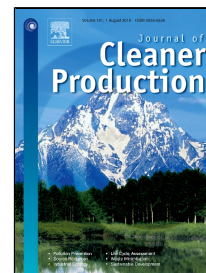


# Accepted Manuscript

Advanced life cycle integrated exergoeconomic analysis of building heating systems: An application and proposing new indices

Emin Açıkkalp, Arif Hepbasli, Cem Tahsin Yucer, Hikmet Karakoc



PII: S0959-6526(18)31592-0  
DOI: 10.1016/j.jclepro.2018.05.239  
Reference: JCLP 13096  
To appear in: *Journal of Cleaner Production*  
Received Date: 14 February 2018  
Accepted Date: 28 May 2018

Please cite this article as: Emin Açıkkalp, Arif Hepbasli, Cem Tahsin Yucer, Hikmet Karakoc, Advanced life cycle integrated exergoeconomic analysis of building heating systems: An application and proposing new indices, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.05.239

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Advanced life cycle integrated exergoeconomic analysis of building heating systems: An application and proposing new indices

Emin Açıkkalp<sup>a,\*</sup>, Arif Hepbaslı<sup>b</sup>, Cem Tahsin Yücer<sup>c</sup>, Hikmet Karakoc<sup>d</sup>

<sup>a</sup>*Department of Mechanical Engineering, Engineering Faculty, Bilecik S.E. University, Bilecik, Turkey*

<sup>b</sup>*Department of Energy Systems Engineering, Faculty of Engineering, Yasar University, 35100 Bornova, Izmir, Turkey*

<sup>c</sup>*Air Force NCO Higher Vocational School, National Defense University 35410, Gaziemir, İzmir, Turkey*

<sup>d</sup>*Anadolu University, Faculty of Aeronautics and Astronautics, İki Eylül Kampusu, Eskişehir, 26470, Turkey*

## ABSTRACT

Advanced exergy-based analysis and assessment tools have been considered very useful tools for detecting the interactions among components of energy-conversion systems and the real potential for improving each component in any system. In this study, a building heating system is analyzed using advanced life cycle integrated (LCI) exergoeconomic analysis method, which combines cost and environmental impacts. Some new indices (metrics) such as advanced exergy destruction ratio, advanced LCI exergoeconomic ratio, advanced LCI exergoeconomic sustainability index and advanced indices are presented. These metrics are also applied to the main components of the system. The boiler has the maximum LCI endogenous exergy destruction cost ratio while the maximum LCI exogenous destruction ratio is due to the water heater. The advanced LCI exergoeconomic depletion ratios are 0.187, 0.599, 0.414 and 0.371 for the endogenous, exogenous, unavoidable and avoidable parts, respectively.

**Keywords:** Advanced exergy, Exergoeconomic analysis, Advanced life cycle integrated exergoeconomic analysis, Buildings, Space heating

---

\*Corresponding author.

E-mail addresses: [eacikkalp@gmail.com](mailto:eacikkalp@gmail.com), [emin.acikkalp@bilecik.edu.tr](mailto:emin.acikkalp@bilecik.edu.tr) (E. Açıkkalp).

Download English Version:

<https://daneshyari.com/en/article/8094291>

Download Persian Version:

<https://daneshyari.com/article/8094291>

[Daneshyari.com](https://daneshyari.com)