

**The First National Conference on Renewable Energies and Advanced
Electrical Engineering (NC REAEE'25)**

May 06-07th, 2025

University of M'Sila

Faculty of Technology

Electrical Engineering Laboratory (LGE)



CERTIFICATE OF PARTICIPATION

This Certificate is Awarded to:

Fares KHALFALLAH

for presenting a paper entitled: **Influence of Parabolic Solar Concentrator Diameter on Captured Energy Flux Distribution.**

Co-authors: ***Razik Benderradji, Elhadj Raouache.***

at the First National Conference on Renewable Energies and Advanced Electrical Engineering (NC-REAEE'25), held at M'Sila University- Algeria, on May 6–7th 2025.

Paper ID: **291**



Conference Chair

Dr. Abderrahim ZEMMIT





**The First National Conference on Renewable Energies and
Advanced Electrical Engineering (NC REAEE'25)**

May 06-07th, 2025

**University of M'sila
Faculty of Technology
Electrical Engineering Laboratory (LGE)**



Influence of Parabolic Solar Concentrator Diameter on Captured Energy Flux Distribution

Fares Khalfallah*¹, Razik Benderradji¹ and Elhadj Raouache²

¹ Department of Physics, Faculty of Sciences, University of M'sila, Algeria

² Mechanical Engineering Department, Faculty of Sciences and Technology, University of Bordj Bou Arreridj, Algeria

*Corresponding author: fares.khalfallah@univ-msila.dz

Abstract

Solar energy, which is clean and renewable, represents a sustainable alternative for electricity production. Among the available technologies, solar concentration systems are the most promising for industrial use. Parabolic concentrators focus the sun's rays on a specific point in order to produce high-temperature heat. This work studies the effect of the diameter of a parabolic concentrator on the distribution of the flux at the focal point. A larger diameter captures more radiation, influencing the density and distribution of thermal energy. Modeling was performed using Tonatiuh open source software, which specializes in optical simulations. The results show that the diameter affects not only the amount of energy concentrated, but also the uniformity of the heat flux. This analysis makes it possible to optimize the geometry of the collector to improve the energy efficiency of the system.

Keywords : Parabolic solar collectors, Flux distribution, Focal region, Tonatiuh.