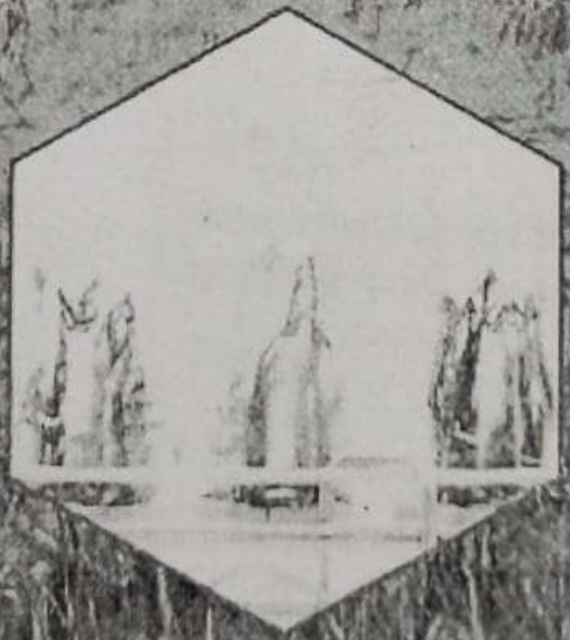
Facets of ENVIRONMENTAL SCIENCES

Editors
Abhishek Singh
Pankaj Kumar
Prashant Bhusan



Facets of Environmental Sciences

Edited by:
Dr. Abhishek SinghDr.
Pankaj Kumar Dr.
Prashant Bhusan

SHREE PUBLISHERS & DISTRIBUTORS
New Delhi–110007

Title : Facets of Environmental Sciences

Editors : Dr. Abhishek Singh, Dr. Pankaj Kumar and
Dr. Prashant Bhusan

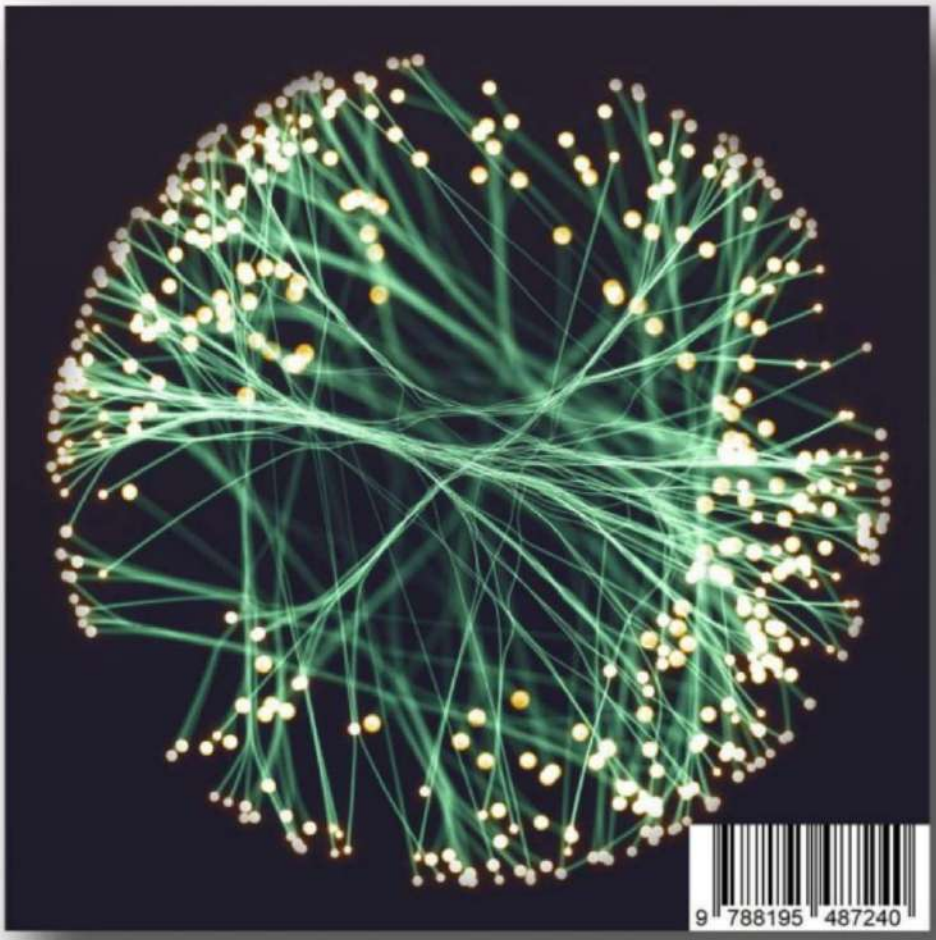
Edition : 2021

Published by :

Shree Publishers & Distributors
22/4735, Prakash Deep Building,
Ansari Road, Daryaganj,
New Delhi-110002

ISBN : 978-93-90674-05-3

Printed by :
In-house
New Delhi-110 002



PROCEEDINGS OF

1ST INTERNATIONAL CONFERENCE ON

WATER, ENERGY & ENVIRONMENT

23 & 24 DEC 2021

www.weecon.in | conference@weecon.in

Director
R.D. Engineering College
Duhai, Ghaziabad

ISET RESEARCH

EI

International Conference on Water, Energy and Environment (WEECON 2021),
ISET Research India in association with IET Vietnam, December 23-24, 2021

EFFECT OF ENERGY MATRICES ON LIFE CYCLE COST ANALYSIS OF PARTLY COVERED N-PVT-CPC ACTIVE DOUBLE SLOPE SOLAR DISTILLER WITH HELICALLY COILED HEAT EXCHANGER USING CUO NANOPARTICLES

Dharamveer*, Samsher, Anil Kumar

Department of Mechanical Engineering, Delhi Technological University, Delhi-110042

*Corresponding author email: veerdharam76@gmail.com

Abstract:

At present, the application of nanotechnology for the production of pure water is increasing. It is a new approach in which nanoparticles are being optimized for active solar distiller units with the helically coiled heat exchanger of the effect of the payback period. Thermal modeling has been developed. The thermal exergy, cost of distillate, and productivity are 7.3% higher, 3.58% lower, and 3.45 % higher, respectively, for double slope N-PVT-CPC-DS-HE (system-A) to N-PVT-FPC-DS-HE (system-B). However, the efficiency of life cycle conversion and energy payback factor at 10% interest rate is 13.62% and 5.93% high, respectively, with nanoparticles. It is found that system-A performs better than system-B based on yield and production cost. The proposed system-A, an active double slope solar distiller unit, meets potable water requirements on a commercial basis, and power developed by 25% PVT can be used to drive the pump. Additional 97.6% excess electricity can be utilized for other supportive applications. The optimum mass flow rate achieved by proposed system-A is 0.02 kg/s from 0.03 kg/s of prior research system-B, i.e., it is decreased by about 33%, which reduces pump work.

Keywords: Energy matrices, energy payback factor, life cycle cost analysis, productivity, heat exchanger, CuO nanoparticles.