

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

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Fares KHALFALLAH

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Influence of Parabolic Solar Concentrator Diameter on Captured Energy Flux Distribution

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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.