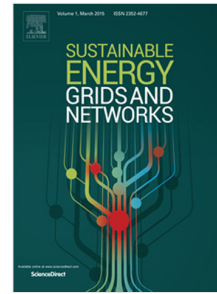


Accepted Manuscript

Exergy cost of information and communication equipment for smart metering and smart grids

Slavisa Aleksic, Vedad Mujan



PII: S2352-4677(17)30010-3
DOI: <https://doi.org/10.1016/j.segan.2018.01.002>
Reference: SEGAN 137

To appear in: *Sustainable Energy, Grids and Networks*

Received date: 12 January 2017
Revised date: 1 September 2017
Accepted date: 25 January 2018

Please cite this article as: S. Aleksic, V. Mujan, Exergy cost of information and communication equipment for smart metering and smart grids, *Sustainable Energy, Grids and Networks* (2018), <https://doi.org/10.1016/j.segan.2018.01.002>

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.

Exergy Cost of Information and Communication Equipment for Smart Metering and Smart Grids

Slavisa Aleksic^{1,2}, Senior Member, IEEE, and Vedad Mujan²

¹Hochschule für Telekommunikation Leipzig (HfTL), Gustav-Freytag-Str. 43-45, 04277 Leipzig, Germany

²Vienna University of Technology, Institute of Telecommunications, Gusshausstrasse 25/ E389, 1040 Vienna, Austria

(e-mail: Aleksic@hft-leipzig.de)

Abstract—Future smart grids are expected to offer numerous advantages over the current electricity grid due to an improved efficiency of electricity production, distribution, consumption as well as sophisticated grid management and integration of distributed renewable energy sources. In order to enable these functionalities, however, additional equipment has to be installed, which, on the other hand, will lead to increased electricity consumption and more e-waste. This paper provides, for the first time, to the best of our knowledge, insights into the overall exergy cost related to the introduction of additional information and communication technology (ICT) equipment such as smart meters and other ICT devices required for future smart grids. We present results obtained using a model for the city of Vienna and considering all life cycle phases. Additionally, the impact of the components' lifetime and various implementation options is shown. Since the environmental impact of the additional ICT equipment for smart grids is presented in a simple and transparent manner using a holistic approach referred as to as the exergy-based life cycle assessment (E-LCA) method, the results presented in this paper can easily be integrated in a more complete model of smart grids with the aim of assessing the exergy efficiency of various concepts and applications for future smart energy generation, distribution, and consumption systems.

Index Terms — Advanced Metering Infrastructure (AMI); Home Area Network (HAN); Information and Communication Technology (ICT); Smart Grids; Exergy-based Life Cycle Assessment (E-LCA); Environmental Sustainability.

Download English Version:

<https://daneshyari.com/en/article/6935407>

Download Persian Version:

<https://daneshyari.com/article/6935407>

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