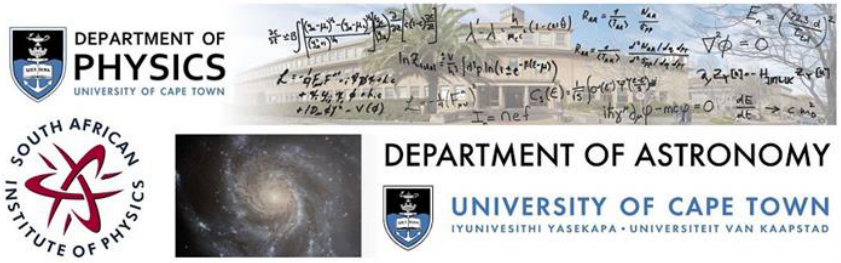

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Dynamic Model to Evaluate the Performance of Residential Air Source Heat Pumps in South Africa

Wednesday, 6 July 2016 16:10 (1h 50m)

Abstract content
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The market of air source heat pumps water heaters for sanitary hot water production is fast gaining maturity in South Africa following the Rebate program that targeted the installation of 65,580 Air source heat pump units by 2013. The performance of these Air source heat pump units are expected to vary depending in which of the 6 climatic zones they are installed. In a bid to quantify the energy savings from these air source heat pump water heaters as well as to predict with better accuracy their performance depending on their locations, a steady-state model using the Number of Transfer unit method for the heat exchanger is developed that simulates air source heat pump water heater units under typical weather conditions as depicted in the 6 different climate zones classification by SANS 204. Results shows that all the air source heat pump water heaters achieve a COP (Coefficient of performance) between 2.8 to 3.3 with the highest COP in climate zone 3. The steady-state model also reveals strong correlation with experimental data collected in climate zone 5 (Alice, Eastern Cape), with a determination coefficient of 0.963.

Keywords: Steady-state model, Air source heat pump water heater, COP and Renewable and energy efficient technology, Climate zone

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