using the water for cleaning – this has been done at several plants across Europe.

In conclusion, the aim of the sector is to decouple economic growth from water use and experience has shown that this will be possible in some cases.

Consideration for water reuse in BREFs and BEMPs (T. Petitguyot, EC-DG ENV)

One action in the circular economy action plan is to take better consideration of reuse within BREFs (Best Available Techniques Reference Documents). There are, however, different documents, including BEMPs (Best Environmental Management Practices) under EMAS (Eco-Management and Audit Scheme), as well as under Ecolabel and green public procurement.

BREFs are a critical tool under IED, which covers 50,000 larger installations in the EU. Installations are to operate to BAT (Best Available Techniques) (set out in permits), as identified in the BREFs. The BAT conclusions are adopted as Implementing Decisions by the Commission. The vast majority of the BREFs contain requirements for water reuse (29 out of 31 BREFs). A key aspect is to separate contaminated/non-contaminated streams and closing water loops. There are few quantitative targets (only for the ceramic sector), most BREFS ask to examine/improve, the status of water reuse. BREFs are being updated, so the aim is to further integrate reuse, especially for some sectors (e.g. food, drink and milk sector). There is ongoing identification of key environmental issues to be addressed in BREF reviews and water will probably be an issue or most sectors.

BEMPs are developed to support EMAS, which is a voluntary scheme. 6 of 11 priority sectors are published so far. Those that address reuse include those on building and construction, on tourism, food and beverage, public administration, etc.

Ecolabel: the purpose is to label the best performing products based on performance across the life cycle. Reuse is taken into account for some of the performance requirements.

Green public procurement (GPP) was set out in COM (2008)400, which aims to reduce the environmental impact of public procurement. Common EU GPP criteria have been developed for 21 product and service groups and reuse is addressed in some of them.

2.3.2.3 Discussion and conclusions of the workshop

The main aspects of the discussion were related to the draft of the minimum quality requirements. It was noticed that there is a lack of consensus on several issues, like the parameters to be included in the standards, the limit values, the definition of the categories of use, and the level of strengthen. Most of those involved agree that a risk management approach is the correct one for the EU level as this requires that the conditions of each scheme need to be taken into account, but for each scheme this is not realistic. Also MS have very different conditions, so setting limit values for some substances for all situations does not seem possible.

The presentation from El Port de la Selva demosite raised the issue of which microorganisms to be monitored in managed aquifer recharge for indirect potable reuse. The outcomes of the experience show that viruses are a major concern, as they survive longer than other pathogens in the aquifer. These results will be taken into account for future developments of the minimum quality requirements for managed aquifer recharge.

There will be a following draft modified by integrating all comments received from the participants and it will be tentatively disseminated at the end of December 2016.

3 Workshop on water reuse governance

In the governance research of Demoware the following activities have been done (WP5): baseline assessment at water reuse schemes (Deliverable 5.1 Issues and response maps), review of EU policy and international review on public acceptance and trust (Deliverable 5.2 Trust in reuse), and tailored advice on stakeholder participation (Deliverable 5.3 Tailored advice on public engagement and stakeholder collaboration strategy for water reuse).

The research outcomes will be presented as good practices in a policy brief (Deliverable 5.4, Policy brief on transferable lessons). Input and reflection on these good practices is gathered from practitioners through workshops with stakeholders at the water reuse schemes of Capitanata (Deliverable 7.2 Stakeholders workshops report) and Sabadell.

Those deliverables open to the general public can be found at the results section of the Demoware website: http://demoware.eu/en/results/deliverables. The objectives of the Sabadell water reuse governance workshop are, to:

- discuss the governance challenges of the Sabadell water reuse schemes
- learn from the experiences of other sites, e.g. Olympic Park
- derive water reuse policy recommendations

The workshop took place on 15 September 2016, at CASSA, Sabadell.

3.1 Programme

The complete agenda of the workshop is listed below:

10:30 **Welcome**
Jordi Vinyoles Cartanyà, CASSA

10:40 **Introduction: Demoware project and workshop objectives**
Jos Frijns, KWR

10:50 **Water reuse governance experience in Sabadell**
Joan Berlanga, Ajuntament de Sabadell

11:10 **Public engagement in water reuse in Sabadell**
Jos Frijns, KWR

11:30 **Water reuse governance challenges: lessons from Olympic Park, London**
Daniel Goodwin, Thames Water / Cranfield University

12:00 **Coffee break**

12:40 **Good practices in water reuse governance**
Jos Frijns, KWR

13:00 **Workshop on good practices for Sabadell / EU**
Open debate among participants

14:00 **Closing**

Jordi Vinyoles Cartanyà, CASSA

3.2 Presentations

A brief summary of the main contents addressed at the presentations is developed below.

Jordi Vinyoles Cartanyà (CASSA) welcomed the participants. Regenerated wastewater is currently used for urban purposes in Sabadell, mainly in commercial areas (flushing toilettes), street cleaning and public parks and private gardens irrigation.

Joan Berlanga, councillor of the city council, stressed the importance of water reuse as the region suffers from water scarcity (e.g. there has been no rain for the last 3 months). For successful water reuse, the participation of citizens is needed. The council has started an education programme for schools and an information campaign on toilet flushing with reclaimed water. The water quality in the river needs to be improved. There is good collaboration with CASSA.

Jos Frijns (KWR) presented the Demoware governance research results on public engagement. An international review showed that public acceptance is key for the success and/or failure of water reuse schemes. Public acceptance is among others related to the trust in water reuse organisations. The focus group meeting with citizens in Sabadell revealed the in general positive attitude of the citizens towards all kinds of urban water reuse. The need for a consistent communication plan was stressed by the citizens. Demoware outcomes suggest raising public awareness, active forms of engagement and the use of multiple communication channels.

Daniel Goodwin (Thames Water / Cranfield University) presented the governance challenges of urban water reuse at Olympic Park, London. The challenges relate to the required risk management plan and the resulting high cost of reclaimed water. Extensive engagement with customers throughout the design and development process was undertaken.

The presentations can be downloaded from the following link http://demoware.eu/en/events/sabadell-governance-workshop-15092016.

3.3 Good practices in water reuse governance

The Demoware governance research identified key governance challenges that need to be addressed for water reuse. In total, six governance challenges are derived:

1. Clear and realistic quality standards and operating requirements
2. A 'fit-for-purpose' monitoring system
3. Facilitate access to capital financing
4. Set competitive recycled water tariffs
5. Promote stakeholder and public collaboration and involvement
6. Inform, raise awareness and educate

In the workshop, the input and reflection of the participants on these good practices were gathered. In total, 4 participants (2 from CASSA, 1 City Council, 1 ACA) participated in the workshop discussions. Three questions were posed:

1. In view of the EU ambition to realise the widespread implementation of water reuse schemes, which good practices do you consider most important for this region in the coming five years?
2. For the successful adoption of which good practices, is most EU support required?

3. In relation to the successful adoption of which good practice can your organisation make the biggest contribution?

For the first two questions, the participants were asked to place three stickers on one good practice, or divide them up between the different good practices. The result of the stickers is shown in Figure 1. The outcome of the discussion is presented below.

The most important good practice for the Sabadell region is competitive reclaimed water tariffs. The price will be decisive and this is truly a challenge (for example related to the high costs for a double net).

The first question was slightly misunderstood. Priorities were given to those good practices that are not within the action perspectives of the own organisations: national government to set realistic quality standards (that include as well improved monitoring requirements) and EU to provide financial support. Information provision is important but not scored as it is relatively easy to do themselves.

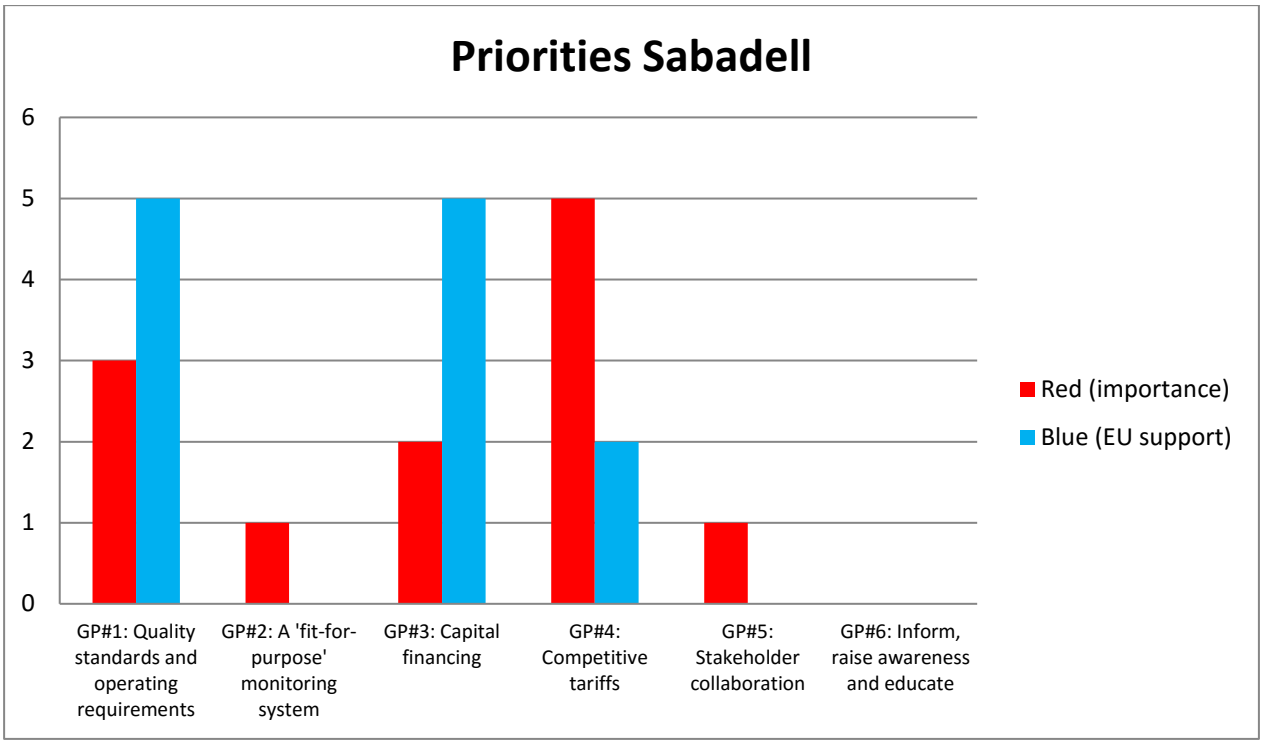

Figure 1 Priorities of participants on good practices on water reuse governance in Sabadell according to importance and EU support

All six practices were considered important, with a suggested 7th good practice: have an integrated approach towards drinking water and reclaimed water, i.e. similar policies, finance etc. independent whether it relates to drinking or reclaimed water.

Capital finance (subsidy) is expected from the EU as the most EU support required. Likewise, the EU should set regulations that ensures good, safe water quality and the use of validated technology. These regulations will then result in less need for extensive monitoring requirements.

For quality standards, the regulations set by the national government will be decisive. Regional (Catalan Water Agency and Catalan Health Agency) and EU regulations will contribute to having national regulations that set realistic standards and related monitoring requirements.

The city council cannot give additional financial support to the reuse scheme. Setting competitive tariffs can be partly dealt with at a regional scale: ACA is already applying no tax on reclaimed water, and there could be regional cross subsidy for reuse projects. Participants also mentioned that having more realistic quality standards will result in lower prices for reclaimed water.

Promoting stakeholder and public collaboration is obviously something CASSA is already doing. The City Council is active in informing and educating (e.g. at schools). CASSA can contribute as well to information and awareness raising, including the use of focus groups meeting with citizens.

4 Conclusions and challenges

Dissemination to policy-makers is an essential activity to promote the inclusion of water reuse on water related policies at EU level, tacking low levels of public administrations interest on this subject.

The different initiatives carried out during the DEMOWARE project to promote the science-policy dialogue on water reuse included organization of workshops, participation in several water reuse initiatives launched by the EC, presentation of the work carried out at several DEMOSITES in workshops and meetings with policy-makers, and face-to-face meetings with EC representatives. All these activities were considered very valuable by the policy-makers involved.

DEMOWARE partners have been involved in the most important initiatives to promote water reuse at EU level, and it has been considered an important asset to support the different instruments developed for maximizing water reuse practices in Europe, like the technical document that is being developed to establish minimum water quality requirements for water reuse on agricultural irrigation and aquifer recharge, and the development of the *Guidelines on Integrating Water Reuse in Water Planning and Management in the context of the Water Framework Directive*. In parallel, the workshop organized specifically for local administrations at the Sabadell demosite was experienced as positive by the participants to increase water reuse knowledge on governance issues.

Several key challenges for governance were identified to be addressed for water reuse schemes. It is crucial to develop realistic water quality standards to protect human health and the environment establishing a monitoring program “fit-for-purpose”. Access to capital for financing water reuse projects should be facilitated. In addition, competitive reclaimed water tariffs are to be established to enable water reuse. Stakeholder collaboration and involvement is vital to assure the implementation of water reuse schemes. Public awareness with information and educational activities is necessary in order to have successfully carry out water reuse projects.

It is essential, and it is a challenge, to liaise project results and partners of this type of projects with policy-makers at different levels to assure the science-policy interface to underpin water reuse initiatives at local, regional, national and European level.

Annex I

Background documents

Background document to the public consultation on policy options to optimise water reuse in the EU

Public consultation on policy options to optimise water re-use in the EU

Background documents

Introduction

Europe's freshwater resources are under increasing stress, with a worrying mismatch between demand for, and availability of, water resources across both temporal and geographical (spatial) scales. Water stress is an issue for arid regions with low rainfall and high population density, but also for temperate areas with intense agricultural, tourism and industrial activities. Global climate change is already exacerbating these problems with projections indicating significant and widespread impacts over the medium to long term. Growing competition for water resources between different water using sectors is already emerging, while high quality resources need to be protected and reserved for drinking water supply.

Europe's ability to respond to the increasing risks of water scarcity and drought could be enhanced by wider reuse of treated wastewater for agricultural, industrial and urban uses in particular. At present, most wastewater originating from urban waste water treatment plants is discharged into water bodies without taking advantage of water reuse solutions' potential. It has been pointed out that this may be due to the lack of common EU environmental/health standards for re-used water and the potential obstacles to the free movement of agricultural products irrigated with reused water.

The maximisation of water reuse is a specific objective of the Blueprint to Safeguard Europe's Water Resources (COM(2012) 673) which mentioned the development of a possible regulation establishing common standards for water reuse. It is also a top priority area in the Strategic Implementation Plan of the European Innovation Partnership for Water.

As a follow-up to the Blueprint, the Commission aims to evaluate the most suitable EU-level instrument/s to foster water reuse, while ensuring the health and environmental safety of water reuse practices and the free trade of food products. In 2015, the Commission intends to finalise an assessment on the issue and, subject to its conclusions, to make a proposal as appropriate.

The Impact Assessment will focus on the reuse of wastewater from urban wastewater treatment plants that has been subject to, at least, secondary treatment, as well as the reuse of appropriately treated industrial wastewater. The assessment will cover all key areas of possible application of water reuse: agriculture, urban, industrial, and recreational uses (e.g. golf courses, bathing), groundwater recharge, etc.

This internet-based consultation is part of the European Commission's efforts to understand the citizens' and stakeholders' views on the need for and possible range of measures which could be undertaken in order to foster safe water reuse solutions. The results will be used as an input for the preparation of the Impact Assessment.

The consultation runs from 30 July 2014 to 7 November 2014.

Please note that this consultation and its results do not prejudge in any way the final outcome and the form of any decision to be taken by the European Commission on this topic.

Questionnaire

Please note that the first questions are of general nature, and replies from question 3 onward require some prior knowledge about EU water policy and the water *acquis*. Questions marked with an asterisk (*) require an answer to be given.
Completing this questionnaire could take up to 30 minutes of your time. Once you start filling in this questionnaire, the maximum time allowed by the system to complete is 90 minutes. Partial responses will not be saved. It is therefore recommended to download the full questionnaire as a PDF and prepare your answers in advance. The PDF document can be found on the consultation page.
Thank you very much for taking the time to contribute to this consultation.

1. Information about you

1.1 Your full name and your email address:
(optional)

Miquel Rovira, miquel.rovira@ctm.com.es

Do you wish your contribution to be made public?
* (compulsory)

- (•) Yes
- ( ) No

1.2 You are replying as a(n):
* (compulsory)

- ( ) Interested individual/citizen/consumer
- ( ) Stakeholder/expert
- ( ) Private company
- ( ) National authority
- ( ) Industrial or trade association
- ( ) Utility / provider
- ( ) Local/regional authority
- ( ) Consumer association
- ( ) Non-governmental organisation (NGO)
- ( ) European Institution
- ( ) Other associations
- ( ) Academic/scientist/research
- ( ) International body
- (•) Other
- ( ) SME
- ( ) Large company

CTM on behalf of project consortium, reflecting the broad consensus of the project management

If responding on behalf of a(n) organisation/association/authority/company/body, please provide the name:
(optional)

DEMOWARE-project (FP7-ENV-2013-WATER-INNO-DEMO GA619040)

If responding on behalf of a(n) organisation/association/authority/company/body, please provide its main sector(s) / field(s) of activity:

(optional)

- [ ] Sanitation
- [ ] Agriculture
- [ ] Economics
- [ ] Drinking water
- [ ] Health
- [x] Other
- [ ] Food Industry
- [ ] Environment / Climate

water reuse research organisations

1.3 Your country/ies:
(compulsory)

- ( ) AT – Austria
- ( ) BE – Belgium
- ( ) BG – Bulgaria
- ( ) CY – Cyprus
- ( ) CZ – Czech Republic
- ( ) DE – Germany
- ( ) DK – Denmark
- ( ) EE – Estonia
- ( ) EL – Greece
- ( ) ES – Spain
- ( ) FI – Finland
- ( ) FR – France
- ( ) HR – Croatia
- ( ) HU – Hungary
- ( ) IE - Ireland
- ( ) IT - Italy
- ( ) LT - Lithuania
- ( ) LU - Luxembourg
- ( ) LV - Latvia
- ( ) MT - Malta
- ( ) NL - Netherlands
- ( ) PL - Poland
- ( ) PT - Portugal
- ( ) RO - Romania
- ( ) SE - Sweden
- ( ) SI - Slovenia
- ( ) SK - Slovakia
- ( ) UK - United Kingdom
- ( ) EU level organisation
- (•) Other

BE, DE, EL, ES, FR, IT, NL, UK, EU

1.4 Do you live in an urbanised or a rural area?
(optional)

- ( ) Urbanised
- ( ) Rural
- (•) Don't know/Not applicable

1.5 Are you aware of water reuse practice in your neighbourhood?
(optional)

- (•) Yes
- ( ) No

1.6 Are you aware of droughts or water scarcity occurring in the area where you live in the past five years?
Drought refers to a temporary decrease in water availability, for example when it does not rain over a long period of time.
Water scarcity occurs when demand for water exceeds the available sustainable resources. Water scarcity situations are not only limited to the southern, drier regions but can occur also in areas in the northern river basins of Europe.
(optional)

- ( ) No
- ( ) Yes, water scarcity
- ( ) I don't know
- ( ) Yes, drought
- (•) Yes, both drought and water scarcity

- [x] Human activities
- [x] Climate change/Less rainfall

2. Your perception of the benefits of and barriers to water reuse

2.1 Which **uses of treated water** do you think are appropriate and should be encouraged, considering that the level of treatment of the water is adjusted in order to meet the quality requirements of the intended uses (several answers possible):

* (compulsory)

- [x] Irrigation of urban green spaces
- [x] Irrigation of fruits and vegetables to be processed
- [x] Food industry
- [x] Street cleaning
- [x] Irrigation of cotton and other crops used for clothing products
- [ ] Drinking water
- [x] Fire fighting
- [x] Irrigation of non-food crops (e.g. animal feed crops, energy crops, etc.) and tree plantations
- [x] Cooling (in energy production / industry)
- [x] Irrigation of golf courses and other sport fields
- [x] Groundwater recharge
- [x] Other industry
- [ ] Bathing waters
- [ ] Food industry with food contact
- [ ] Other
- [ ] Irrigation of fruits and vegetables to be eaten raw
- [x] Food industry with no food contact

Please specify

In view of the extent of de facto indirect reuse (by using surface water which has received considerable amounts of treated wastewater) we consider planned indirect potable reuse (IPR) through e.g. managed aquifer recharge a suitable application.
To our understanding the scope of the impact assessment should be restricted to the use of municipal wastewater and industrial wastewater in other sectors / outside the treatment facilities. The on-site recycling of industrial wastewater streams to increase water efficiency in industrial production is not subject to this IA but should be subject to other ambitions (e.g. BREFs).
Further, reuse of industrial water would be mostly applicable in an industrial context.

2.2. Please indicate your views on the level of the following potential benefits of water reuse:

	High	Medium	Low	I don't consider this as a potential benefit	I don't know
Reduced water scarcity * (compulsory)	●	○	○	○	○
Reduced pollution discharge from urban waste water treatment plants into rivers * (compulsory)	○	○	○	●	○
Improved resilience/adaptation to climate change * (compulsory)	●	○	○	○	○
Energy and carbon savings * (compulsory)	○	○	●	○	○
Increased resource efficiency (nutrients recycling) * (compulsory)	●	○	○	○	○
Contribution to soil fertilisation * (compulsory)	○	●	○	○	○
Cost savings for public authorities * (compulsory)	○	●	○	○	○
Cost savings for water users * (compulsory)	○	●	○	○	○
Increased revenues for the agricultural sector (due to higher water availability and productivity) * (compulsory)	●	○	○	○	○
Increased revenues for the tourism sector (due to higher water availability) * (compulsory)	○	●	○	○	○
Innovation potential in the water industry * (compulsory)	○	●	○	○	○
Job creation * (compulsory)	○	●	○	○	○

If you identify other important benefits, please specify them:
(optional)

Potential development growth in new residential areas
Increased food self-sufficiency
Increase of industrial production in certain sectors

2.3. Please indicate the importance of the following main barriers to a wider uptake of water re-use solutions:

	High	Medium	Low	I don't consider this as a barrier	I don't know
Too high cost of reused water	○	●	○	○	○
Too low price of freshwater water	●	○	○	○	○
Insufficient control on (freshwater) water abstractions	○	●	○	○	○
Lack of awareness on the multiple benefits of water reuse	●	○	○	○	○
Water reuse not seen as a component of integrated water management (e.g. in scarce areas no incentives to water reuse in place)	●	○	○	○	○
Fear of potential trade barriers for food products	○	●	○	○	○
Negative public perception on the quality of reused water	○	●	○	○	○
Lack of clarity in the regulatory framework to manage risks associated with water reuse	●	○	○	○	○
Too stringent national water reuse standards	●	○	○	○	○
Technical barriers and scientific uncertainties	○	○	●	○	○

If you identify other important barriers, please specify them:
(optional)

Lack of public participation, customer engagement and stakeholder collaboration
Insufficient evaluation of costs and (external) benefits
Unclear responsibilities and liabilities for authorities, utilities and end-users

3. Your opinion on possible EU measures

3.1 Please indicate your opinion on the likely effectiveness of the following potential EU measures to **promote water reuse** (where cost-effective)

	(a) very effective	(b) Effective	(c)Slightly effective	(d) Not effective at all	(e) I don't know
1. Maintaining status quo: No new EU measure	○	○	○	●	○
2. Optimising status quo: Increased enforcement of WFD requirements on water pricing & freshwater abstraction control, integrated water management and better governance	○	●	○	○	○

3.1 Non regulatory measure: Develop non-binding EU guidelines on how to foster water reuse	○	○	◉	○	○
3.2 Non regulatory measure: Promotion of forthcoming ISO/CEN water reuse standards as a common reference for management of health and environmental risks to be used by Member States	○	◉	○	○	○
3.3 Non regulatory measure: Awareness raising and dissemination of information on the various benefits of water reuse, among all key stakeholders/consumers	○	◉	○	○	○
3.4 Non regulatory measure: Non-binding guidance on the implementation of the WFD and Urban Waste Water Treatment Directive (e.g.: clarify provisions of the UWWT Directive on water reuse; give priority to water reuse among alternative water supply options; encourage water stressed Member States to set targets for water reuse)	○	◉	○	○	○
4.1 Regulatory measure: Legally binding framework to require that MS in water stressed river basins assess the contribution of water reuse and, when relevant, set targets for it, while managing health and environmental risks	○	◉	○	○	○
4.2 Regulatory measure: Legally binding minimum standards on water reuse at EU level *In the present context, the term 'standard' refers to different types of documents that provide requirements, specifications, guidelines or characteristics (e.g. water quality, reuse practices, etc...) to ensure that water reuse projects achieve an acceptable level of health and/or environmental protection*	◉	○	○	○	○

If you think other EU measures would be relevant in order to promote water reuse, please specify them:
(optional)

R&D programs and demonstrative actions

Funding and financing programmes

Do you consider that a combination of different measures would be necessary to **promote water reuse**?
* (compulsory)

(●) Yes ( ) No

The ranked effective measures should be combined in a coordinated and phased way. Need for both mandatory elements and supportive guidance and incentives.

3.2. Please indicate your opinion on the potential effectiveness of the following possible EU measures to ensure the **environmental and health safety** of water reuse practices

	Very effective	Effective	Slightly effective	Not effective at all	I don't know
1. Maintaining status quo: No new EU measure	( )	( )	(●)	( )	( )
2. Non regulatory measure: Promotion of forthcoming ISO/CEN water reuse standards as common referential for the management of health and environmental risks to be used by Member States	( )	(●)	( )	( )	( )
3. Regulatory measure: Legally binding minimum standards on water reuse at the EU level addressing health and environmental risks *In the present context, the term 'standard' refers to different types of documents that provide requirements, specifications, guidelines or characteristics (e.g. water quality, reuse practices, etc...) to ensure that water reuse projects achieve an acceptable level of health and/or environmental protection*	(●)	( )	( )	( )	( )

If you think other EU policy measures would be relevant in order to ensure the safety of water reuse practices, please specify them:
(optional)

Consider cross-sectorial measures (agriculture, industry, environmental)

Do you consider that a combination of different measures would be necessary to ensure **the safety of water reuse practices**?
* (compulsory)

( ) Yes (●) No

3.3. Please indicate what are in your view the **main pros and cons**, **costs and benefits** for the possible EU measures, aiming to achieve a higher uptake of safe water reuse in the EU (as mentioned before, the options below could be combined):

3.3.1 Maintaining status quo: no EU measure - **Pros and Cons**
(optional) (maximum 1500 characters; count: 0)

Pros: no costs
Cons: no uptake of water reuse development expected, risk of unmanaged water reuse

(a) 3.3.1 Maintaining status quo: no EU measure - **Benefits/Costs (in monetary terms)** (optional) (maximum 1000 characters; count: 0)

No implementation costs but additional cost for alternative climate change adaptation measures
Additional costs incurred, as benefits of water reuse will not be utilised

3.3.2 Optimising status quo: Increase enforcement of WFD requirements concerning water pricing and freshwater abstraction control, integrated water management and better governance - **Pros and Cons** (optional) (maximum 1500 characters; count: 0)

Pro: consensus likely, some mandatory reporting obligations on water reuse could be added easily
Cons: might not be sufficient, water pricing issue is critical and debated

3.3.2 Optimising status quo: Increase enforcement of WFD requirements concerning water pricing and freshwater abstraction control, integrated water management and better governance - **Benefits/Costs (in monetary terms)** (optional) (maximum 1000 characters; count: 0)

Better cost-recovery makes water reuse more viable
Not much additional costs

3.3.3 Non regulatory measure: Develop non-binding EU guidelines on how to foster water reuse - **Pros and Cons** (optional) (maximum 1500 characters; count: 0)

Pros: informative instrument, simple measure to implement
Cons: limited impact

3.3.3 Non regulatory measure: Develop non-binding EU guidelines on how to foster water reuse -**Benefits/Costs (in monetary terms)** (optional) (maximum 1000 characters; count: 0)

Benefits: no costs of enforcement
Costs: low

3.3.4 Non regulatory measure: Promotion of forthcoming ISO/CEN water reuse standards as a common reference for the management of health and environmental risks to be used by the Member States - **Pros and Cons** (optional) (maximum 1500 characters; count: 0)

Pros: leveraging ongoing activity, based on broad international expertise
Cons: limited scope, covering irrigation uses only

3.3.4 Non regulatory measure: Promotion of forthcoming ISO/CEN water reuse standards as a common reference for the management of health and environmental risks to be used by the Member States - **Benefits/Costs (in monetary terms)** (optional) (maximum 1000 characters; count: 0)

Benefits : increase of reuse projects
Costs : low regulatory costs

3.3.5 Non regulatory measure: Awareness raising and dissemination of information on the various benefits of water reuse, among all key stakeholders - **Pros and Cons** (optional) (maximum 1500 characters; count: 0)

Pros: inform and influence public perception, educate and disseminate correct / unbiased information
Cons: water shortages will drive consideration of reuse schemes; rather suitable as complimentary measure

3.3.5 Non regulatory measure: Awareness raising and dissemination of information on the various benefits of water reuse, among all key stakeholders - **Benefits/Costs (in monetary terms)** (optional) (maximum 1000 characters; count: 0)

Benefits: low cost
Costs: low cost

3.3.6 Non regulatory measure: Develop non-binding EU guidelines on implementation of the Water Framework Directive and Urban Waste Water Treatment Directive (e.g.: clarify provisions of the Urban Waste Water Treatment Directive on water reuse; give priority to water reuse among alternative water supply options; encourage water stressed Member States to set targets for water reuse) - **Pros and Cons**
(optional) (maximum 1500 characters; count: 0)

Pros: builds on established procedures and fosters impact of current directives
Cons: non-binding thus limited impact, compliance rather questionable

3.3.6 Non regulatory measure: Develop non-binding EU guidelines on implementation of the Water Framework Directive and Urban Waste Water Treatment Directive (e.g.: clarify provisions of the Urban Waste Water Treatment Directive on water reuse; give priority to water reuse among alternative water supply options; encourage water stressed Member States to set targets for water reuse) - **Benefits/Costs (in monetary terms)**
(optional) (maximum 1000 characters; count: 0)

Benefits: leverage investments made for UWWTD/WFD implementation
Costs: relatively low

3.3.7 Regulatory measure: Legally binding framework to require that, in water stressed river basins, MS assess the contribution of water reuse under different water stress scenarios and, when relevant, set targets for water reuse in accordance with a clear framework for managing health and environmental risks - **Pros and Cons**
(optional) (maximum 1500 characters; count: 0)

Pros: targeted and effective, significant impact
Cons: consensus needed among MS

3.3.7 Regulatory measure: Legally binding framework to require that, in water stressed river basins, MS assess the contribution of water reuse under different water stress scenarios and, when relevant, set targets for water reuse in accordance with a clear framework for managing health and environmental risks - **Benefits/Costs (in monetary terms)**
(optional) (maximum 1000 characters; count: 0)

Benefits: better achievement of benefits of water reuse in river basins
Costs: significant if targets are set and adequate infrastructure needs to be built

In the present context, the term 'standard' refers to different types of documents that provide requirements, specifications, guidelines or characteristics (e.g. water quality, reuse practices, etc...) to ensure that water reuse projects achieve an acceptable level of health and/or environmental protection

3.3.8 Regulatory measure: Legally binding minimum standards on water reuse at EU level addressing health and environmental risks - **Pros and Cons**

(optional) (maximum 1500 characters; count: 0)

Pros: high level of protection can be achieved; regulations will have positive influence on public trust in reuse schemes
Cons: demanding process to establish minimum standards; could hamper reuse if induced costs are too high

In the present context, the term 'standard' refers to different types of documents that provide requirements, specifications, guidelines or characteristics (e.g. water quality, reuse practices, etc...) to ensure that water reuse projects achieve an acceptable level of health and/or environmental protection

3.3.8 Regulatory measure: Legally binding minimum standards on water reuse at EU level addressing health and environmental risks - **Benefits/Costs (in monetary terms)**

(optional) (maximum 1000 characters; count: 0)

Benefits: harmonisation within EU
Costs for implementation and monitoring may be high, and thus may hamper reuse projects.

3.4. According to you what should be the main focus of a potential EU-level measure on water reuse?

	High	Medium	Low	I don't know
Promoting water reuse where relevant * (compulsory)	◉	○	○	○
Safety of water reuse applications * (compulsory)	◉	○	○	○

If you have any additional comments, please provide them in the box below:
(optional) (maximum 1000 characters; count: 0)

Promote activities for the demonstration benefits of water reuse
Balance between promotion of water reuse and its safe application
Provide water quality standards and operational risk management guidelines
No disproportional measures for reused water compared to other water resources
Water quality to be judged according to its appropriateness for use and not its origin
Recognised methodologies for water reuse project design and capacity building

Annex II

DEMOWARE comments on the Draft 3 of the CIS Guidance on Water Reuse provided to DGENV and the external consultant on 12 February 2015.

Name and contact details	FP7-619040 DEMOWARE project Xavier Martinez Lladó (xavier.martinez@ctm.com.es) Demoware technical coordinator
Please indicate if you have provided any attachments (e.g. information for cases to be included, etc.)	

Chapter	Subject	Comment
1	**Introduction**	
1.1	How using reclaimed water may contribute to meeting WFD and other EU policy objectives	
2	**Definitions: what is reused water?**	
3	**Different potential sources and uses for reuse of treated waste water**	"This guidance does not suggest any priority between the different possible purposes" This is not true as the guidance gives preference to non-potable reuse. "The costs (treatment and distribution) of providing the water are acceptable, sustainable and competitive with other sources" The cost of reuse is higher in most cases compared to groundwater abstraction, but if GW is not available in the required quantities preference should be given the reuse and GW quantity improvement even if this is associated with higher cost.
3.1	Contribute to environmental objectives/make water available for future uses	"However, the practice of groundwater recharge may raise concerns depending on the quality of the water injected" Injected or infiltrated? (two different issues) It would help the reader to reason about the compliance of the given examples with EU law, if the WW treatment technologies before entering the eco-system/aquifer are indicated. Possibly this could a table on examples in the Annex.
3.2	Agricultural irrigation	

3.3	Industrial uses	The Tarragona site as an example for water reuse in the industrial sector should be given (http://demoware.eu/en/demo-sites/tarragona)
3.4	Municipal/landscape uses	The Toreele Site as example for aquifer recharge and potable reuse should be given (http://demoware.eu/en/demo-sites/torreele)
4	**The benefits and risks of re-using treated waste water**	
4.1	Introduction	
4.2	The environmental benefits of the reuse of treated waste water	
4.3	Economic benefits of reuse of treated waste water	
4.4	Wider economic benefits due to avoided costs related to water scarcity and in adaptation to climate change	
4.5	Increased business competitiveness through stimulating innovation	Mention the establishment of the association Water Reuse Europe (www.water-reuse.eu). Water Reuse Europe (WRE) is the trade association for organisations involved in the European water reuse sector. WRE's mission is to create a collective identity for the European water reuse sector and promote an innovative and dynamic water reuse industry.
4.6	Social benefits of water reuse	
4.7	The risks and drawbacks of the reuse of treated waste water to the environment	"**Therefore, water reuse schemes may require treatment beyond that of secondary treatment to remove any substances of concern to the protection of soils or water bodies**." This might to too strict: "any substances of concern" limits all treatments to RO + UV/AOP. One should not mix risk and concern. Pharmaceuticals will be present in all/most reuse application such as irrigation in agriculture, golf courses etc. Many people are concerned about TrOC transfer to crop, even though little evidence is given that it is a risk for consumers or the environment. "**Distribution and storage of treated waste water:** the economics of water reuse schemes mean that source, treatment and use locations are often relatively close together." This is at the end a strong argument for urban reuses (e.g. potable, public/private irrigation) or high yield agriculture (e.g. crop to be eaten raw) next to larger cities. Most

		agricultural areas are not local next to large urban area thus long transfer distances may hinder reuse.
4.8	The risks and drawbacks of the reuse of treated waste water to health	"Further, persistence and possible accumulation of *Escherichia coli* in soil and vegetables are very limited, even when the bacterium is present in irrigation water in high concentrations." This is an argument for what? That E.Coli is a bad indicator, as the survival time might be low compared to the one of pathogens? "Water, soil and produce samples were analysed for *E. Coli* bacteria. In all cases, the concentration of these infective agents on the tomatoes and potatoes was negligible, so consumption of these vegetables could be considered safe." Again, other (pathogenic) MO might survive longer in the environment compared to E.Coli. Other indicators such as Clostridium perfr. or Enterococci intest. might be better suitable, but maybe overall more solid data on survival of viruses compared to the indicators is needed.
5	**Ensuring the reuse of treated waste water is consistent with EU water law**	
5.1	Introduction	
5.2	Water Framework Directive 2000/60/EC (WFD)	
5.3	Groundwater Directive 2006/118/EC (GWD)	
5.4	Directive 91/271/EEC concerning urban waste water treatment (UWWTD)	"Where nitrogen and/or phosphorus in the water is applied in irrigation, the nature of the receiving soils, rate of uptake by the crop (and how this varies across a season) and other factors all affect whether the nitrogen and/or phosphorus applied in the irrigation water could contribute to pollution in the Sensitive Area. If there is a risk, there are two options available:" As the (complete) absence of risk cannot be scientifically proven, this sentence does not make sense, as in risk management "no risk" vs "a risk" is not a concept. Better would be a "not-acceptable risk level" (a risk) or "the residual risk is negligible" (for no risk). Or as option could be stated "an risk assessment compared to the expected benefits should be performed"
5.5	Directive 91/676/EEC concerning the protection of	

	waters against pollution caused by nitrates from agricultural sources (Nitrates Directive)	
5.6	Conclusions	
6	**Planning for the reuse of treated waste water**	
6.1	Introduction: the planning context	
6.2	Steps in planning for reuse of treated waste water	The interaction of the planning process and the risk assessment (see 7.4) remains unclear. The RA should already be part of the planning process, as it defines the health risk associated treatment requirements. Risk management/assessment should be seen as an integral part of the planning process.
7	**Ensuring the reuse of treated waste water is safe for people and the environment**	
7.1	Introduction	
7.2	Standards for the quality of reused treated waste water	
7.3	Practical application of quality standards	
7.4	Risk assessment and management	Consider adding the water reuse safety plan approach.
8	**Public participation and communication**	
8.1	Introduction	
8.2	How to engage with the public and stakeholders	
8.3	Issues affecting public acceptability	
9	**Funding Water Reuse Schemes**	
9.1	Introduction	
9.2	Water pricing as a source of funding	
9.3	The use of EU level funds	

Annex III

Invited experts	Affiliation
1. Laura Achene (IT)	Italian Institute for Health (ISS)
2. Andreas Angelakis (EL)	Dept. for Water Resources, Institute of Iraklion, Hellenic National Agricultural Research Foundation (NAGREF)
3. Anders Dalsgaard (DK)	University of Copenhagen, WHO representative on water reuse issues for the EC
4. Jörg E. Drewes (DE)	Technological University of Munich Chair of the IWA Water Reuse Specialist Group
5. Despo Fatta-Kassinos (CY)	NIREAS-International Water Research Centre, University of Cyprus
6. John Fawell (UK)	Private consultant
7. Anita Forslund (DK)	University of Copenhagen
8. Albert Jansen (NL)	Netherland's Organization for Applied Scientific Research (TNO)
9. Valentina Lazarova (FR)	SUEZ Environnement
10. Helena Marecos do Monte (PT)	Instituto Superior de Engenharia de Lisboa (ISEL)
11. Gertjan Medema (NL)	Water Cycle Research Institute (KWR)
12. Duncan Mara (UK)	Emeritus Professor, Faculty of Civil Engineering, Leeds University
13. Bruno Molle (FR)	Institut National de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture (IRSTEA)
14. Alfieri Pollice (IT)	Water Research Institute, Italian National Research Council (IRSA-CNR)
15. Thomas Ternes (DE)	German Federal Institute of Hydrology (BfG)
16. Marie Teyssandier (FR)	French National Authority for Health
17. Emmanuel Van Houtte (BE)	Intermunicipal Water Company of the Veurne Region (I.W.V.A.)
18. Thomas Wintgens (DE)	University of Applied Science and Arts Northwestern Switzerland (FHNW)
19. Domingo Zarzo (ES)	Spanish Desalination and Water Reuse Association

Organizers	Affiliation
20. Thomas Petitguyot	EC- DG ENVIRONMENT (DGENV)
21. Laura Alcalde Sanz	EC-Joint Research Centre (JRC)
22. Bernd M. Gawlik	EC-Joint Research Centre (JRC)