

Impact of lockdown amid COVID-19 pandemic on energy consumption in residential buildings in Indonesia: An Index Decomposition Analysis

Oleh:

Charles O.P. Marpaung
Uras Siahaan

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Charles O.P. Marpaung^{2,3}

Uras Siahaan⁴

Abstract

The corona virus disease (COVID) – 19 pandemic outbreak has almost touched everyone's life and is affecting every sector in the economy. This outbreak was first identified in Wuhan, China, in December 2019 and continues to this day in all parts of the world. The impact of the Covid-19 pandemic outbreak is the daily routine life has come to a standstill, many sectors such as businesses, transport, and many more industries have come to a halt. Only essential sectors like healthcare, food and beverages, energy, communication and IT, financial, logistics, construction, strategic industries, basic services and public utilities, business sectors that serve daily needs have been permitted to operate (Pergub DKI No. 33/2020). Many countries include Indonesia-imposed curfew, mandatory stay-in-home orders and lockdown of cities and countries. Due to the forced restrictions “stay in home”, the daily needs of the people would be affected, one of them is the energy consumption in the residential buildings. Analyzing changes in energy consumption is not enough without knowing the factors that influence it. There are some studies have analysed the factors which affect the energy consumption in the residential buildings. Nie et al. (2017) analysed the changes in residential energy consumption in China's urban and rural areas over the 2001-2012 period based on the logarithmic mean Divisia index method. They found that residential energy consumption changes are decomposed into seven driving forces, which are climate change-, energy price-, energy expenditure mix-, energy cost share (in total expenditure)-, expenditure share (in income)-, per capita income-, and population-effects. Xu and Wang (2014) used a hybrid model to analyse the changes of residential energy consumption in Singapore. They found that there are five factors which affect residential energy consumption changes, i.e., population-, structural-, occupancy-, life style-, and intensity-effects. Nie and Kemp (2014) analysed changes in energy use by Chinese households for five energy-using activities: i.e., space heating/cooling, cooking, lighting and electric appliances. They noted that based on the logarithmic mean Divisia index technique, the changes in energy use are due to changes from floor appliances and to change in floor space, population, and energy mix. Zhao et al. (2012) analysed changes in residential energy consumption in urban China. They found that there are five factors affect the changes in energy use i.e., price effect, intensive structure effect, extensive structure effect, expenditure effect, and population effect. However, to the best of our knowledge, no studies have analysed the changes of energy consumption in the residential sector and the factors which affect it due to Covid-19 pandemic. The purpose of this research paper is to examine the factors which affect the

¹ Submitted to the 1st International Conference on Sustainable Architecture and Engineering (ICoSAE) 2020

² Corresponding Author

³ Charles O. P. Marpaung is with the Post Graduate Program, Universitas Kristen Indonesia ; e-mail address: cop.marpaung@gmail.com

⁴ Uras Siahaan is with the Post Graduate Program, Universitas Kristen Indonesia; e-mail address: urassiahaan@yahoo.com

energy consumption in the residential buildings in Indonesia due Covid-19 pandemic by using an index decomposition analysis (IDA) approach.