28 August 2020

Prof. Dr. Enrico Sciubba

Editor-in-Chief

*Energies*

My co-authors and I are pleased to submit an original research article to *Energies*

*TITLE*

**The Energy and Exergy of Light  
With Application to Societal Exergy Analysis**

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*STATEMENT*

I attest that this manuscript is our original work, that it has not been previously published in a journal, in whole or in part, and that it is not under consideration by any other journal. All authors are aware of, and accept responsibility for, the manuscript. The authors have no conflicts of interest.

*SIGNIFICANCE OF OUR WORK AND WHAT NEW INFORMATION IS DESCRIBED IN THE MANUSCRIPT*

In the field of societal exergy analysis, the exergetic efficiency of electric lamps has been approximated by an energy efficiency, resulting in much confusion to date. In this paper, we develop a new, exact method for calculating the exergetic efficiency of lamps, based on recent results in the photometry and thermodynamics of radiation literature. The exact method (a) is free of (possibly erroneous) assumptions for the maximum luminous efficacy, (b) uses the correct spectral exergy-to-energy ratio, no longer assuming its value to be 1, and (c) allows choices for the spectral weighting function. The exact method exposes assumptions inherent to the original method and leads to a better approximation of lamp exergetic efficiency, when needed.

*WHY DO THE AUTHORS THINK THE PAPER IS IMPORTANT AND HOW IT FITS THE SCOPE OF ENERGIES?*

This paper is important, because it clarifies a methodological issue in the growing body of societal exergy analysis literature, and it concludes with specific recommendations for societal exergy analysts.

This paper fits the scope of *Energies*, because it matches many *Energies* subject areas listed at <https://www.mdpi.com/journal/energies/about>. In particular, the following are directly relevant to our article:

* Exergy,
* Thermodynamics,
* Energy forms, and
* Energy transformation.

We have worked hard to provide a concise, novel article that we believe will be of significant interest to your readership. We trust that you will find the manuscript to be both novel and important and hope you will accept its submission to *Energies*.

Yours sincerely,

Matthew Kuperus Heun