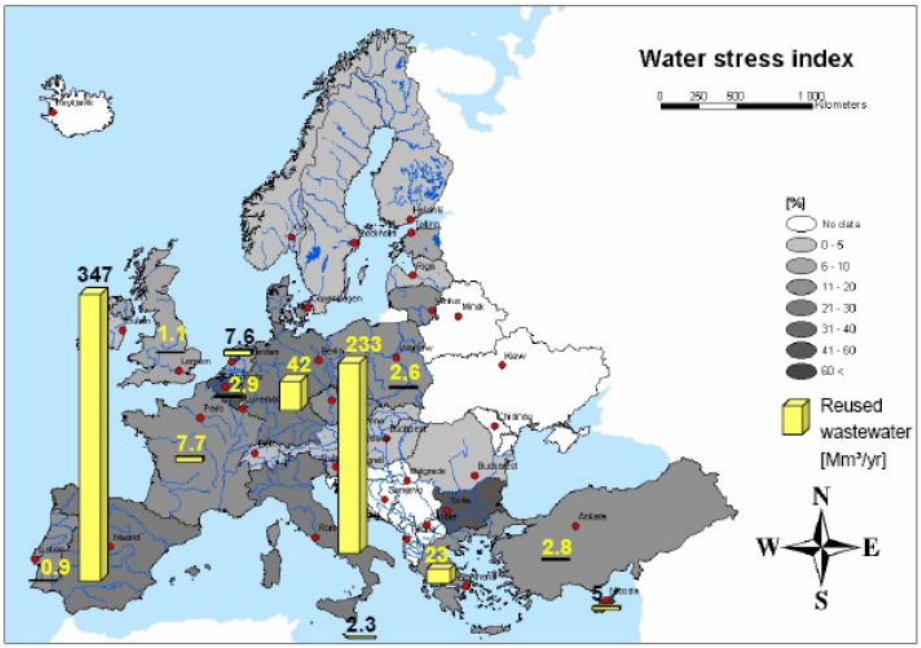
# Background document to the public consultation on policy options to optimise water reuse in the EU

## 1. Current situation and future trends in water reuse

### Current situation

Reports on wastewater reuse in the European Union have recently been commissioned by DG ENV (TYPSA, 2012; TYPSA, 2013) in order to get an overview of current reuse practices in Europe. These reports, however, mostly refer to information sources from 2006-2007. In particular, comprehensive data on quantities reused date back to 2006 (data produced as part of the EU-funded AQUAREC project). In 2006, it was estimated that the total volume of reused treated wastewater in the EU amounted to **964 Mm³/year**, accounting for **2.4% of the treated urban wastewater effluents** (Hochstrat et al., 2006)[1]. Figure 1 below presents the amount of reused wastewater in European countries, as estimated by AQUAREC in 2006, relative to the spatial distribution of water stress. **Spain** accounted for about **a third of the total volume of EU water reuse (347 Mm³/year)** while **Italy** used approximately **233 Mm³/year**. In both countries, agriculture is the dominant use. Reclaimed water reuse was also significant in **Cyprus (100% of treated effluents)** and **Malta (just under 60%)**, whereas in Greece, Italy and Spain water reuse constituted only between 5 and 12 % of their treated effluents.

**Figure 1: Reuse of reclaimed water in Europe (2006)**




An overview of the water reuse situation by Member State is provided in the 2013 report by TYPSA for DG ENV.

### Future trends

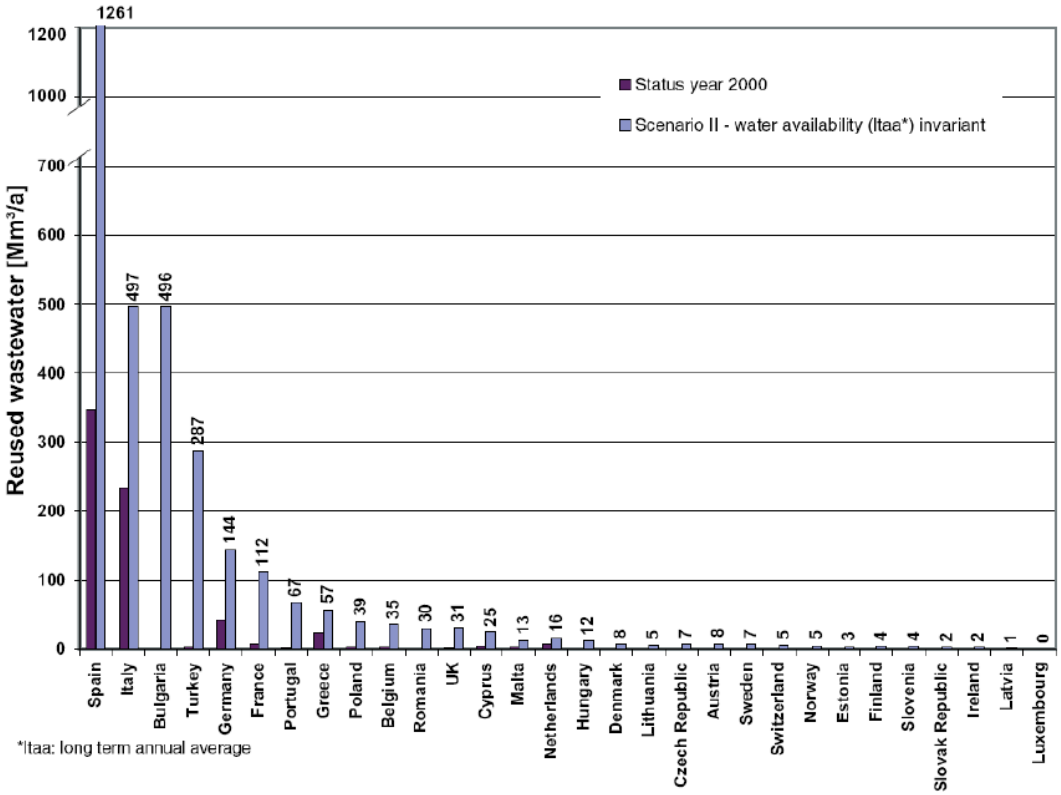
Analysts agree on the **significant potential for further development of water reuse projects in the EU**. **Climate change** pressures are likely to increase the level of interest in such solutions for both mitigating wastewater disposal impacts and episodic drought effects (Falloon et al., 2010). Moreover, a number of countries are developing the policy framework and – for those that do not possess suitable wastewater treatment technology – technical capacities needed to promote the uptake of water reuse.

In 2006, the AQUAREC project developed a model to estimate the potential for water reuse in the EU. This model was based on a mass balance approach considering the quantity of reclaimed water available for reuse on the one

[1] The remaining treated urban waste water is generally discharged back into water bodies.

hand, and the demand for such water in different activity sectors on the other hand. Key results from this model are presented in the figure below.

**Figure 2: Model output for wastewater reuse potential of European countries on a projection horizon of 2025 (Scenario II), from the AQUAREC project**




Overall, the estimate predicts a wastewater reuse volume of **3,222 Mm$^3$/year** in Europe **by 2025**, with **Spain showing the greatest reuse potential (over 1,200 Mm$^3$/year)**. **Italy and Bulgaria** both have an estimated reuse potential of approximately **500 Mm$^3$/year**, while **Germany and France** are projected to reuse **142** and **112 Mm$^3$/year** of water respectively, with significant increases from their current baseline; they are followed by **Portugal and Greece**, which account for reuse potential of **less than 100 Mm$^3$/year**.

## 2. Problem definition

Water reuse is considered as an effective way of helping to solve the water scarcity and droughts issue in the EU, and reduce the contamination burden from wastewater, as well as the costs of treatment. It may also have a lower environmental impact than other alternative water supplies such as water transfers or desalination. Although the reuse of reclaimed water is an accepted practice in several EU countries experiencing water scarcity issues (e.g. Cyprus, France, Greece, Italy, Malta, Portugal, Spain), where it has become an integral and effective component of long-term water resources management, overall only a small proportion of reclaimed water is currently reused in the EU, including in those countries. Hence, there is significant potential for an increased uptake of water reuse solutions.

The problem to be addressed can be summarised as follows: **in spite of its numerous advantages and development potential, the reuse of reclaimed water is not widely implemented in many Member States.** While the reuse of water may not be an appropriate solution in all places and circumstances, for technical and/or economic reasons, there are many lost opportunities to develop water reuse schemes. Six main types of barriers have been identified and are presented below.

## Issue 1 (I1): Inadequate water pricing and business models

**Insufficient price differentials** between reused reclaimed water and freshwater, exacerbated by a **lack of full cost recovery** within most EU water markets (poor enforcement of the cost recovery principle set by Art. 9 of the WFD, in particular), limit the economic attractiveness of water reuse projects. Water is incorrectly priced, failing to account for the range of external costs associated with the abstraction, purification and discharge cycle. This issue can be considered as a regulatory failure as it results from improper implementation of the WFD provisions.

## Issue 2 (I2): Insufficient monitoring of freshwater abstraction

Insufficient monitoring of freshwater abstraction is observed in many Member States, mostly in the agriculture sector (e.g. irrigation), with many instances of illegal abstraction together with abstraction permits going beyond available resources. The fact that the raw freshwater is abstracted for free (illegally) or is over-allocated contributes to maintaining a low level of demand for reclaimed water. This issue can be considered as a regulatory failure as it results from improper implementation of the WFD provisions.

## Issue 3 (I3): Uncertainties for decision-makers

Due to the fact that different MS have developed different standards, **this might create some trade barriers** for **agricultural goods** where these goods irrigated with reclaimed water are put on the common market as the level of safety in the producing Member States may be not considered as sufficient by the importing countries[2].

In some Member States where no water reuse standards are in place (i.e. Member States other than CY, ES, FR, EL, IT, and PT), there is a **lack of clarity in the regulatory framework to manage health and environmental risks**, and a **lack of confidence in the health and environmental safety** of water reuse practices. Health and environmental safety conditions under which wastewater may be reused are not clearly specified by EU legislation for applications such as agriculture, urban uses, industrial uses and certain recreational uses. In addition to the lack of common EU standards on water reuse, there are uncertainties with regard to potentially applicable legislation that need to be taken into account when issuing permits for reuse projects.

Low levels of demand for water reuse are partly due to the **lack of stakeholders' awareness concerning the benefits of water reuse** (information failure). In addition to the most obvious benefits (mitigation of economic risks related to water scarcity, conservation of the aquatic environment, cost savings for utilities), there are a host of benefits that stakeholders are not aware of (e.g. energy and carbon savings, reduced costs and environmental impacts associated with synthetic fertilisers, local economic development).

No matter how technically sound and scientifically justifiable the water reuse schemes are, they can fail for a lack of **public acceptance**. Reuse for potable purposes meets with the strongest opposition but, even for non-potable reuse purposes, public attitudes such as perception of water quality play an important role. Perceived health risks may result from a lack of knowledge and misconceptions on what 'reclaimed water' means and how it may be used.

## Issue 4 (I4): Very stringent water reuse standards in some Member States

Where national standards are in place, they might be very stringent (e.g. sometimes similar to those for drinking water even for non-potable uses) thereby limiting the economic attractiveness of water reuse schemes for potential investors. Complying with standards involves significant costs, especially if existing waste water treatment plants need to be refurbished. Another obstacle is the high number of quality parameters to be monitored and the high sampling frequency required, entailing high monitoring costs.

[2] The case of ill-founded accusations in Germany regarding cucumbers from Spain as the cause of a deadly E. coli outbreak is often quoted as an example by the stakeholders.

### Issue 5 (I5): Reuse not seen as a component of integrated water management approaches

A higher uptake of water reuse is hindered by insufficiently integrated water management mainly due to **fragmentation of responsibilities** for and authority over different parts of the water cycle; and a l**ack of communication and cooperation among stakeholders** involved in the whole water cycle, in particular between **water supply** and **sanitation** stakeholders.

In the WFD, reuse of water is mentioned as one of the possible measures to achieve the Directive's quality goals (Part B of Annex VI), however this remains a recommendation rather than a requirement. Furthermore, **article 12 of the Urban Waste Water Treatment Directive (UWWTD)** is limited to encouraging the reuse of treated wastewater.

### Issue 6 (I6): Technical barriers and scientific uncertainties

The water reuse sector in the EU seems to be mature, technical solutions are well-known and available to cover a wide range of applications and environments, however these solutions are not always cheap and there remain a few technical challenges (e.g. *removal of micropollutants* – heavy metals, pharmaceuticals, drug metabolites, household chemicals, etc. – by conventional treatment techniques, *methods for identification and optimisation of appropriate reclamation technologies for the various reuse applications* are inconsistent and unreliable (JRC, 2013), *saline intrusion* in sewage systems, etc.).

## 3. Possible EU level measures

Different approaches can be envisaged as appropriate at EU level vis-à-vis the above mentioned obstacles.

### Maintaining status quo

No EU measure.

### Optimising status quo

#### Increase enforcement of WFD requirements concerning water pricing and freshwater abstraction control, integrated water management and better governance

This is a key action area identified by the Commission 2012 Water Blueprint[3] to address the economic barriers associated with water reuse, although the enforcement of WFD requirements on water pricing and abstraction permits goes beyond water reuse.

### Non regulatory measures

#### Develop non-binding EU guidelines on how to foster water reuse

These guidelines would include recommendations in order to address market failures that currently limit the uptake of water reuse solutions (e.g. identifying and eliminating subsidies in main water markets that are detrimental to water reuse, promoting full cost recovery). They would also reflect the most recent knowledge base on cost/benefit analyses of reuse schemes. The development of such guidelines would be accompanied by measures to produce more comprehensive and up-to-date data on the benefits of reuse, including comprehensive cost/benefit analyses, comparative carbon footprints, etc. These guidelines would contribute to addressing the economic barriers related to water reuse.

[3] http://ec.europa.eu/environment/water/blueprint/index_en.htm

## 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

ISO standards on water reuse for agricultural irrigation are expected to be published in 2015, while there is not yet any defined timeframe for the publication of ISO standards covering other uses (work has just started). This would contribute to addressing the lack of clarity on water reuse-related requirements in the EU policy framework.

## Awareness raising and dissemination of information on the various benefits of water reuse, among all key stakeholders

This would have two main objectives: to build trust, credibility and confidence in water reuse solutions (addressing health risks-related concerns of the general public and workers potentially exposed to reclaimed water); and raise awareness on the benefits of reuse for the various stakeholders involved in the development of reuse schemes. The implementation of such instruments could build on previously developed guidance in EU and non-EU countries and on successful examples, and could involve working with NGOs, farmers and industry to help build trust among the different groups of stakeholders that need to be targeted. Recent research has shown that key success factors to gain public acceptance are to make people aware of the water cycle, of the need to recycle water and of the associated benefits.

## Develop non-binding EU guidelines on implementation of the Water Framework Directive and Urban Waste Water Treatment Directive

These guidelines would:

- Clarify the requirements of Art. 12 of the UWWTD (specify what is meant by 'where appropriate') and provide guidance to Member States (MS) on how to apply this article, especially when new WWTPs are built or existing ones are upgraded;
- Provide guidance on cases where water reuse should be given priority among alternative water supply options;
- Encourage water stressed MS to assess the contribution water reuse can make under different water stress scenarios and, if this contribution is significant, to develop agreed targets for reuse of reclaimed urban wastewater as part of their river basin management plans (e.g. a given percentage of the reclaimed water produced within the river basin).

## Regulatory measures

## 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

Water stressed MS would be obliged to assess the contribution water reuse can make under different water stress scenarios and, if this contribution is significant, develop agreed targets for reuse of reclaimed wastewater as part of their river basin management plans (e.g. a given percentage of the reclaimed water produced within the river basin) (e.g. see the Australian example) in accordance with a clear framework for managing health and environmental risks.

## Legally binding minimum standards on water reuse at EU level addressing health and environmental risks

The objective of these new legislative provisions would be to provide clarity to project developers on how to manage health and environmental risks related to water reuse projects in the EU. Compliance with recognised EU standards would increase the credibility of water reuse projects and would provide more certainty for potential investors with regard to business risk management. Common standards would also contribute to creating a level playing field for producers of agricultural products irrigated with reclaimed water.

These standards would have to:

- Be applicable to all MS while not requiring MS to rely on water re-use if they do not wish so;
- Cover the reuse of reclaimed water from urban and industrial origin;
- Be used as a basis for the drafting of water reuse permits;
- Reflect current scientific knowledge on health and environmental risks of reclaimed water reuse;

In addition, in order to meet the objective related to internal trade, the policy instrument should be designed so that Member States would have no incentive to implement more stringent requirements with regard to irrigation of food crops. When defining the level of ambition of the EU standards, a balance would therefore have to be found between:

- The need to provide a high level of assurance to stakeholders with regard to safety aspects;
- The need to avoid excessive administrative burden and costs for project developers (as this has been observed in FR and IT); and
- The need to prevent Member States from jeopardising the free movement of agricultural goods.

The standards would provide a clear framework for managing risks associated with water reuse. This framework would aim to prevent and control the following main risks (at least):

- Risks to public health, considering the various possible exposure pathways;
- Occupational health risks for workers exposed to reclaimed water;
- Agricultural productivity losses (with regard to nutrients load and salinity, in particular);
- Damage to industrial processes and industrial products;
- Risks resulting from the accumulation of harmful substances in irrigated soils.

Experts agree on the fact that, although numerical standards on a list of substances/pathogens are important, they cannot provide sufficient reassurance on safety on their own. A broader **risk-based approach** is needed, encompassing risk management plans, treatment standards, treatment process controls, application controls and water quality benchmarks. Such an approach would be based on the implementation of a **risk management plan** specific to each reuse project, to be established in accordance with specifications detailed by the legislation. The plan would include an assessment of risks and the implementation of adequate control measures and monitoring procedures in order to reduce risks to an acceptable level[4]. This would be accompanied by a list of parameters and associated limit values (either legally-binding or indicative). The risk management plan would need to be approved in order to be granted a permit.

[4] This alternative could draw on the Australian guidelines (http://www.environment.gov.au/system/files/resources/044e7a7e-558a-4abf-b985-2e831d8f36d1/files/water-recycling-guidelines-health-environmental-21.pdf).