Accepted Manuscript

A novel solar concentrating system based on a fixed cylindrical reflector and tracking receiver

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PII: S0960-1481(17)31004-2

DOI: 10.1016/j.renene.2017.10.040

Reference: RENE 9328

To appear in: Renewable Energy

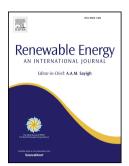
Received Date: 25 May 2017

Revised Date: 26 September 2017

Accepted Date: 11 October 2017

Please cite this article as: Maatallah T, Houcine A, El Alimi S, Ben Nasrallah S, A novel solar concentrating system based on a fixed cylindrical reflector and tracking receiver, *Renewable Energy* (2017), doi: 10.1016/j.renene.2017.10.040.

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ACCEPTED MANUSCRIPT

1	A novel solar concentrating system based on a fixed cylindrical
2	reflector and tracking receiver
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12	
13	Abstract:
14	The performance of a novel solar energy concentrating system consisting of a cylindrical
15	mirror placed in a stationary position and a receiver tracking system is investigated. Via a
16	computational tool based on the ray-tracing method, the sensitivity of the geometric
17	concentration ratio, rim angle, shadow angle, incidence angle and hourly insolation level to
18	the optical performance of the concentrator are evaluated. The simulation includes a model of
19	solar concentrating system based on the approximation of the optical behavior of a cylindrical
20	reflector. In fact, the optical efficiency of the solar concentrator system is examined. The
21	results prove that the maximum of the optical efficiency is achieved for 20×geometric
22	concentration ratio and 80° -rim angle. Moreover, the concentrated solar density and the Local
23	Concentration Ratio (LCR) distribution along the tracked receiver tube are analyzed and
24	compared to those obtained by the classical one-axis tracked parabolic trough concentrator
25	system.
26	Keywords: solar energy concentrating system; a fixed cylindrical reflector; receiver tracking
27	system; RT 3D-4R method; optical efficiency

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