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## 論文要約

In this dissertation, we delved into the issue of global energy poverty, with a specific focus on Japan as a developed nation where limited research has been conducted on this topic, leading to a lack of understanding of its nature within the country.

In Chapter 1, we provide an overview of the socioeconomic and sociotechnical energy challenges persisting worldwide. Despite significant efforts by prominent organizations and agencies, around 760 million people worldwide lack access to modern energy services, a crucial component for meeting their basic needs. Addressing energy poverty remains a critical challenge, with developed nations, including Japan, facing issues related to energy service affordability, while developing nations grapple with accessibility concerns. This thesis takes a unique approach by delving into the understudied area of energy poverty research in Japan, despite signs of its existence, such as low energy self-sufficiency ratios and high energy prices.

We specifically prioritized addressing the limitations associated with data availability, regional focus, subjective insights, and the categorization of the most vulnerable groups impacted by energy poverty, as these aspects emerged as crucial through our comprehensive literature review on the subject, in Japan and other developed nations.

To achieve this, we explore the experiences of independent college students as a category of vulnerable households and examine the impact of the unexpected event of COVID-19 pandemic on this vulnerable group, considering its implications for socioeconomic status. Additionally, we conduct a macro-level investigation on ordinary households by comparing two socioeconomically contrasting pilot locations in Japan: Tokyo and Oita prefectures. Accordingly, Chapter 2 delved into the experiences of independent college students as a category of vulnerable households affected by energy poverty. This chapter was divided into two distinct parts:

Firstly, in Chapter 2.1, we examined the circumstances they face in relation to energy poverty. This suspicion was grounded in factors including low-income, high-energy prices, and modest lifestyles, supported by both international literature on energy poverty and the specific context of independent college students. Our investigation confirmed that they indeed fall within the classification of vulnerable households, suggesting an addition to the list of vulnerable households in Japan.

Chapter 2.2 provides a deeper exploration of the lived experiences of college students, who are considered as vulnerable households, particularly in the face of unexpected events that disrupt their daily lives and socioeconomic status. The survey conducted for this chapter specifically investigated the impacts of COVID-19 lockdowns and its restrictions on these households' energy consumption patterns, effectively examining the consequences of an unforeseen socioeconomically impactful event on them. The results revealed significant impacts, with 93.1% of respondents indicating that COVID-19 restrictions affected them in various ways. Notably, 68.8% of respondents reported an increase in household energy consumption, while many experienced job losses or reduced working hours, which alternatively resulted in a decrease in income. These factors, with their potential to exacerbate energy poverty, are among the most impactful challenges faced by this vulnerable category.

In Chapter 3, we conducted a comprehensive investigation of energy poverty by examining the conditions of randomly selected ordinary households. To gather data for this analysis, we collected 1,570 data samples using specifically designed questionnaires that aimed to explore energy poverty. In order to overcome regional study limitations, considering the extensive engagement of other countries' literature in energy poverty research and the call for the importance of area specific energy poverty research, we focused on data collection and comparison between Tokyo and Oita prefectures, which represent two socioeconomically contrasting locations. Additionally, we addressed the comparison of energy poverty before and after the Russia-Ukraine war, which significantly impacted energy costs in Japan. This unexpected event allowed us to identify potential factors of vulnerability. To assess and depict the transition of households towards or away from energy poverty, we developed the Energy Poverty Possibility Indicator (EPPI). By classifying households into three categories - Invulnerable (IVu), Semi-Vulnerable (SVu), and Vulnerable (Vu) - in both regions, and observed that Vulnerable households demonstrated greater stability in Tokyo and exhibited higher resilience against negative changes, such as price surges resulting from unexpected events like the Russia-Ukraine war. The research findings affirm that energy poverty must be addressed and targeted differently based on

regional contexts, even within the same country. This supports the assertions made in European studies, demonstrating the relevance of these suggestions in the case of Japan as well.

Lastly, Chapter 4 serves as a comprehensive summary of this dissertation and delves into the profound research findings. On a global scale, the concluding notes emphasize that buildings resilience to combat future challenges in a world striving for universal energy access requires drawing from the lessons learned in developed nations like Japan and adopting novel approaches to assess and address energy poverty. These insights are crucial for achieving the overarching goal of universal energy access worldwide.