

Concept Paper		
Webinar on “Use of Solar Energy in Water Desalination”		
Webinar	PRG-161/2019/POSIT	SEC

Background

Desalination is defined as the removal of salt (sodium chloride) and other minerals from the sea water to make it suitable for human consumption and/or industrial use. The most common desalination methods employ reverse-osmosis in which salt water is forced through a membrane that allows water molecules to pass but blocks the molecules of salt and other minerals¹. With improvements in technology, desalination processes are becoming cost-competitive with other methods of producing usable water for our growing needs.

A desalination process essentially separates saline water into two parts - one that has a low concentration of salt (treated water or product water), and the other with a much higher concentration than the original feed water, usually referred to as brine concentrate or simply as ‘concentrate’. The use of solar energy in thermal desalination processes is one of the most promising applications of the renewable energies. Solar desalination can either be direct; use solar energy to produce distillate directly in the solar collector, or indirect; combining conventional desalination techniques, such as multistage flash desalination (MSF), vapor compression (VC), reverse osmosis (RO), membrane distillation (MD) and electro-dialysis, with solar collectors for heat generation. Direct solar desalination compared with the indirect technologies requires large land areas and has a relatively low productivity. It is however competitive to the indirect desalination plants in small-scale production due to its relatively low cost and simplicity.

Introduction:

South Asia is a water stressed region, and a water crisis is increasing for many regions in South Asia. Apart from Bhutan and Nepal, South Asia’s per capita water availability is already below the world average. Bangalore, Karachi and Kabul are among the 10 cities in the world that are “on the verge of an imminent water crisis². In fact, according to ADB, water supply in India may fall 50 per cent below demand by 2030. But with abundant solar energy potential in South Asia, a viable economic case could be built for solar thermal based desalination.

Therefore, SEC under its thematic area of “Program to Successfully Implement Technology Transfer (POSIT)” proposes this webinar on use of solar energy in water desalination. This webinar will be an effort to share the available knowledge and experience of the experts from different organizations involved in the thermal desalination of sea water as well as researchers from the research organizations. As solar thermal desalination is in its early

¹ <http://www.businessdictionary.com/definition/desalination.html>

² Center for Science & Environment, 2018

stages, with a few projects recently established, therefore the webinar will not only share theoretical knowledge, but will also share the important learnings from those recent projects and will aim to share with the SAARC professionals the solutions to commonly encountered problems during those projects.

Objectives:

The objective of the webinar is to educate the energy and water sector professionals from SAARC region about the technology options, opportunities and challenges linked with the use of solar thermal desalination/purification. The proposed webinar will provide an opportunity to the SAARC audience to get their questions answered by the experts before they actually design any policy, regulatory or project-based initiative. This webinar will also help SEC link up the experts with the professionals of the SAARC region by developing strong networks with the distinguished experts of the field. In the long run, through such insightful webinars, SEC aims to strengthen its bond with global experts and SAARC professionals.

Major Aspects to be covered in the Webinar:

Following major aspects will be covered in the webinar

- 1) General Problems in Seawater Desalination
- 2) Solar Energy Utilization and Thermal Desalination Technologies
- 3) Multi-Stage Flash Distillation (MSF)
- 4) Multi-Effect Distillation (MED)
- 5) Vapor Compression Distillation
- 6) Solar Desalination System Combined with Conventional Technologies
- 7) Absorption and Adsorption Solar Desalination System
- 8) Barriers and challenges in solar thermal desalination
- 9) Costs involved in solar thermal desalination
- 10) The Benefit Evaluation and Material Selecting
- 11) Global examples
- 12) Implementation in SAARC region
- 13) Commercial viability

Relevance, Coherence and Sustainability:

This dissemination webinar is relevant to POSIT Thematic Area of SEC. Use of solar thermal technology in best/economical way is the principal theme of the activity.

Potential Professional Resource

Experts from government, private sector and academia, having experience in solar thermal desalination technologies will be invited from and outside SAARC region to speak for 25-40 minutes to share their experiences.