

**“DESIGN AND PERFORMANCE ANALYSIS OF PORTABLE SOLAR
DISTILLATION SYSTEM AND DOMESTIC HOT WATER IN CO-
GENERATION PROCESS”**

Submitted to Delhi Technological University in Partial Fulfilment of the Requirement for the
Award of the Degree of

Master of Technology

In

Mechanical Engineering

With specialization in Renewable Energy Technology

By

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CERTIFICATE

This is to certify that the project entitled “Design and Performance analysis of Portable Solar Distillation System and Domestic Hot Water in Co-generation Process” being submitted by me, is a bonafide record of my own work carried by me under the guidance and supervision of Dr. Rajesh Kumar (Associate Professor) in partial fulfilment of requirements for the award of the Degree of Master of Technology in Production Engineering from Department of Mechanical Engineering, Delhi Technological University, Delhi.

The matter embodied in this project either full or in part have not been submitted to any other institution or University for the award of any other Diploma or Degree or any other purpose what so ever.

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ABSTRACT

Most of the distillation system works by consuming energy either by burning fossils fuels or electrical energy. In the case of portable solar distillation system no conventional form of energy is required except the solar energy. It works on the principle of simple evaporation and condensation process similar to the formation of clouds. It takes brackish or impure water as an input and gives pure distilled or drinkable water. Performance of this system provides the detailed information about the effect of variation of temperature, wind speed and solar irradiation on the overall performance of the system.

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ABBREVIATION

FPCs	Flat Plate Collector
ETCs	Evacuated Tubular Collector
PTCs	Parabolic Trough Collector
LFRs	Linear Fresnel Reflector
PSWDs	Portable Solar Water Distillation System
TDS	Total Dissolved Solids
$^{\circ}\text{C}$	Degree Celsius
mm	Millimeter
ml	Milliliter
m	Meter
η	Efficiency
hf_g	Latent Heat of vaporization
M	Condensate Production
I	Solar Radiation
A	Area of the Device
Σ	Summation

EHPTs	Evacuated Heat Pipe Tubes
NISE	National Institute of Solar Energy
MNRE	Ministry of New and Renewable Energy
MSF	Multiple-stage flash
MEB	Multiple effect boiling
RO	Reverse Osmosis
ED	Electro-dialysis
VC	Vapor Compression