DELIVERABLE D9.5:

Policy-makers workshop proceedings

The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement nº 619116

Deliverable D9.5: Policy-makers workshop proceedings

Project acronym: demEAUmed

Project full title: Demonstrating integrated innovative technologies for an optimal and safe closed water cycle in Mediterranean tourist facilities

Grant agreement no.: 619116

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Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including Commission Services)	
CO	Confidential, only for members of the consortium (including Commission Services)	

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List of Contents

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1. Project Overview

demEAUmed (demonstrating integrated innovative technologies for an optimal and safe closed water cycle in Mediterranean tourist facilities) is a European project co-funded by the European Union under the 7th Framework Program within ENV-2013-WATER-INNO-DEMO-1 with a budget of 5,831,908 M € over 42 months, and started officially on January 1st, 2014. The aim of demEAUmed project is the involvement of industry representatives, stakeholders, policy-makers and diverse technical and scientific experts in demonstrating and promoting innovative technologies, for an optimal and safe closed water cycle in Euro-Mediterranean tourist facilities, leading to their eventual market uptake.

The demEAUmed consortium is led by LEITAT and scientifically coordinated by ICRA. It is composed of 15 members from different fields - business, research, technology, hotel communities and public agencies and organizations - from seven European countries: Spain, Germany, The Netherlands, Austria, Italy, France and Belgium.

demEAUmed will face two key challenges: the importance of the tourism economy and water scarcity characteristic of the area. It will be a critical platform for promoting the use of sustainable and innovative technologies in other Euro-Mediterranean tourist facilities in light of also the global tourism market. The project will design a dissemination plan analysing critical stakeholders/customers to adequately transfer demEAUmed results. Creation of new market opportunities to European industry and SMEs will also be addressed.

A representative resort placed in Catalonia, Spain, is considered as a DEMO site, where a representative part of all inlet and outlet waters will be characterized, treated with proper innovative technologies, and reused to reduce the carbon footprint of water management in an integrated approach at demonstration level.

2. Document objectives and targeted audience

This document aims at providing a summary of demEAUmed conference that took place in Barcelona on the 18th of May 2017, by providing the project meeting minutes of the different presentations as well as some pictures to illustrate how the event was organized. The presentations themselves, meaning the slide, are uploaded in the partner's area of demEAUmed website. They are the core content of the event and this document is accompanying them.

Its audience is the Project Consortium, the Project Advisory Board as well as the Commission Services and project Evaluators. Also, any other interested stakeholder, including the participants of the conference, is welcomed to access the document and retrieve the public information made available.

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3. List of participants

Table 1 – List of participants

Name	Organization
Javier Casellas	LEITAT
Carles Perez	LEITAT
Ignacio Montero	LEITAT
Maxence Viallon	LEITAT
Ariadna Claret	LEITAT
Marti Aliaguilla	LEITAT
David Galí	LEITAT
Julia Garcia	LEITAT
Gianluigi Buttiglieri	ICRA
Ignasi Rodriguez-Roda	ICRA
Mark Santana	ICRA
Marc Balcells	ICRA
Alessio Cibati	ICRA
Lluis Corominas	ICRA
Joaquim Comas	ICRA
Christiane Chaumette	Fraunhofer IGB
Giuliana Ferrero	UNESCO-IHE
Yuli Ekowati	UNESCO-IHE
Jordi Cros	ADASA
Miquel Pujadas	ADASA
Montserrat Batlle	ADASA
Heinz Gattringer	Alchemia-Nova
Andrea Zraunig	Alchemia-Nova
Johannes Kisser	Alchemia-Nova
Manfred Radtke	Radtke Biotechnik
Hans-Jürgen Förster	EUT
Lutz Pistol	EUT
Walter Nadrag	Sico Technology

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Barbara Hartenstein	Wapure Int.
Tullio Servida	IDROPAN
Ettore Servida	IDROPAN
Eduard Coloma	Samba Hotels
Maha Al-Salehi	SEMIDE
Eric Mino	SEMIDE
Mathieu Salel	LGI
Martin Pecanka	LGI
Alberto Pezzi	ACCIÓ
Xavier Amores	CWP
Wanda Gaj	European Commission
Valentina Lazarova	Suez Environnement
Xavier Martinez	CTM
Natasa Atanasova	Universitat de Girona
Klara Westling	IVL
Miguel Galmes	Robinson
Daniel Recio	Gremi d'Hotels de Barcelona
Eduardo Fernandez	Melia Hotels
Akiça Bahri	African Water Facility
Raquel Iglesias	CEDEX
Lluis Altimira	CHEMIPOL
Gaetan Blandin	Lequia – University of Girona
Miquel Estelrich	Universitat de Girona
Natalia Gil	Mejoras Energeticas
Jose Manuel Taure	ADANTIA
Javier Ray	Defcon8
Paula Rodriguez	Student
Santiago Sahuquillo	Tecnica y proyectos

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4. Proceedings of the final conference

4.1. Agenda of the final demEAUmed conference

Table 2 – Agenda of the final demEAUmed conference

Opening session		
9:00	Welcome	ACCIÓ, CWP
9:05	EU support for water reuse technologies	Wanda Gaj, EC
9:25	Importance of water/natural resources and Tourism in the Mediterranean	Valentina Lazarova, Suez Environnement
demEAUmed project results		
9:45	Overview of 42 months for water reuse in touristic facilities	Javier Casellas, LEITAT; Gianluigi Buttiglieri, ICRA
10:05	The 8 demEAUmed technological solutions for the tourism market	All demEAUmed technological partners
11:00	Open discussion	All
11:15	Coffee Break - poster sessions of technologies	
12:00	Decision Support System to optimize water reuse at hotels	Mark Santana, ICRA
12:30	Market Opportunities for water reuse technologies (MEDA & tourism)	Martin Pecanka and Mathieu Salel, LGI
Invited projects		
13:00	Demoware overview and results	Xavier Martinez, CTM
13:15	ReuCity overview and results	Natasa Atanasova; Girona University
13:30	R3Water overview and results	Klara Westling, IVL
13:30	Lunch Break - Networking	
Tourism and Water Session		
14:45	Water reuse in the Robinson facilities	Miguel Galmés, Robinson
15:00	Water reuse in the hotels in Barcelona	Daniel Recio, Gremi d'Hotels de Barcelona
15:15	Water reuse in Melia Hotels International	Eduardo Fernandez, Meliá Hotels International
15:30	Open discussion with the audience	All
Policy-oriented session		
15:50	Policy Making efforts on water reuse, next challenges	Akiça Bahri, African Water Facility coordinator
16:05	European regulatory instrument on water reuse in Spain	Raquel Iglesias, CEDEX
16:20	Open discussion with the audience	All
16:50	Meeting Closure	ICRA, LEITAT

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4.1.1. Structure of the conference and opening session

Alberto Pezzi, ACCIÓ

Xavier Amores, CWP

Wanda Gaj, European Commission

The final conference of demEAUmed project took place at ACCIÓ offices (Barcelona, Spain).

The morning session begins with a welcome of ***Alberto Pezzi*** of ACCIÓ. Then the Catalan Water Partnership ***Xavier Amores*** begins the conference by welcoming the partners and presenting the agenda.

Wanda Gaj (WG) from the European Commission gives an overview on the EC's relationship to research as well as future funding-investment opportunities from the EC. She presents the untapped potential for water reuse in the EU and the water reuse policy agenda with the process towards new legislation.

After the presentation of ***Valentina Lazarova***, the rest of the morning session is devoted to reviewing of project technical achievements, a resume of some project exploitation and technical issues as well as presentations from other projects (table 2).

An overview of the main objectives and results of demEAUmed project is, in fact, given by ***Gianluigi Buttiglieri*** (GB, ICRA) and ***Javier Casellas*** (LEITAT), followed by a 7 minutes' synopsis of each technology by the partners. This is followed by a coffee break in which the attendees could see the posters describing the presented technologies.

Afterwards, Mark Santana (MVS, ICRA), gives an update on the decision support system (DSS) as well as shows a preliminary demo of the DSS program. Next, Mathieu Salel (MS2) and Martin Pecanka (MP) of LGI give a talk on the possible market opportunities of technologies that are advanced in their development.

The morning session concludes with the description of the other projects that have either finished or are currently underway. The first invited project is from DEMOWARE, which is presented by Xavier Martinez. This is followed by Natasa Atanasova, who presents on ReuCity. The morning session finally ends with a presentation on R3 Water by Clara Westling.

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The afternoon session is characterized by roundtables. The first centers on water reuse in the tourism industry. The invited speakers are Daniel Recio from the Barcelona Tourism Association, Miguel Galmés from Robinson Club, and Eduardo Fernandez from Melia Hotels International. The second afternoon session consisted of two presentations. The first one is given by Akiça Bari, the Coordinator of the African Water Facility, who gives a talk centered on tourism and resource use in the Mediterranean. This is followed by Raquel Iglesias, who presents the issues associated with Spanish water reuse legislation at the national level. This session is the core of the deliverable but all the conference is presented to better understand the context, the challenges and the possible solutions of the important issues related to water scarcity and tourism.

In order to have a better understanding of the current situation in the Mediterranean bassin and to make the event more attractive to participants, the organising committee decided to approach the issue from different point of views, being the technological outcomes that could help improve the situation, the industrial challenges faced by the tourism industry, and the legal framework in which all these actors are active. On top of that, it is important to involve various actors from the research and industry to discuss about the challenges that the current legal framework is facing. This enriches the outputs of the poly makers workshop my including different point of views and by ensuring that the main actors are represented and express opinions and concerns about the messages that need to be promoted.

Valentina Lazarova, Suez Environnement

Gianluigi Buttiglieri, ICRA

Valentina Lazarova (VL), presents on the relationship between tourism, water and natural resources in the Mediterranean and how to achieve sustainability through water reuse. She highlights the hydric stress at global level and how it is spreading around the world and getting worse and worse. There are three types of water challenges: in terms of quantity, quality and affordability. She comments that we have to adopt new ways of doing things, change our consumptions habits and encourage the implementations of new solutions to imagine alternative water resources. She then discusses about the strong nexus between water and tourism and how water scarcity threatens the tourism industry and that sustainable water management is critical to secure a future for tourism. It is important to diversify and apply different options, not only desalination but also water reuse, rainwater harvesting, etc. She focuses on the role of alternative water resources for sustainable water cycles and the status and trends in desalination and water reuse that are highly increasing since early 2000. Up to 20% of

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recycled water is reused in Kuwait but most of other countries have much lower percentages. In general in EU countries the percentages are much lower (around 2.4% of treated urban wastewater effluents, less than 0.5% of annual EU freshwater withdrawals) and much effort is still needed. A lot of innovative technologies are available and the main barriers for water reuse are the regulatory concerns associated with process and water quality monitoring, the relatively high cost of water reuse compared to conventional water supply and public acceptance and health liability. She ends the presentations with some examples of successful cases of water reuse in touristic areas.

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4.2. demEAUmed project results

4.2.1. Overview of 42 months for water reuse in touristic installations

Gianluigi Buttiglieri (GB, ICRA) gives a synopsis of the entire project up until month 42 of demEAUmed. He begins by describing the background and objectives of the project. He then summarizes the strategy for the implementation a water reuse system in Hotel Samba. Next he describes the Work Packages that comprise demEAUmed.

- WP3 – GB summarizes facts relating to the hotel, the demo site, the water meter installation as well as the quantities of water used during the high and the low season. He mentions the water quality analyses that were done for standard contaminants as well as microbiological indicators and micropollutants. Also pointed out are the sampling campaigns, which were done for wastewater and greywater quality. Results of the studies in terms of micropollutants show relationship between seasonality and wastewater but not for greywater.
- WP4 – The roadmaps for greywater and wastewater reuse systems are shown to the attendees.
- WP5 – GB gives a brief summary of the ADASA SCADA system
- WP7 – GB summarizes the environmental and socio-economic assessments of technologies.

The presentation ends with a resume of the results of the project in terms of water footprint, water management and communication to client and society.

4.2.2. The 8 demEAUmed technological solutions for the tourism market

This section of the conference is dedicated to the promotion of the water treatment technologies by the partners. Each partner has 7 minutes to explain their technologies.

Alternative pool water disinfection technology

UVOX – ***Barbara Berson*** (BB) first explains the UVOX treatment process. This technology is used to tread used pool water for subsequent recirculation back into the pool. She then shows the test results which demonstrate an effective reduction of chlorine in the water as well as reduction of DBPs in the treated water. She states the advantages include no chemical addition as well as a relatively low cost.

Greywater treatment technologies

Green Walls – ***Heinz Gattringer*** (HG, Alchemia Nova) begins his presentation with some facts about Alchemia Nova and then explains the theory behind VertECO otherwise known as green walls as well as its innovative feature being a vertical setup. Results from testing show that contaminants are far below the legal limits in the effluent water. The benefits of this technology include a low energy use and water savings.

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SmartAIR MBR – ***Ignasi Rodriguez-Roda*** (IRO) explains the technology while also highlighting the small footprint and high energy use associated with conventional MBR technology. This technology is used to treat greywater and, in the case of hotel Samba, from the shower but it is applied also for hotel wastewater treatment. Results show high removal rates for COD, BOD, TKN, and NH_4. Also there is an associated energy savings. IRO concludes the presentation by mentioning further applications for this technology.

Ignacio Montero, LEITAT

ECEF – ***Ignacio Montero*** (IM) begins his presentation by explaining the principles behind the SPEF technology, followed by the operational parameters. Results include 30-35% reductions in COD, full disinfection, as well as reductions in micropollutants. The OPEX value for this technology is estimated to be about 1.85€. This technology is recommended for streams with micropollutants.

Wastewater treatment technologies

SPEF – The second part of IM's presentation begins by explaining the processes behind the technology as well as the operational parameters. Results highlighted include reductions of over 90% for NTU and 65% for COD. The technology´s OPEX value is estimated to be about 0.26€.

Electrochemical Ozonation – ***Christiane Chaumette*** (CC, Fraunhofer) begins her presentation with the background of the technology by first explaining how it works and possible applications. Testing shows 90% removal of micropollutants and COD at 1 kWh/m^3. She then describes how the technology fits is integrated at Hotel Samba.

Plimmer – ***Tullio Servida*** (TS, IDROPAN) explains the technology and mentions that it is an alternative to reverse osmosis. In terms of treatment, it can recover 80% of water as opposed to the 50% associated with RO technology. The OPEX is also relatively low for this technology. The technology has been applied in demEAUmed project both in the greywater and wastewater treatment line.

4.2.3. WP8 Decision Support Tool and Modelling

Mark Santana, ICRA

Mark Santana (MVS, ICRA) presents an update on the progress of the water cycle model that will be included in the DSS. He begins the presentation by contextualizing the water cycle model within the DSS. Next, he shows, via demonstration, a case study in which a hotel is being simulated using the web-based program.

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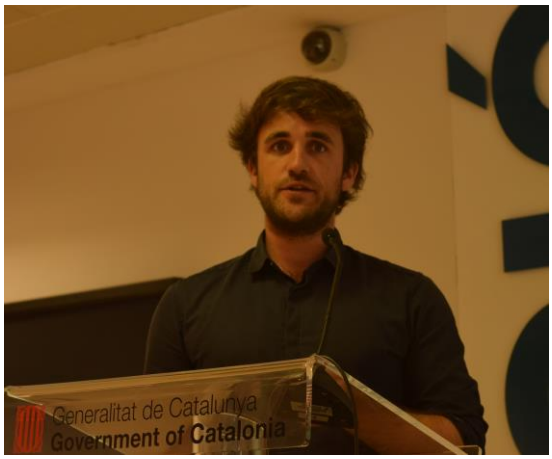
4.2.4. Market Opportunities for water reuse technologies (MEDA & tourism)



Mathieu Salel, LGI

Mathieu Salel (MS2) and Martin Pecanka (MP) of LGI present the market opportunities for some advanced technologies. Their presentation begins by describing the water sector such as quantification worldwide of the amount of water available, trends and projections in water use and tourism. MS2 then talks about the challenges in the Mediterranean including pricing, awareness, acceptance, and lack of harmonization. Next, the market opportunities were described for three technologies (i.e. UVOX, VertECO, and Plimmer) plus the DSS.

Interventions, discussion and comments:

- One question asks if there is recommended treatment line with all of the technologies. The answer is that the combination of about 2 technologies can be enough and improve the effluent water quality.
- Another question addresses the importance of cost. One attendee responds that cost is important; however public perception could incentivize the implementation of these technologies. Cost could be advantageous for some technologies.
- One attendee declares that the environmental framework should be taken into account. It is replied that environmental and socio-economical assessment is part of demEAUmed project (WP7) and it is also presented in one of the conference posters.
- One comment mentions that the DSS is not necessary. First, there are differences in hotels including water use habits. Also, wastewater quality is variable, which may affect treatment technology operation. Another comment adds that systems are complex. The principle and the possible applicability of the DSS are remarked and its possibility to be applied as a first exploitation tool to reach the market.
- One comment mentions experience with community involvement. An attendee mentions that Hotel Samba is very supportive and water reuse gives the hotel a good image for the tourist.
- Comment states that UVOX is not only for pools without chlorine but also to reduce chemical usage.

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4.3. Invited projects

4.3.1. Demoware overview and results

Xavier Martinez, CTM

Xavier Martinez (XM) begins his presentation by mentioning the growing importance of water reuse in Europe. However, there are barriers to implementation of water reuse. There is need to improve technologies, better monitoring, assess real benefits and risks, better understand pricing, and address the low levels of public and political enthusiasm. XM then describes the DEMOWARE by describing the project structure. Sub-Projects include: a reuse scheme in France, an industrial water reuse scheme in Tarragona, and indirect water reuse in Port de la Selva.

4.3.2. ReuCity overview and results

Natasa Atanasova, Universitat de Girona

Natasa Atanasova (NA) describes the ReuCity project by first explaining the current water and food issues and optimization of these systems. Possible solutions include partially closing the loops or systemic changes. The presentation also mentions the development of a DSS as well as its application to Hotel Samba in which “loops” in the system are closed. The results of the study were also presented.

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4.3.3. R3Water overview and results

Klara Westling, IVL

Klara Westling starts mentioning that this project centers on the reuse and recovery in urban wastewater treatment systems. R3Water objectives include: the development of technologies, and their demonstration in full-scale plants. The project is able to develop technologies, improve energy efficiency, promote these technologies, and aid in policy development. Environmental technology verifications were made for each technology. An announcement was also made about its final conference in May.

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4.4. Tourism and water session

4.4.1. Round table with professionals from the tourism sector

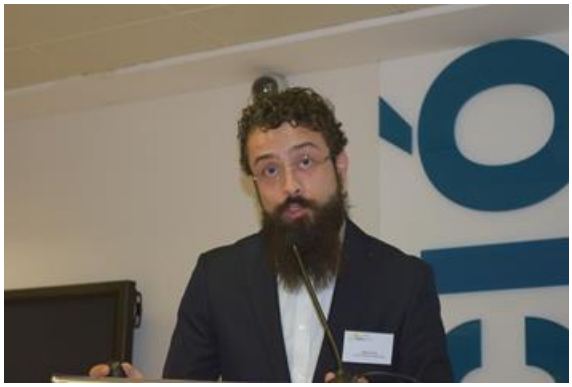
Miguel Galmés, Robinson

The roundtable consists of three speakers: ***Miguel Galmés*** (MG, Robinson), ***Daniel Recio*** (DR, Gremi d'Hotels de Barcelona), ***Eduardo Fernandez*** (EF, Melia Hotels International). Each speaker gives a short presentation.

MG describes the importance of sustainability to Robinson as well as gives some examples such as onsite treatment plants for hotels.

DR speaks about the challenges the tourism industry in Barcelona has with respect to sustainability as well as the strategic plan of sustainability 2017-2019. He also gives examples of hotels that have implemented this plan with reduction of water consumption, energy saving and efficiency, prevention of food waste and waste management.

EF gives some background facts of Melia hotels. He also mentions company's commitment to sustainability via the company's environmental affairs department. Another part of this commitment is commented: the SAFE campaign, in which hotels keep track of their consumption and aim to achieve 15% in energy minimization.



Daniel Recio, Gremi d'Hotels de Barcelona

Eduardo Fernandez, Melia Hotels

<u>Interventions, discussion and comments:</u>

- The first comments centers around infrastructure and innovation. One asks when Robinson changed the pipes in its hotels, if source separation was considered. The pipes were not changed inside the building; however all other water pipes were changed. The system is designed to use reused water for toilets. There was an onsite treatment plant that was designed but it did not work due to water leakage. A new hotel building was built by Robinson that has obtained environmental certifications such as LEED as well as the German

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green building certification. MG also comments that there is no incentive to fix the infrastructure: he highlights that money is an important issue to be considered in these cases as well as bureaucracy. In this sense, the abatement of barriers or the provision of economic support from Public administrations will be useful.

- One comment points out that there is some effort on water saving and monitoring but no mention on technology (except pool water disinfection) and technology maintenance. Operators may be needed to maintain these technologies.
- A third conversation touches on chlorine. One participant says chlorine can be reduced but also the issue of DBPs needs to be considered. Another adds that legislation determines the minimum level of chlorine in pools.
- One conversation addresses issues of innovation, conservation and consciousness in Spain. One participant states that innovation applies to other action. However, this is countered by another comment highlighting there is a lack of consciousness in Spain for water conservation, even though there are exceptions like Barcelona association of hotels. Small hotels do not care too much about conservation and it is also more complicated. Larger hotels (e.g. Meliá hotels) are more able to implement the necessary changes. MG counters that Spain is evolving. Much of the influence comes thanks to experience with guests from Northern Europe, generally more conscious of the necessity of conservation measures. Guests are also open to guided tours of the water management systems that help in increasing the awareness of guests. World Water Day is also celebrated at Robinson hotels. Nevertheless MG once more comments that price is still an issue, savings in water and energy costs are “applauded”.
- One question addresses that there are many information in many hotels and asks if the solution can be considered as a global one. EF comments that the issue is site specific and the data reported in his presentation are based on hotel category and averaged but not on geographical distribution. He thinks that there could be a global solution thanks to engineering. Anyway, up to now, many of these water management solutions are based on preventing legionella (e.g. no storage of hot water, etc.).
- One comment mentions special chemicals used to make reuse better and if there are thinking of water reuse for laundry services. MG responds by saying that Robinson is not currently thinking about this or laundry water reuse. The commenter suggests tailoring chemicals to ensure a safer reuse of water. MG counters that money is key and laundry reuse is not (yet) a priority. It is also commented that it is important to consider not only water but circular economy issues in general.
- One comment suggests that higher water price would also increase hotel price and affect tourism. MG suggests that water price should be high for everyone. However, the commenter mentions household price is higher than the hotel rate. Some support and fewer barriers would help in increasing water reuse. It is reminded that water price is already higher in some cases (e.g. 5€/m^3 in Malta).
- One commenter says that certain things are necessary to ensure public health. The solution is not easy to find. Nevertheless, there are tradeoffs and there is a need to be flexible. VL comments that source separation is not always possible and the safeness of tourists is a

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priority. Some tourists may go for cheaper hotels. In some other cases cheaper material may contain more VOC and also smart metering are useful but may disturb sleep, etc. The price of hotel rooms is also a factor. In Bora Bora a room price is around 200€/night and you may implement some solutions. In Costa Brava the price is much lower and the implementation is more difficult.

Discussion with the audience

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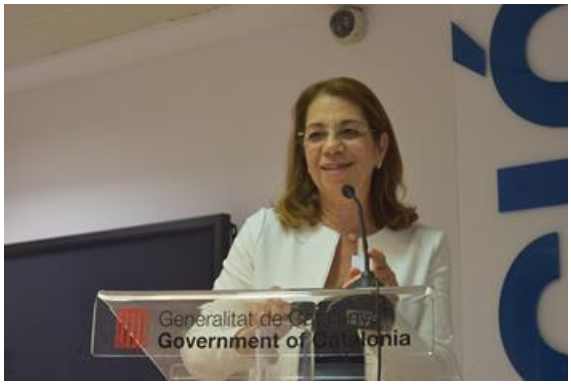
4.5. Policy oriented session

4.5.1. Policy-making efforts on water reuse, next challenges



Akiça Bahri, African Water Facility

The second roundtable of the day is dedicated to policy with respect to water reuse and tourism. This discussion is headed by two speakers: ***Akiça Bari*** (AB), the Coordinator of the African Water Facility; and ***Raquel Iglesias*** (RI) of CEDEX.

AB is the first presenter. Her presentation centers on the impacts, benefits and challenges of tourism in the Mediterranean area, especially in regards to water management. She mentions that the Mediterranean is the most popular area for tourism, supporting her explanations by showing the evolution and increasing of tourism in this area with two maps with a 10 years lapse (1995 and 2005). Due to the fact that Mediterranean area suffers water scarcity episodes, significant challenges on water management are present. So far, in order to address water scarcity problems, big water infrastructures have been constructed with huge land requirements, such as water reservoirs, dams, desalination plants, water transfer schemes, etc. Also she exposes that freshwater demand produces environmental problems like groundwater overexploitation, saline intrusion, and overuse of non-renewable resources. After this introduction she talks about the "competition" of tourism with other sectors (agriculture, hydro-electricity, household needs, etc.) for water availability. For example, agriculture consumes 2/3 of total water usage in the Mediterranean area. But she claims that the added value of water in tourism can be up to 60x higher than in the agricultural sector. She also tackles the importance of including ethical issues in terms of water access and water reuse (water rights, food and water security for local people). Next, she exposes some of the impacts of tourism in Mediterranean such as: overexploitation, degradation of freshwater ecosystems, pressures on domestic consumption, and peaks in wastewater volumes. She remarks that there are still some places in Mediterranean area which are not provided with wastewater treatment facilities. She also talks about tourism water footprint and she displays data on direct and indirect use of water by tourism (e.g. associated to fuel, food, infrastructures, etc.). Nevertheless, tourism can be a driving force for the implementation of water reuse activities. Future climate change scenarios enhance the necessity of improving water management, establishing water pricing (assuring access to safe water for everybody) and developing water recycling and reuse policies. She focus on the importance of Governments, tourism industry and citizens to engage in water-saving measures and to incorporate concrete measures for water savings: installation of water saving devices, water saving policies, promotion of water reuse, water and land planning, etc. She describes that water reuse can enhance tourism activities, brings significant advantages to agriculture (e.g. crop irrigation) and tourism (e.g. golf course irrigation), contributes to the protection of local natural resources, the implementation of small-scale

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decentralized sanitation and reclaimed water technologies. In addition, she emphasizes the importance of water, food and energy vectors management within an integrated approach. Water reuse not only benefits tourism but also agriculture as well as protects natural water resources. At the end of her presentation she presents an example of water reuse for irrigation of golf courses in Tunisia. This measure allowed the development of golf courses during the last decades, with the corresponding increasing interest for tourists. To finalize she highlights the importance of tourism that is an important economic pillar for Mediterranean regions. On the other hand, she stresses the need to create tourism policies in order to limit the negative environmental and social impacts of tourism. She introduces the concept of sustainable and responsible tourism as a catalyst for positive environmental change, low greenhouse gas emission and water and waste recycling.

Raquel Iglesias, CEDEX

RI's presentation looks in depth at the Spanish water reuse legislation (Royal Decree, RD-1620/2007) and compares it to the JRC technical proposal for quality requirements for water reuse in agriculture irrigation and aquifer recharge. As an introduction she explains that Spain exhibits the greatest amount of water reuse in Europe and that the Water Framework Directive (WFD) contemplates water reuse as a measure for water balance. The Spanish RD 1620/2017 has been applied since 2007 and quality requirements of reclaimed water and authorization process in Spain have to be in accordance with RD, which only contemplates reuse of treated wastewater. After this introduction, she puts as open question: if 10 years after the enforcement of the RD, this legislation is an effective tool to protect human health and environment. To deeply analyses the RD, she initially displays a figure with the different steps that wastewater follow through the water reuse system, before becoming reclaimed water. Afterwards, she exposes the different water uses and reclaimed water applications permitted in Spain and their water quality categories, with the corresponding biological and physical-chemical indicators to be monitored and the stipulated water quality limits values according to the RD. There are 23 water reuse applications divided in 6 water quality categories. She also exposes the necessary water treatment to be applied, according to water quality category, following the requirements of RD. Then, she focuses on comparing water quality limits established by RD and water quality limits established by JRC technical proposal. The JRC proposal fixes the monitoring requirements and the minimum frequencies for verification monitoring. In general, she explains that monitoring requirements are quite similar in both, the legislation and the proposal, but there are some limit values that change from the RD to the JRC proposal. For reclaimed water quality A it is mandatory for European member states (MS) the validation monitoring. And the operational monitoring (flow rate, nitrate, BOD, etc.) is also mandatory for MS in water treatment process. It is worth mentioning that the JRC proposal includes a set of preventives measures in order to reduce potential adverse effects on health and environment.

Interventions, discussion and comments:

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- The discussion mainly focuses on the difficulties to be in compliance with RD 1620/2007. One question wonders if preventive measures are feasible. Currently, these measures are now being implemented.
- One comment mentions the difficulty for decentralized systems to follow these regulations.
- Another comment addresses the issue of monitoring, since there are a limited amount of labs dedicated to water quality testing. Anyway the analyses are expensive and this is a barrier for the implementation of decentralized water reuse technologies. It is wondered if it is possible to simplify this verification step. RI replies that there are many categories of reuse: if you can't go for class A you can go to class B and with more barriers you need less treatment and monitoring.
- It is asked if for a certain period (e.g. 1 year) you have good results it is possible to decrease the frequency of analyses. IR replies that it is not possible for safety.
- VL comments that it is difficult to implement legislation also because some indicators are difficult to measure (and also different laboratories may give different results) and the cost of monitoring is very high. The compromise should be to ensure human safety but also guarantee the applicability of water reuse.
- RI comments that regulation is more easily applied by big entity and for smaller ones it is more difficult.
- CC also comments that the microbiological limits, based sometimes on log removal, are difficult to be applied in reality. For example it is very difficult to demonstrate a 5 log removal of clostridium and only membrane technologies or similar can demonstrate it indirectly. Anyway it is reminded that different classes of water quality are foreseen in order to foster water reuse.
- Few comments address the gap of mentioning of greywater within the legislation.
- TS comments that in some cases also salinity should be considered in water reuse legislation, e.g. for aquifer recharge.

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5. Conclusions

After the valuable contributions of demEAUmed final event speakers and the public interventions, it can be concluded that new water reuse regulations at EU level should be implemented in order to assure 1) health and environmental protection and 2) an harmonized framework for water reuse in Europe. This legislation should include reliable and cost-effective water quality monitoring systems. Moreover, the social and cultural aspects of water reuse should be considered, being strongly supported by Governments and International Organizations, to overcome the public perception of reclaimed water quality and the willingness of populations to pay for wastewater reuse project and use of reclaimed water for different purposes. Therefore, public's knowledge and understanding of reclaimed water safety and applicability is the way to generate water reuse public acceptance and demand. Water reuse is an interesting measure to tackles the freshwater overconsumption in touristic facilities, protect natural water natural resources, decrease greenhouse gas emissions and to reach a sustainable and responsible tourism in accordance with current environmental challenges.

6. Annex – Presentations

All the presentations are uploaded in the partner's area of demEAUmed website: http://www.demeaumed.eu/index.php/component/jdownloads/category/33-finalconf?Itemid=449

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