

Review Form 3

Journal Name:	Journal of Energy Research and Reviews
Manuscript Number:	Ms_JENRR_125856
Title of the Manuscript:	THERMODYNAMIC ANALYSIS OF TWO-STAGE VAPOUR COMPRESSION REFRIGERATION SYSTEMS USING ECO-FRIENDLY REFRIGERANTS
Type of the Article	

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

Compulsory REVISION comments	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.	This article holds substantial importance for the scientific community, mainly in the areas of thermodynamics, and refrigeration. The work reports a critical need for environmentally friendly refrigerants in response to the increasing demand for cooling solutions in Nigeria. By focusing on low-GWP and zero-ODP refrigerants like R-717, R-600, R-600a, and R-290, it aligns with global efforts to reduce the environmental impact of refrigeration systems. The use of Engineering Equation Solver (EES) software for performance analysis strengthens the study's methodology, making the findings robust and useful for researchers and engineers working on refrigeration system optimization. However, the reviewer suggests that the same methodology could be applied to new alternative and eco-friendly refrigerants, such as Hydrofluoroolefins (HFOs), which could further enhance the significance of the present manuscript.	
Is the title of the article suitable? (If not please suggest an alternative title)	The title " THERMODYNAMIC ANALYSIS OF TWO-STAGE VAPOUR COMPRESSION REFRIGERATION SYSTEMS USING ECO-FRIENDLY REFRIGERANTS " effectively conveys the core focus of the research, making it clear and relevant for the scientific community.	
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.	The abstract of the current article is comprehensive and well-structured, clearly summarizing the key aspects of the study, including the objective, methodology, refrigerants analyzed, operating parameters, and the main findings. However, a few suggestions could help improve its clarity and impact: <ol style="list-style-type: none"> 1. Avoid providing abbreviations in abstract, instead authors may add separate Nomenclature section. Eg. Evaporating Temperature (TE), Condensing Temperature (TC), Superheating Temperature (Tsup), etc. 2. Consider rephrasing sentences for improved clarity. For example, "The study revealed that except for \dot{m} for all the other four operating parameters considered have significant effect on the COP." could be revised to "The study revealed that, except for the mass flow rate (\dot{m}), all other operating parameters significantly affect the COP of the refrigeration systems considered. 3. The abstract may also include the environmental impact of the eco-friendly refrigerants mentioned in the study, which can be evaluated using Total Equivalent Warming Impact (TEWI) analysis. To support this analysis, the authors may refer to relevant resources, such as those listed below. <ul style="list-style-type: none"> • https://doi.org/10.1080/01430750.2024.2378949 • https://doi.org/10.1080/15567036.2021.2024302 	
Are subsections and structure of the manuscript appropriate?	Yes, structure and subsections of the manuscript are appropriate.	
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	The manuscript is scientifically robust and technically sound, as it conducts a comprehensive thermodynamic analysis of two-stage vapor compression systems using environmentally friendly refrigerants like R-717, R-600, R-600a, and R-290. The comparative study of multiple refrigerants enhances the validity of the findings. Using Engineering Equation Solver (EES) software to analyze key parameters adds credibility, as it is a reliable tool for such analyses. The findings on the relationship between COP and operating parameters are consistent with established refrigeration principles, making the study a valuable contribution to the field.	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. :-	Introduction section must be written on more quality way, i.e. more up-to-date references addressed. Research gap should be delivered on more clear way with directed necessity for the conducted research work. Moreover, to emphasize the impact of eco-friendly refrigerants on the environment, the authors may consider adding a few additional references, which are listed below; <ul style="list-style-type: none"> • https://doi.org/10.1080/01430750.2024.2378949 • https://doi.org/10.1080/15567036.2021.2024302 	

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<p>Minor REVISION comments</p> <p>Is the language/English quality of the article suitable for scholarly communications?</p>	<p>English language should be carefully checked and carefully check paper for language typos.</p>	
<p>Optional/General comments</p>	<ol style="list-style-type: none"> 1. The main objective of the work must be written on the more clear and more concise way at the end of introduction section. 2. Conclusion section is missing some perspective related to the future research work, quantify main research findings. 3. Paper has a lot of abbreviations, add Nomenclature. 4. Authors may add quality graphs in result and discussion section. For the same use recent tools such as Origin etc. 5. Fig.1 and 2, should be replace with more quality schematic diagrams. 6. In, Fig. 2 Expansion Valve is incorrectly spelled as Value. 7. In, Fig.2 Valve is written as “alve”. 8. The thermodynamic analysis of a two-stage vapour compression refrigeration system is performed based on the following assumption: <ul style="list-style-type: none"> • Isenthalpic expansion of refrigerant in the expansion valves, • Negligible changes in kinetic and potential energy. • Negligible pressure and heat loss or gain in the pipe or other components, • The compression process is irreversible and adiabatic <p>“Authors should provide references for the said assumptions.”</p> 9. The following parameters values were used: <ul style="list-style-type: none"> • Condensing temperature, TC = 50 °C is used as the baseline and varied from 30 °C to 80 °C. • Evaporating temperature, TE = -20 °C is used as baseline and varied from 0 °C to -50 °C. • Sub-cooling temperature, Tsub = 4 °C is used as baseline and varied from 0 °C to 20 °C. • Superheating temperature, Tsup = 4 °C is used as the baseline and varied from 0 °C to 20 °C. • The mass flow rate of the refrigerant, (\dot{m}) = 0.05 kg/s is used as baseline and varied from 0.01 kg/sec to 0.11 kg/sec. <p>“Clarify on how authors have selected baseline temperatures. Moreover, The mass flow rate of the refrigerant, (\dot{m}) = 0.05 kg/s is used as baseline.”</p> 10. Please check Figures 3 to 6 for consistency in temperature units. Additionally, in Figure 7, ensure that the symbol for mass flow rate is consistent, as different abbreviations have been used throughout the manuscript. It is important to maintain uniformity in symbols. 11. In conclusion section, authors have mentioned that, “The mass flow rate of the refrigerant does not have effect on the COP”. This statement is found to be very vague, as mass flow rate generally affects the COP of refrigeration systems, please clarify on this. Moreover, the step value chosen for mass flow rate is very marginal; it would be helpful to clarify the context in which this value was selected. 	

PART 2:

	Reviewer’s comment	Author’s comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Are there ethical issues in this manuscript?</p>	<p><i>(If yes, Kindly please write down the ethical issues here in details)</i></p>	

Reviewer Details:

<p>Name:</p>	<p>Rahul Ganeshrao Deshmukh</p>
<p>Department, University & Country</p>	<p>Dr. D. Y. Patil Technical Campus, India</p>