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## An efficient and reliable model develop and employ in a simulation application to compute the coefficient of performance of an air source heat pump water heater

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**Abstract content**   
 (Max 300 words)   
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ASHP water heaters are renewable energy devices for sanitary hot water production and this technology is fast gaining maturity in the South Africa market especially in the residential sector. The paper focused on the design and building of DAS to measure the power consumption, ambient temperature, relative humidity, initial inlet and the final outlet water temperature of the ASHP as well as the volume of water heated up and that drawn off into the building. A mathematical model of the COP was developed whereby the predictor parameters are the electrical energy use, the difference between the final outlet and initial inlet ASHP water temperature, the volume of water drawn off, average ambient temperature and the relative humidity during a heating up cycle. The predictors were further rank by their weight of importance. The results depict that both average ambient temperature and relative humidity as primary factors to the COP. The experimental result shows that a COP of 2.80 was achieved when the average ambient temperature was 27.3oC, relative humidity of 25.9%, initial inlet and out water temperature of 22.6oC and 55.4oC, volume of water drawn off was 49L while the average power used was 1.43 kW and the heating up cycle took 0.83 hour. Conclusively the model predictor sensors are cost effective and easy to be implemented. The build and develop model can predict the Cop with very high accuracy.

**Apply to be considered for a student award (Yes / No)?**

No

**Level for award (Hons, MSc, PhD)?**

NON

**Main supervisor (name and email) and his / her institution**

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**Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?**

Yes

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