

Introduction

The U.S. Bureau of Reclamation (Reclamation) and the New Mexico Water Resources Research Institute (NM WRRRI) sponsored a day-and-a-half conference to identify U.S. research needs concerning inland, small-scale, low-cost rural brackish desalination water projects using renewable energy such as solar, wind, geothermal, and waste heat sources. The conference brought together about 150 participants to gain a better understanding of the topic and to propose projects relevant to rural communities. The NM WRRRI coordinated the conference with the assistance of Reclamation and the Brackish Groundwater National Desalination Research Facility (BGNDRF).

The conference took place in Alamogordo, New Mexico, the home of the BGNDRF, on December 13-14, 2011. Tours of the desalination research facility were held before and after the conference and most conference participants attended a tour. The BGNDRF is a focal point for developing technologies for the desalination of brackish and impaired groundwater found in U.S. inland states. The facility brings together researchers from federal government agencies, universities, the private sector, research organizations, and state and local agencies to work collaboratively and in partnership. The facility's mission is to pursue research into supply-enhancing technologies using brackish groundwater sources including solutions to concentrate management, renewable energy/desalination hybrids, desalination technologies for produced water, and small-scale desalination systems. Water desalination apparatuses being developed by entities such as New Mexico State University, University of Texas at El Paso, General Electric, Veolia, Reclamation, and others were highlighted during the tours.

The conference convened experts from several continents, bringing attention to the important linkages between renewable energy sources and desalination of brackish groundwater. International experts representing Europe, Australia, the Middle East, Northern Africa, Canada, and Singapore described state-of-the-art projects and their applicability to inland states such as New Mexico.

Objectives

The conference objectives were to:

1. identify U.S. research needs concerning new approaches and techniques applicable to inland, small-scale, low-cost rural brackish desalination water projects using renewable energy sources;
2. identify research priorities for projects that can be conducted at the BGNDRF or elsewhere;
3. identify potential collaborations for proposed projects; and
4. distribute the results of the conference broadly.

To meet the first objective, a conference planning committee comprising staff from Reclamation, the NM WRRRI, and BGNDRF held regular conference calls for several months prior to the event. Planning committee members identified and invited participants with an interest in the topic including researchers and users of the technology; invited speakers to give presentations to conference participants informing attendees on current regional, national, and international projects focused on desalination using renewable energy; and identified and invited experts to serve in working groups whose charge would be to identify relevant projects.

The conference's second objective was to identify research priorities for projects that could be conducted at facilities such as the BGNDRF. The invited members of the working groups were assigned to one of eight break-out groups: wind, solar, geothermal, action, infrastructure, water resources, environmental impacts, and institutional considerations (see break-out group participants below). A week prior to the conference,

members of the working groups were provided with a sample Project Description Sheet and Participant Instructions. At dinner on the first evening of the conference, a table was assigned to each break-out group and members of the group met each other and agreed on a group facilitator. Reclamation staff member, Kevin Price, provided an overview of the Project Description Sheet, Participant Instructions, Facilitator Instructions, and the proposed protocol for the next day. Each group was asked to meet the next morning, complete Project Description Sheets, and present their agreed upon top projects to the plenary group during the afternoon session. After projects were presented in a plenary conference session, each conference participant voted on their favorite proposed projects.

The third objective was to identify potential research and dissemination collaborators. The Project Description Sheet included a request to identify Proposed Partners for each project.

The final conference objective was to prepare a final report that would be posted on Reclamation's and NM WRRRI's websites. This report provides a conference proceedings including PowerPoint presentations from plenary speakers, two top-ranked project descriptions, other break-out group project descriptions, and links to relevant papers as provided by plenary speakers.

Break-out group participants

Action

Mike Hightower, Sandia National Laboratories

Larry Jessup, Veolia Water

Randy Shaw, Reclamation, Brackish Groundwater National Desalination Research Facility, Alamogordo

Wendel Ela, University of Arizona

Tommy Fuller, Holloman Air Force Base, Alamogordo

Environmental Impacts

Anthony Tarquin, University of Texas at El Paso

Kevin Price, Reclamation, Denver

Jill Shaunfield, U.S. Department of State

Shahid Chaudhry, California Energy Commission

Jalal Rastegary, Institute for Energy and the Environment, New Mexico State University

Geothermal

Jorge Arroyo, Texas Water Development Board

Tom Davis, Center for Inland Desalination Systems, University of Texas, El Paso

Jim Witcher, Witcher and Associates

Jim Loya, Institute for Energy and the Environment, New Mexico State University

Amy Halloran, Sandia National Laboratories

Infrastructure

Ali Al-Qaraghuli, National Renewable Energy Laboratory

Katie Guerra, Reclamation, Denver

Neil Moe, General Electric

Institutional Considerations

Andrea Achilli, University of Nevada, Reno

Ian Watson, American Membrane Technology Association

Mike Hamman, Reclamation, Albuquerque

John Hawley, Hawley Geomatters, Inc.

Miguel Rocha, Reclamation, Denver

Solar

Kevin Black, Reclamation, Phoenix
Michael Landis, Reclamation, El Paso
Guillermo Zaragoza, Plataforma Solar de Almeria
Hill Kemp, Kll, Inc. Suns River
Ardeth Barnhart, University of Arizona
Mitch Haws, Reclamation, Arizona, Phoenix

Water Resources

Alexander Fernald, New Mexico Water Resources Research Institute
Jaya Tharamapalan, University of Central Florida
Bekele Debele Negewo, World Bank
Ken Rainwater, Texas Tech University
Ali Sharbat, Institute for Energy and the Environment, New Mexico State University

Wind

James Stalker, Precision Wind
Linda Reekie, Water Research Foundation
Peter Fox, Arizona State University
Dave Furukawa, National Centre of Excellence in Desalination, Australia
Joe Jacangelo, WateReuse Research Foundation
Angela Adams, Reclamation, Yuma, AZ