


Chapter 11

Evaluation of the Impact of COVID–19 on Energy Consumption in Residences

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ABSTRACT

Due to the COVID-19 epidemic, curfews were implemented, leading to a shift towards home-based education and remote work for professionals such as teachers and engineers. This study compares the energy consumption of a house located in İzmir before and during the pandemic. Two scenarios were analyzed to assess energy consumption in a residential building: C1 as the reference case before COVID-19 and C2 as the case during COVID-19. The analysis showed that, in both cases, the domestic water heating load was prevalent during winter months, while the cooling load was prevalent during summer months. The energy consumption of interior lighting and equipment remains constant regardless of ambient weather conditions. It has been observed that electricity, natural gas, and water consumption increased during the pandemic. Additionally, the cooling loads of the house were found to be

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higher than the heating loads, resulting in an annual average increase of 2507 kWh for heating load and 586 kWh for water consumption during the Covid-19 pandemic.

1. INTRODUCTION

The World Health Organization (WHO) has declared COVID-19 a pandemic due to its rapid and widespread transmission across the globe (Oerther and Watson, 2020; Bsisu, 2020; Yashavantha and Jayabaskaran, 2020). This pandemic is regarded as the most severe global health crisis since the 1918 Spanish Flu (Qadir and Al-Fuqaha, 2020), significantly impacting societies, economies, and healthcare systems worldwide. The rapid spread of the virus has presented an unprecedented challenge with far-reaching and unpredictable economic consequences, disrupting industries, financial markets, and employment at an alarming scale (McKibbin and Fernando, 2020).

Currently, humanity is confronting a highly contagious and not yet fully understood virus known as COVID-19. The pandemic has caused immense devastation on a global scale, affecting every aspect of human life, from healthcare to education and the environment. The severe impact of COVID-19 has led to disruptions in supply chains, significant job losses, and economic instability, posing challenges for governments, organizations, and individuals alike.

To combat the spread of the virus, governments and health authorities worldwide have implemented various preventive measures. Social isolation, quarantine policies, and enhanced personal hygiene practices have been identified as the most effective methods to reduce transmission (Hendrickson and Rilett, 2020; Gargiulo, 2020). In response to the escalating health crisis, many countries imposed lockdowns, travel restrictions, and physical distancing protocols to mitigate the virus's spread and alleviate the burden on healthcare systems.

One of the most profound effects of the pandemic has been on the education sector. As a consequence of the global health emergency in early 2020, schools, colleges, and universities had to undergo a sudden and dramatic shift in their teaching and learning strategies. Educational institutions worldwide closed their physical premises, forcing students and educators to transition to distance learning and on-line education platforms (Qadir and Al-Fuqaha, 2020). This abrupt transformation brought about numerous challenges, including disparities in access to technology, internet connectivity issues, and difficulties in maintaining student engagement in virtual learning environments.

In addition to the changes in education, the pandemic has significantly altered work environments. Many professionals, including teachers, engineers, healthcare workers, and corporate employees, were required to adapt to remote work settings.

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