

ENERGY POVERTY AND ENERGY INEQUALITY IN JAPAN: A DIRECT MEASUREMENT APPROACH

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Overview

This study proposes a new approach to evaluating energy poverty or energy inequality via direct measurement of energy service use. In recent years, there has been growing interest in energy (or fuel) poverty worldwide, and much literature has come out. On the measurement issue, various types of energy poverty measures have been presented, while there is still much room for progress in the evaluation methodology (e.g., Okushima, 2017). For example, Fig. 1 shows the levels of regional energy poverty in Japan, evaluated by the traditional 10% indicator (Boardman, 1991). The figure clearly indicates the differences in energy poverty prevalence between regions and seasons, which implies the importance of regional or seasonal variation in household energy needs in such measurement. Traditional measures generally focus on energy costs against income, i.e. energy affordability, and they cannot adequately treat the vulnerability factors behind the prevalence of energy poverty, such as climate (Okushima, 2019; Robinson et al, 2018).

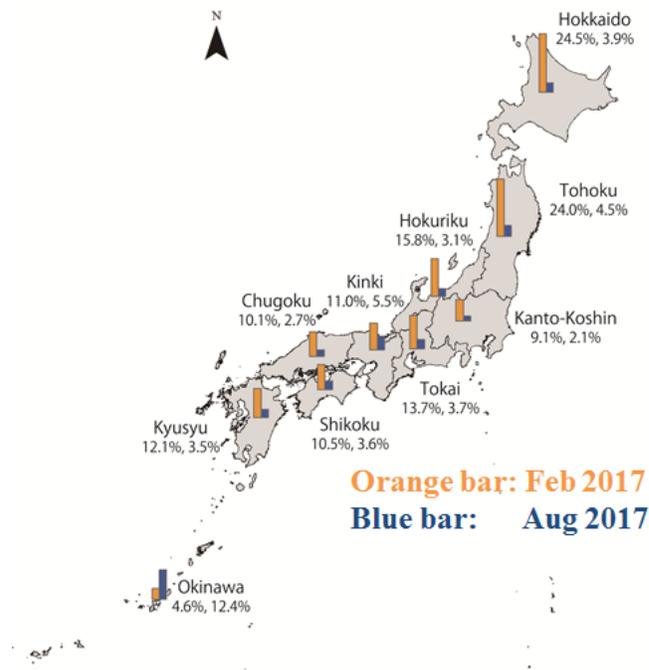


Fig. 1. Regional energy poverty in Japan (evaluated by the 10% indicator)

Source: Author's calculation using anonymized information in "Family Income and Expenditure Survey," Statistics Bureau, Ministry of Internal Affairs and Communications, Japan

Methods

The new energy poverty measure proposed in this study is a kind of relative poverty measure in calorific value and constructed in a multidimensional setting (Okushima, 2019). The measure introduces a new concept, 'types'. The 'types' are built on the ethical consideration on 'energy needs' and enable us to capture a variety of energy vulnerability factors such as climate and dwelling types. This new approach can also be applied to energy inequality measurement, considering the diverse energy needs of households or individuals.

Results

This study applies the new measure to examining regional energy poverty in Japan, using the most recent data. The result is shown in Fig. 2. The figure shows large variation of energy poverty prevalence between the Japanese regions, and notably, the southern regions of Shikoku and Kyushu experience relatively high poverty rates (13.2% and 12.2%, respectively), which is different from the evaluation by the traditional measure (Fig. 1). As the result indicates, it is necessary for regional assessment to implement poverty or inequality measures that can adequately treat the differences in household energy needs, which inevitably depend on the vulnerability factors, e.g., the climate in their living places.

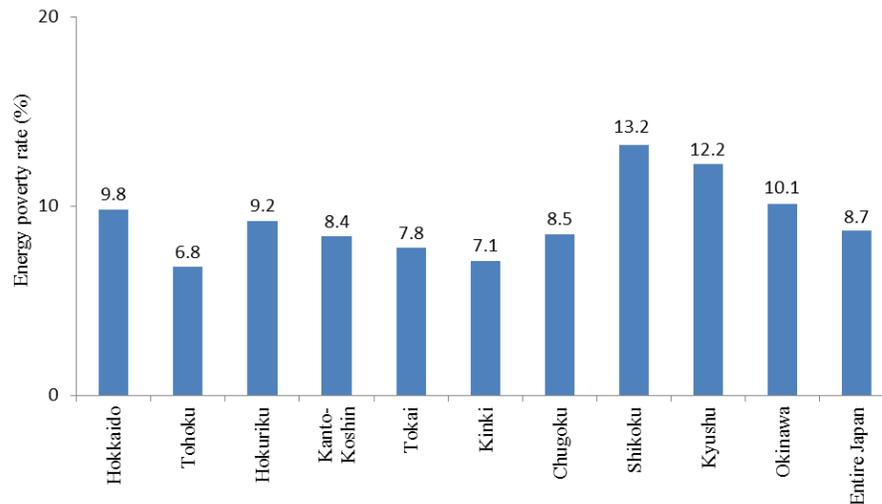


Fig. 2. Energy poverty in Japan and its 10 regions in 2017 (evaluated by the new measure)

Source: Author's calculation using anonymized information in "Survey on the Actual Conditions of Carbon Dioxide Emissions from Residential Sector," Ministry of Environment, Japan

In addition, the study discusses the essential role of kerosene (heating oil) in ensuring adequate energy services (heating in winter), specifically in the northern Japan. The use of kerosene will be appeared as an agenda for both the energy poverty and the low-carbon energy transition in Japan. The study also brings up an energy (in)justice issue - 'energy poverty premium' - for discussion. It means that the unit cost of energy for all energy services is much higher for the energy poor, as compared with the non energy poor.

Conclusions

The results of this study provide new insights into the scholarship in this field. Moreover, the study discusses the current Japanese energy transition policies, which exacerbate energy poverty (Chapman and Okushima, 2018). It suggests that the future energy transition from fossil fuels to renewables should be promoted carefully with due consideration to the impact on the energy poor. The study deals with Japan as a case study, although the new measure and policy implications could be applied to other countries as well.

References

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