

Horizon 2020 Capacity Building/Mediterranean Environment Programme

“Desalination and the Environment”

22-25 February, Israel, 2011

Introduction - The Horizon 2020 Initiative

The “**Horizon 2020 Initiative**” aims to de-pollute the Mediterranean by the year 2020 by tackling the sources of pollution that account for around 80% of the overall pollution of the Mediterranean Sea: municipal waste, urban wastewater and industrial pollution.

Horizon 2020 was endorsed during the Environment Ministerial Conference held in Cairo in November 2006 and is one of the key initiatives run under the Union for the Mediterranean (UfM). The H2020 2007-2013 Road-Map focuses on the following four pillars:

- Identification of projects to reduce the most significant sources of pollution.
- Identification of capacity-building measures to help neighbouring countries create national environmental administrations that are able to develop and police environmental laws.
- Use of the EC’s research budget to develop greater knowledge of environmental issues relevant to the Mediterranean and ensure this is shared.
- Develop indicators to monitor the success of Horizon 2020.

H2020 is made up of the following components: monitoring, reporting and research (RMR); investment; and capacity building. Under each component, a project is currently being run. H2020 Capacity Building/Mediterranean Environment Programme (H2020 CB/MEP) is the project aiming at enhancing the capacities to address pollution problems at institutional and society level. In addition, through the H2020 MEP, a Hot Spot Investment Programme (HSIP) for the West Balkans and Turkey - as complementary to the Mediterranean HSIP (MeHSIP) – is being elaborated. The other two projects currently being carried out under the investment and RMR H2020 components are respectively the MeHSIP and the Mediterranean Shared Environmental Information System (Med SEIS).

The framework - Horizon 2020 Capacity Building/Mediterranean Environment Programme

Obviously pollution is expected to be substantially reduced through the installation and proper functioning of major infrastructures (e.g. sewage treatment plants), installing pollution reduction technologies in industries, etc. However, this won’t work if institutional and individual capacities are not in place. This is what the H2020 CB/MEP aims to enhance by operating within the existing and developing policy instruments, and supporting the implementation of the commitments undertaken in the framework of the ENP as well as other regional agreements e.g. of the Barcelona Convention, while cooperating, coordinating and synergising with all relevant (EU and other) programmes.

Aims and objectives

The main objective of this project is to support the implementation of Horizon 2020 with a special focus on environmental mainstreaming. It aims to address the following problems:

- low political priority given to the environment;
- insufficient integration of environment in the different sector policies (agriculture, tourism, transport or energy) and lack of inclusion of the different actors from local to international level;
- Insufficient capacities and resources at institutional and civil society level.

More specifically, the purpose is to support the implementation of the Horizon 2020 Initiative Road Map and Work Plan through capacity building and awareness raising activities, and to promote integration of environment issues in other sectors policies.

Partners

This project is funded by the European Union and implemented by the National and Kapodistrian University of Athens (NKUA) in consortium with: Mediterranean Action Plan of the United Nations Environment Programme and its Regional Activity Centres and Programmes (UNEP/MAP and its RACs), National Waste Management Agency (ANGed)/ Regional Solid Waste Exchange of Information and Expertise Network in Mashreq and Maghreb Countries (SWEEPNet), Umweltbundesamt GmbH – Austrian Environment Agency (AEA), Lebanese Ministry of Energy and Water - the General Directorate of Hydraulic and Electrical Resources (LMoEW), Hellenic Ministry for Environment, Energy and Climate Change, UNESCO-IHE Institute for Water Education (UNESCO-IHE), Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), Arab Network for Environment and Development (RAED), WWF Mediterranean Programme Office (WWF MedPO), Association of Cities and Regions for Recycling and Sustainable Resource Management (ACR+), Arab Countries Water Utilities Association (ACWUA).

Partner Countries

The Partner countries are: Albania, Algeria, Bosnia- Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Montenegro, Morocco, occupied Palestinian territory, Tunisia, Turkey, Syria.

Course Description - Desalination and the Environment

Introduction to the training course

The training course is organized within the framework of the ENPI Horizon 2020 CB/MEP project and in response to the capacity building needs identified earlier in the project. The course is organized by the H2020 CB/MEP Urban Water Expert with the support of the Institute for Hydromechanics, Karlsruhe Institute of Technology (KIT), Germany. Its duration is 4 days; the language of the course is English.

Around thirty (30) participants are expected to attend from Israel, Jordan and the Palestinian Authority.

Target group

The capacity building activity is targeted to a heterogeneous mix of representatives from authorities, academia and industry, e.g. environment and water authorities, universities and research facilities, consultants and plant operators and others that are involved, or will be in the future, in finding solutions for the waste challenges arising from desalination plants in their country, region or local authority. The background level of the trainees is expected to be of an intermediate University degree level; otherwise, they may have a working background in engineering, natural or environmental sciences.

Learning objectives

The main objectives of the course are:

- To provide a basic understanding of desalination technologies and processes
- To provide an overview of global and regional desalination capacities and trends
- To provide an overview of resource use and environmental impacts

- To provide an overview of the technical and regulatory approaches for reducing resources use and mitigating the impacts of desalination plants
- To provide an overview of the water intake - effluent discharge system of desalination plants and related environmental concerns
- To provide a basic understanding of pollutant transport and mixing from effluent discharges
- To provide technical training and guidance on the intake and discharge design
- To provide an introduction into pollutant transport modeling and mixing zone water quality assessment
- To provide technical training on design procedures and modeling tools by hands-on exercises and case-studies
- To improve the skills of desalination and marine environment professionals and increase their awareness of the impacts of desalination plants on the environment

Methodology and Structure

The workshop is intended to be mostly in the form of presentations. However, the course will allow sufficient time for questions and discussions of emerging topics, i.e. by asking participants to state their background and particular interest in the topic in an introductory round, by allowing participants to raise their questions throughout the course and by having an open forum towards the end in which participants can share and discuss their personal or national perspectives with their trainers and fellow participants to facilitate mutual understanding.

The last day will be dedicated completely to exercise the provided tools and to train the participants on a common software system to solve given case studies or case studies of interest for the participants.

Therefore the general structure of the course will be:

- Presentations
- Discussions on emerging topics
- Site visit
- Software training
- Open forum (Personal and/or National perspectives)

Learning outcomes of the training course

The key learning outcomes are:

- To increase awareness that desalination is an industrial water treatment process, which is often chemically, energetically and operationally intensive and focused on large infrastructure developments
- To increase awareness that desalination is evolving into a coastal based industry in some sea areas, such as the Mediterranean Sea
- To identify the most significant environmental impacts which require mitigation and to increase awareness of the potential cumulative impacts of desalination plants in some sea areas, such as the Mediterranean Sea
- To increase awareness for the need of sustainable project designs and 'green' desalination technologies and to understand the concepts of environmental impact assessment (EIA) and best available techniques (BAT) as complementary approaches for mitigating the impacts of desalination plants
- To be capable to identify most significant concerns of water intake and effluent discharge systems
- To be capable to apply basic screening equations for an order of magnitude analysis and design improvements
- To understand principle limitations and advantages of design equations and discharge modeling tools as usually presented in assessment reports
- To run first simulations with the discharge modeling tool CORMIX
- To interpret model results of planned or existing discharge designs for impact analysis

The course will allow sufficient time for questions and discussions of emerging topics.

A preliminary overview of the course is given below:

- Definition and application of Water Management Hierarchy of water conservation measures
- Overview on seawater desalination processes, market and technologies
- Physical characteristics of desalination plant discharges: mixing processes, potential impacts on the environment, impact mitigation measures
- Chemical characteristics of desalination plant discharge: potential for toxicity and bioaccumulation, impact mitigation
- Design of intake and discharge structures: modeling concepts, screening equations and design recommendations
- Energy demand of different desalination processes, environmental implications of energy use, energy demand in perspective, and impact mitigation measures
- Environmental regulations
- Concept of environmental impact assessment (EIA), environmental monitoring studies, and best available techniques (BAT) for desalination projects
- Visit and tour of a local desalination plant
- Demonstration of screening tools and the discharge expert system CORMIX
- Case studies and hands-on exercises
- IWP Finance of desalination projects
- National perspectives: open forum

Course schedule/ curriculum

Course schedule/ curriculum				
22.02.2011	Topic	Description	Length	Method/Speaker or Trainer
Session 1	Official opening	- Welcome addresses and opening words - Introduction of course program - Introduction of speakers and participants	1.5 hours (9-10:30)	Opening words, presentation by Thomas Vlachogianni , ENPI H2020 CB/MEP and round of introductory statements
			Coffee (15 min.)	
Session 2	Introduction to seawater desalination	Overview on desalination processes, market, and technologies	1.5 hours (11:00-12:15)	Koussai Quteishat Arab Countries Water Utilities Association (ACWUA)
			Lunch (1 hour)	
Session 3		Country Status: Israel Country Status: Jordan Country Status: Israel	13:15-14:45	Rani Amir , Director of the Marine and Coastal Environment Division Ministry of Environmental Protection Koussai Quteishat Abraham Tenne , Head of Desalination Division and Chairman of WDA - the Governmental water and sewage Authority
			Coffee (15 min.)	
Session 4	Environmental Impacts	Introduction to the environmental concerns of desalination plants, physical effluent characteristics and their marine ecological effects, intake designs and their marine ecological effects	2h (15:00-17:00)	Presentation Sabine Lattemann

Open Forum		Participants have the opportunity to make a 5-minute presentation (3 slides) , regarding their specific projects or concerns/questions.	30min.	Moderator: Tobias Bleninger
Ice-breaker			1h	Informal come together in hotel lobby
23.02.2011	Topic	Description	Length	Method/Speaker or Trainer
Session 1	Discharge systems	Physical characteristics of desalination plant discharges: characteristics of outfalls, mixing processes, potential impacts and mitigation measures	1.5 hours (09:00-10:30)	Presentation Tobias Bleninger Institute for Hydromechanics, Karlsruhe Institute of Technology (KIT), Germany, currently visiting professor at Federal University of Paraná (UFPR), Department of Hydraulics and Sanitation, Curitiba, Brazil
			Coffee (15 min.)	
Session 2	Chemical use and discharge	Chemical characteristics of desalination plant discharge: potential for toxicity and bioaccumulation, impact mitigation	1.5 hours (11:00-12:30)	Presentation Sabine Lattemann
			Lunch (1 hour)	
Session 3	Intake and outfall designs	Modeling concepts, screening equations and design recommendations	1.5 hours (13:30-15:00)	Presentation Tobias Bleninger
			Coffee (15 min.)	
Session 4	Sea water desalination plant characteristics	Sorek Sea Water Desalination 150 Mm ³ /yr Pipe Line Project Presentation		Presentation Eng. Iris Jancik, Hutchison Water, SOREK DESALINATION
	Energy use	Energy demand of different desalination processes, environmental implications of energy use, energy demand in perspective, and impact mitigation measures	1.5 hours (15:30-17:00)	Presentation Sabine Lattemann
24.02.2011	Topic	Description	Length	Method/Speaker or Trainer
Session 1	Environmental impact assessment	Concept of environmental impact assessment (EIA), environmental monitoring studies, and best available techniques (BAT) for desalination projects	1.5 hours (9-10:30)	Presentation Sabine Lattemann
			Coffee (15 min.)	
Session 2		Modeling and design techniques for effluent discharges	1.5 hours (11-12:30)	Presentation Tobias Bleninger
			Lunch (1 hour)	
Session 3 & 4		Visit and tour of a local desalination plant	3.5 hours (13:30-17:00)	Presentation
25.02.2011	Topic	Description	Length	Method/Speaker or Trainer
Session 1		Demonstration of screening tools and the discharge expert system CORMIX	1 h (9-10:00)	Software demonstration Tobias Bleninger
Session 2		Case studies and hands-on exercises, Course Evaluation	2.5 hours (10-12:30)	Software training Tobias Bleninger
			Lunch (1 hour)	
Session 3	Project Finance	IWP Finance of desalination projects	1 h (13:30-14:30)	Presentation Koussai Quteishat
Session 4	Closing	Closing Remarks and Certificates Awards Departure	14:30-15:00	