

# Energy Poverty and Just Energy Transition in Japan

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# Today's presentation

- Show the current situation of energy poverty (EP) in Japan
- Consider the differences in 'Climate' & 'Access to low-carbon energy' in the context of energy justice
- Suggest policy options for generating an inclusive, just energy transition in Japan

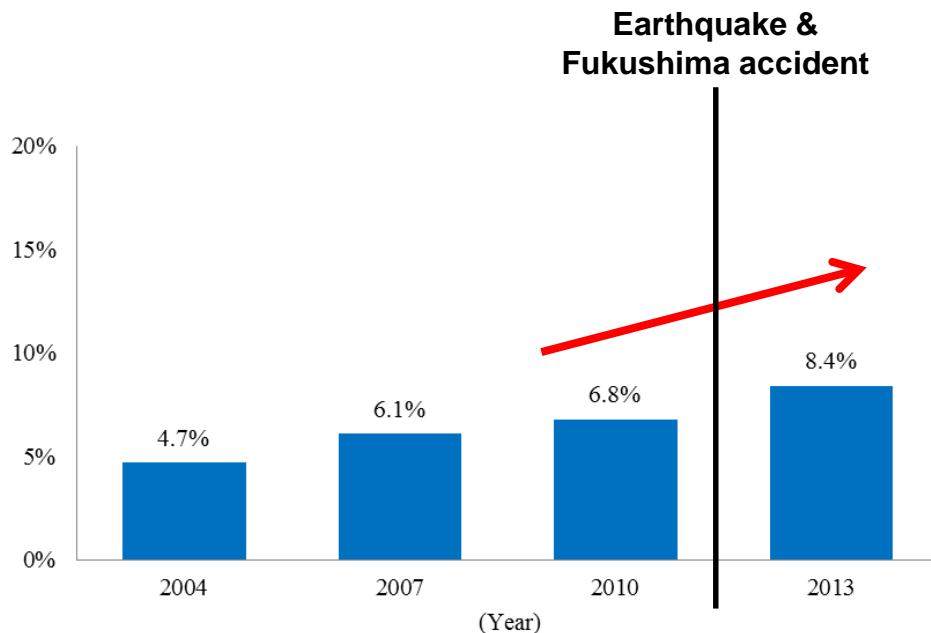
# Energy poverty: concept and definition

- Energy poverty can be defined conceptually as e.g.
  - ◆ the inability to attain a socially and materially necessitated level of domestic energy services (Bouzarovski and Petrova, 2015)
- Practically, e.g., the traditional 10% measure defines energy poverty households as those that spend more than 10% of their income on energy expenses (electricity, gas, and heating oil(=kerosene))

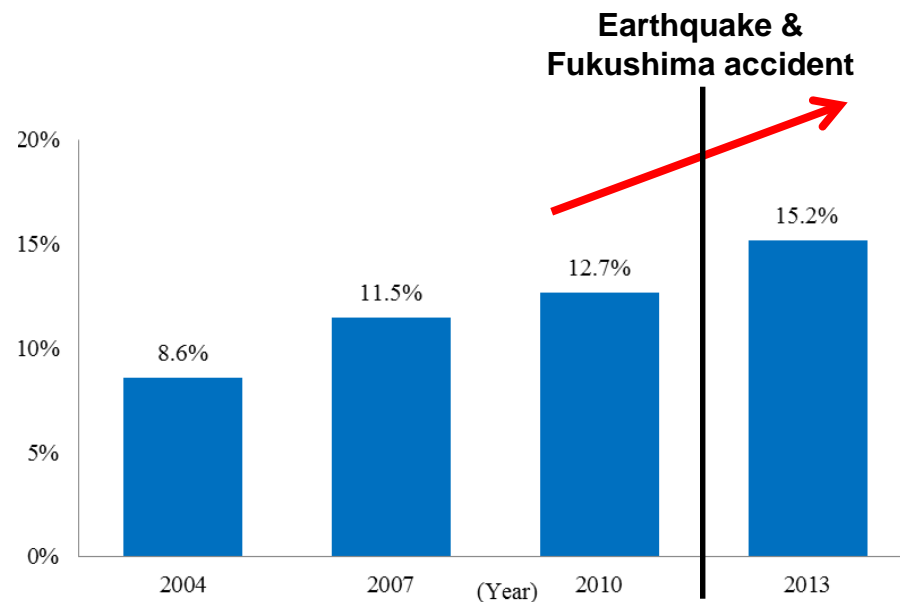
Energy poverty: 
$$\frac{\text{Energy expenses (electricity, gas, and heating oil)}}{\text{Income}} > 0.1$$

# Historical trend in energy poverty in Japan

- Okushima (2016) evaluated energy poverty in Japan using the 10% measure



Energy poverty rate in Japan  
by 10% measure  
(Annual expenditure base)

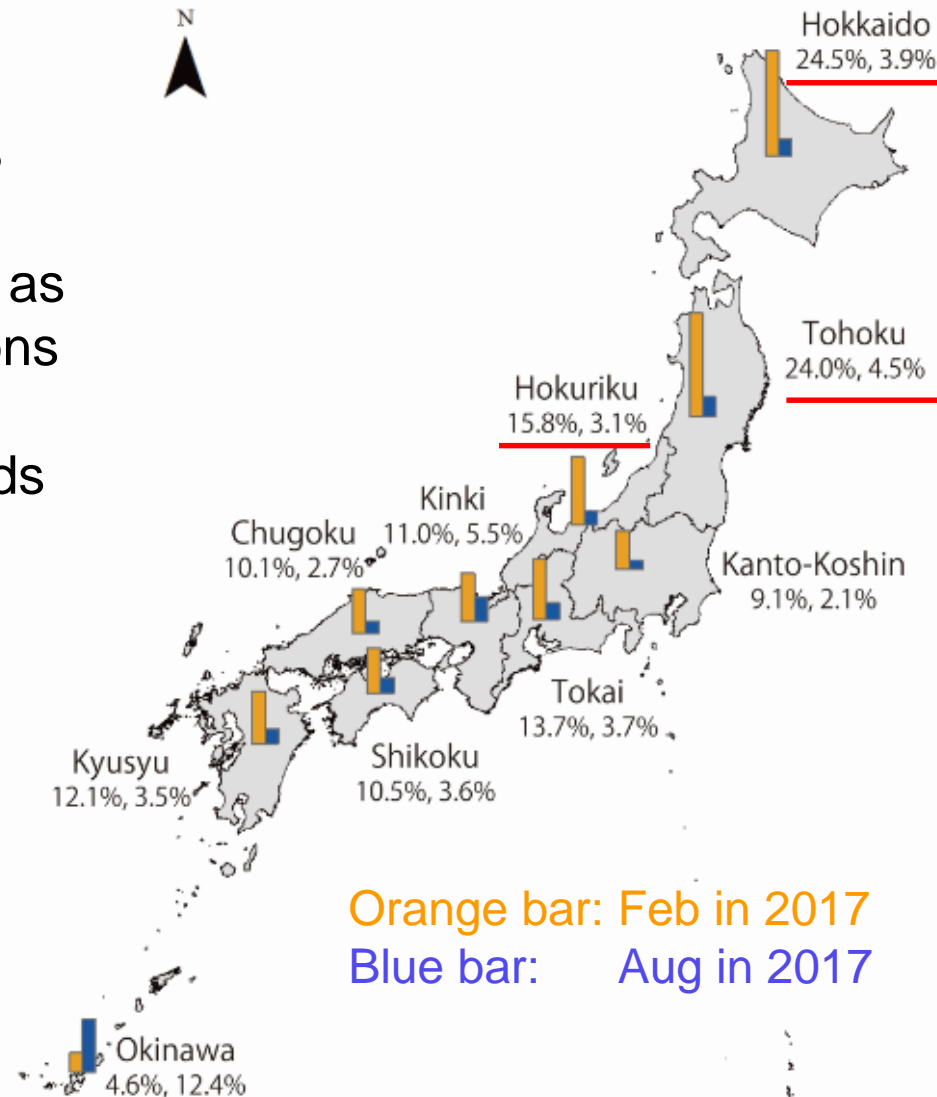


Energy poverty rate in Japan  
By 10% measure  
(Winter expenditure base)

Shares of EP households are increasing since the 2000s, especially after the 2011 Great East Japan Earthquake (GEJE)

# Energy poverty from the regional perspective

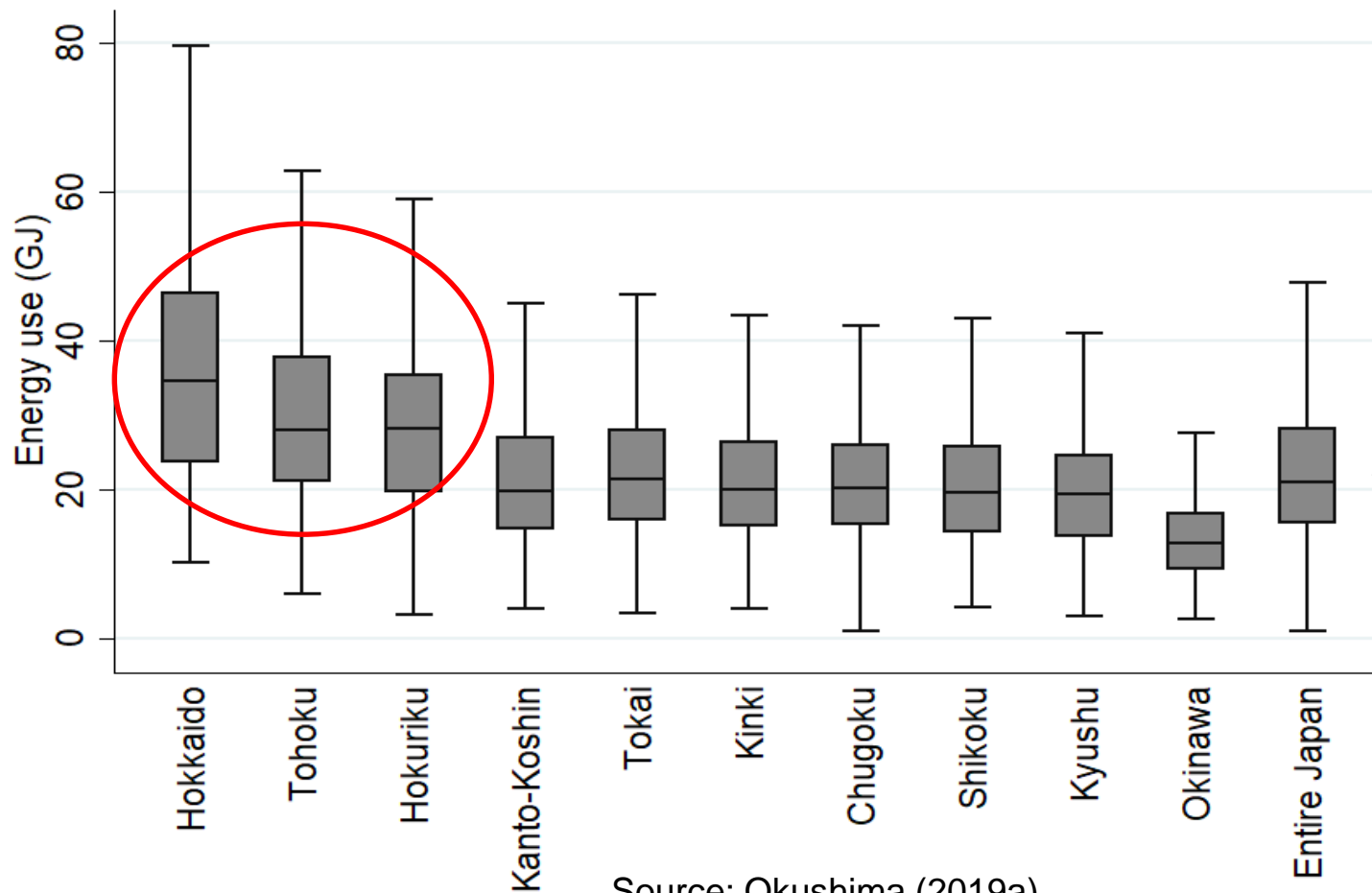
- EP prevalence much differ between regions and seasons
- ◆ Higher in the northern regions such as Hokkaido, Tohoku & Hokuriku regions
- ◆ Higher in winter due to heating needs in these regions (very cold winter & much snow)



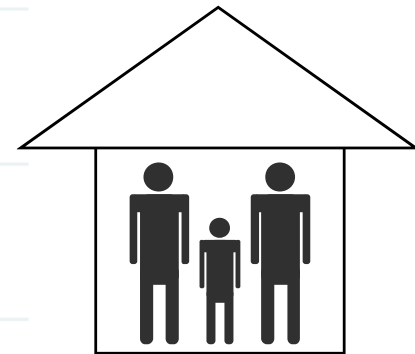
Source: Author's own calculation using the anonymized information in "Family Income and Expenditure Survey," Statistics Bureau, Ministry of Internal Affairs and Communications, Japan

# Distribution of domestic energy service use

- Distribution of energy service use (in GJ) also differs between regions  
→ Higher in the northern regions due to winter heating needs



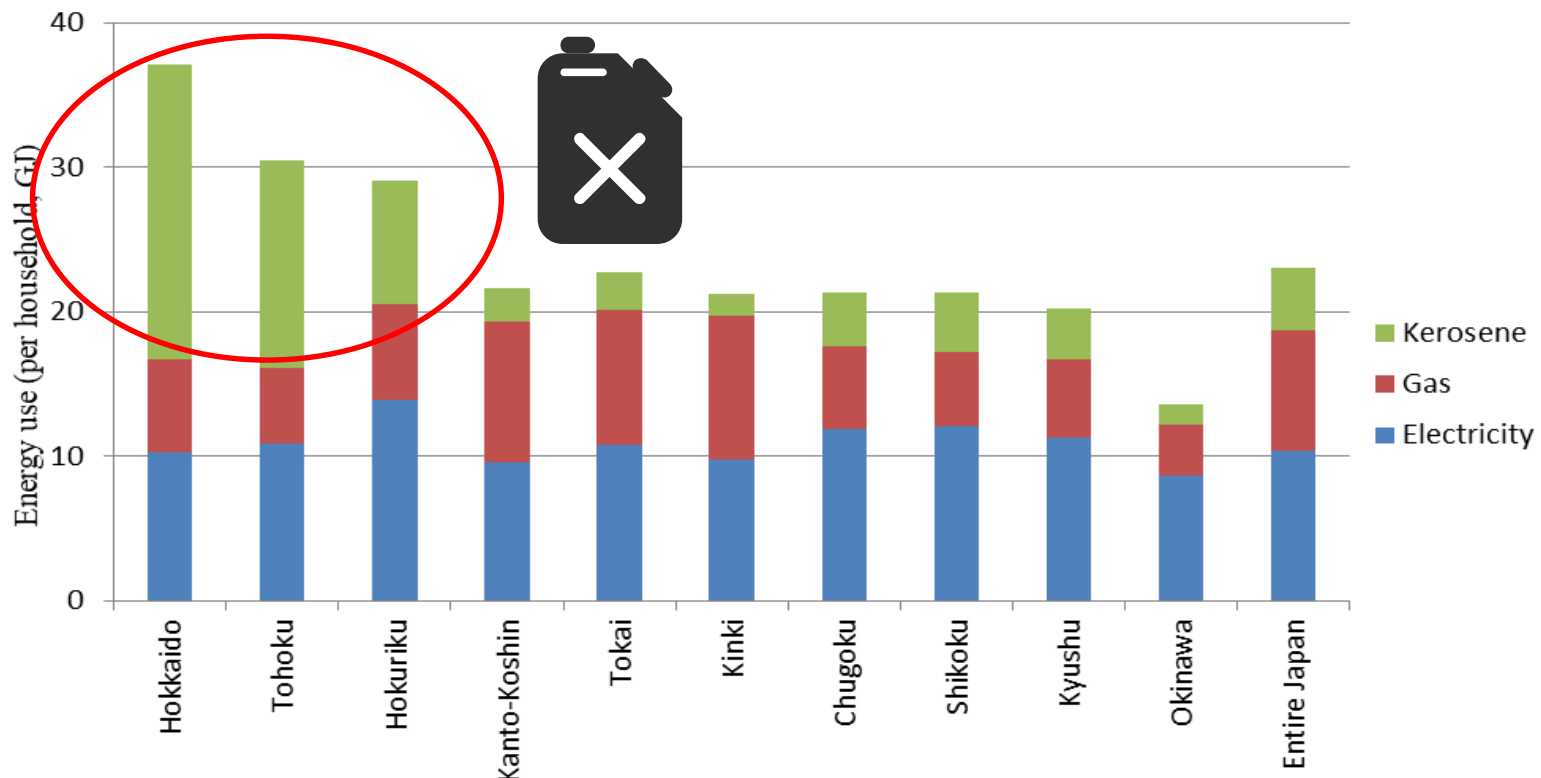
Source: Okushima (2019a)



# Average energy use by energy source: 10 regions

- By energy source, kerosene (heating oil) is important for the northern part
  - ◆ Much use of kerosene stoves for winter heating in the northern regions
  - ◆ And notably, the elderly (vulnerable to EP) like kerosene stoves (a bit cultural matter!)

How to deal with kerosene in future energy transition in Japan?

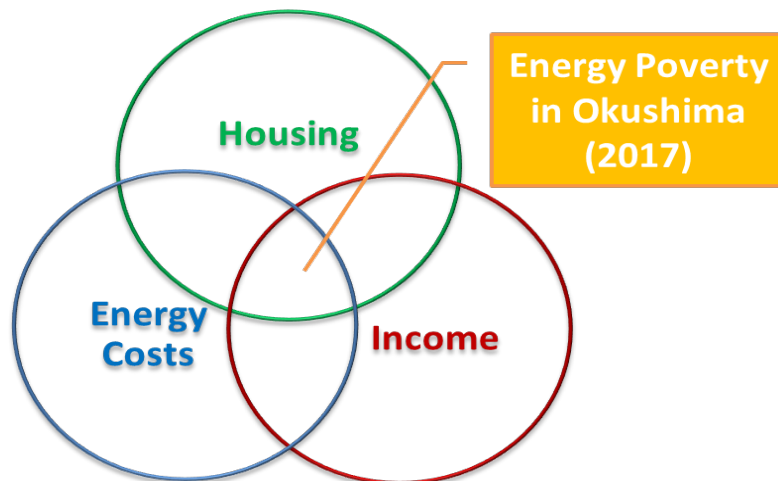


Source: Okushima (2019a)

# Factors behind energy poverty prevalence

## 3 attributes of EP (Traditionally focused)

- ① High energy costs  
&
- ② Low income  
&
- ③ Living energy-inefficient house



## Vulnerability factors lying behind (Today's focused)

Climate  
&  
Access to low-carbon  
energy



much relate to  
energy justice issues

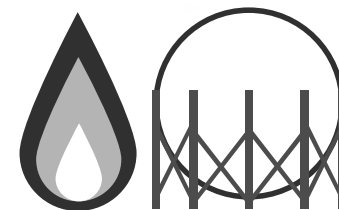
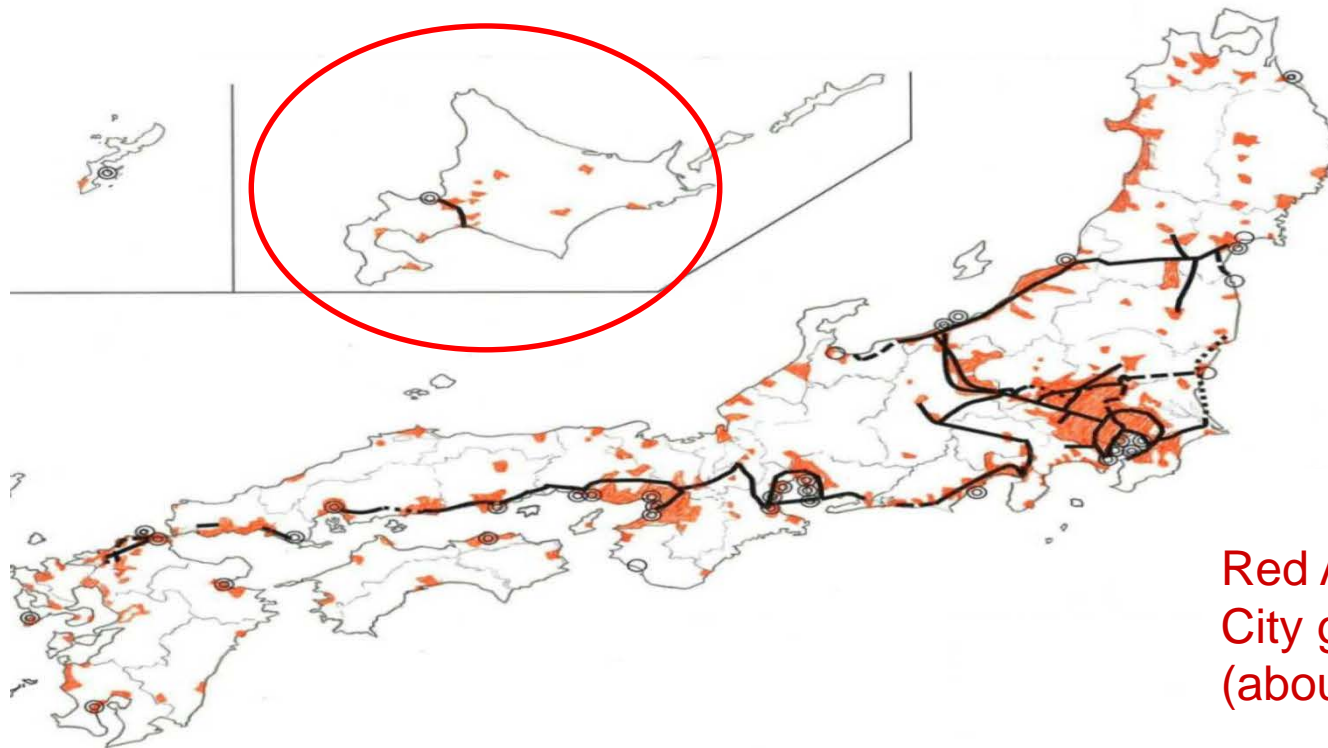
(Unequal opportunity &  
beyond one's control  
or responsibility)



# Access to LNG (on or off gas grid) in Japan

- Most rural areas have no access to city gas (LNG), using LPG
  - ◆ LNG is cheaper and lower carbon intensity than LPG

Difference in energy infrastructure is an important issue of EJ  
→ Uneven distribution of opportunity for lower-carbon energy



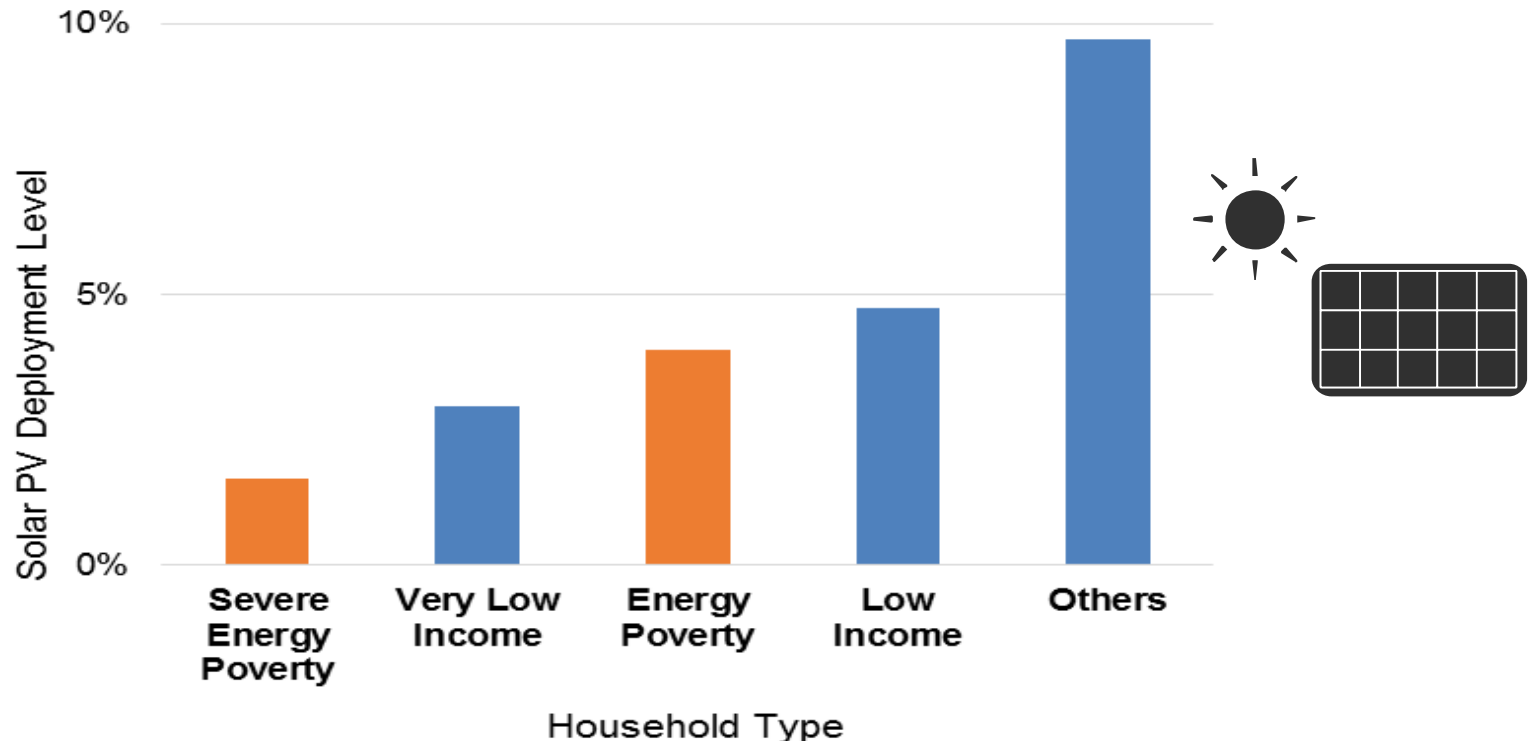
Red Area:  
City gas (LNG) is available  
(about 6%)

Source: <http://www.enecho.meti.go.jp>

# Access to solar energy in Japan

- Access to solar energy (solar PV deployment) is limited for EP
  - ◆ EP can reap the smallest benefit of the FIT (Feed-in tariffs)
  - ◆ FIT is representative of the low-carbon ET regime in Japan

Nevertheless, EP pay the cost of FIT (2.95JPY / kWh) with no exemption!



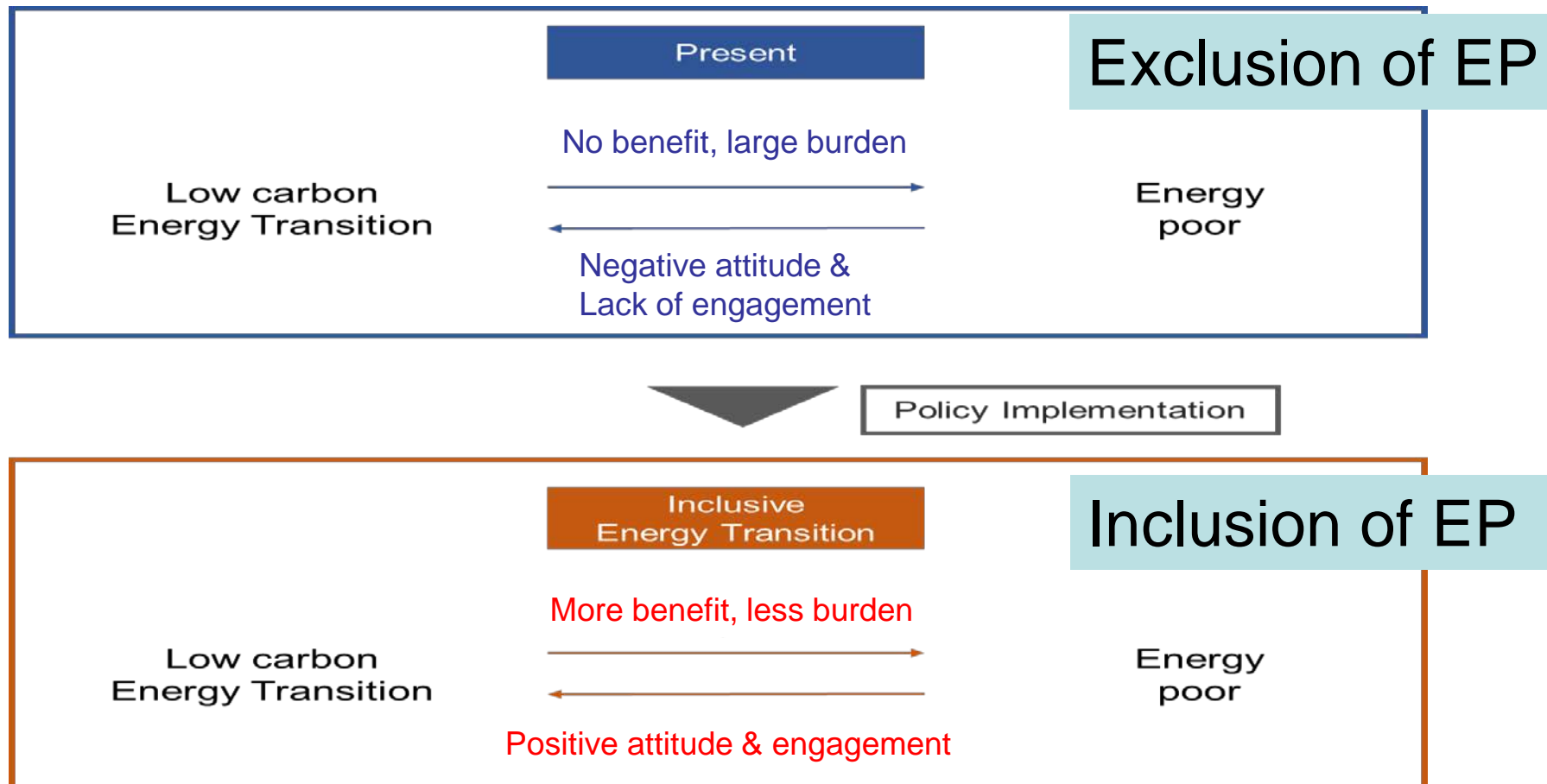
*Note:* Here, energy poverty is defined as 'subjective energy poverty'

*Source:* Chapman and Okushima (2018)

# Towards generating a just transition

- In our survey, EP demonstrate a negative attitude & lack of engagement to the current low-carbon ET regime in Japan (Chapman and Okushima, 2018)

For a just transition, government needs to distribute more benefit of RE to EP!



# Vulnerability to higher 'carbon pricing'

Government now considers higher 'carbon pricing'  
as a low-carbon ET policy

BUT,

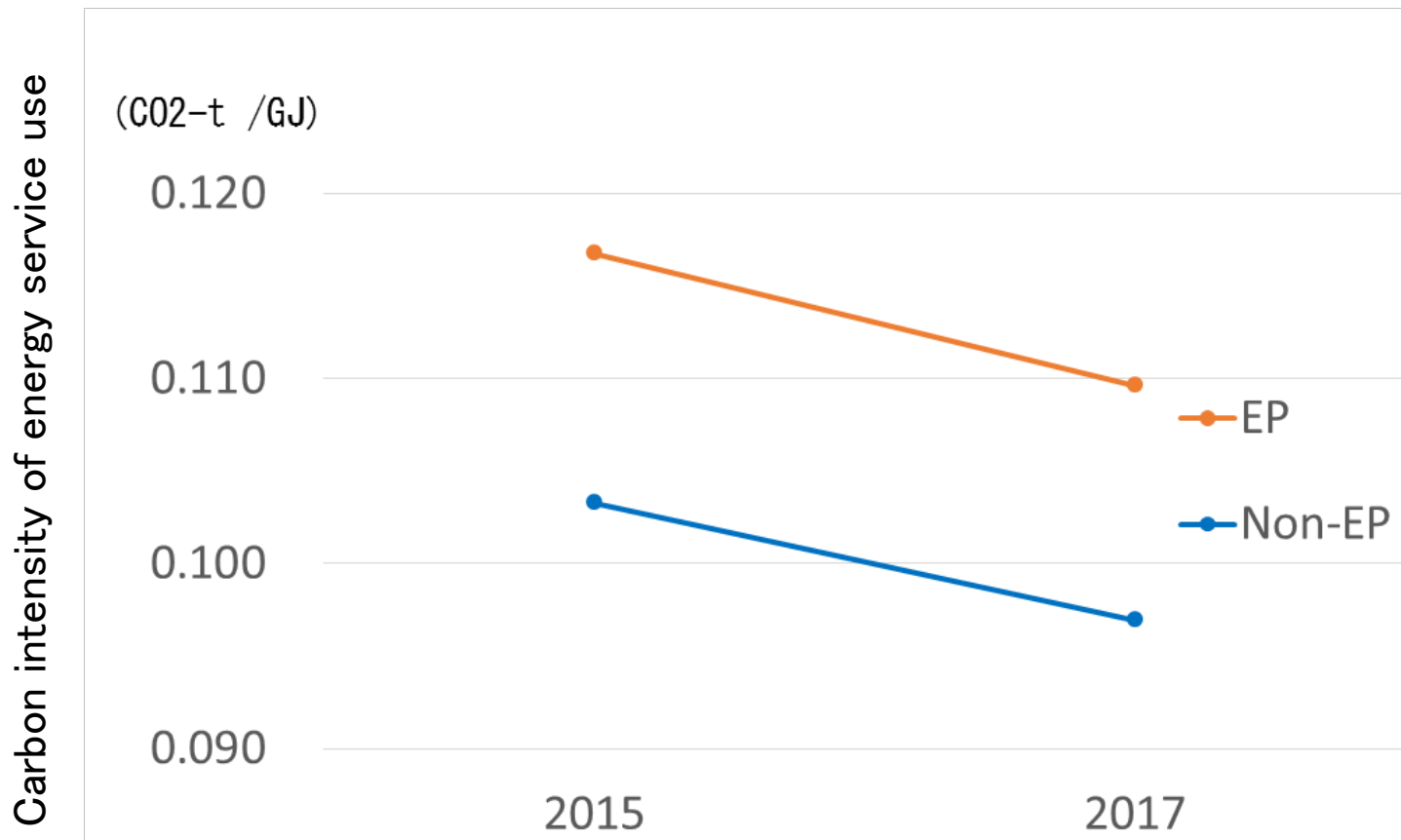
EP are significantly vulnerable to higher 'carbon pricing'  
Two issues which stand in the way

- ① Higher carbon intensity of EP
- ② Energy poverty premium (EPP)

# Higher carbon intensity of EP households

- EP households: Higher carbon intensity than non-EP

Higher carbon pricing places more burdens on EP!



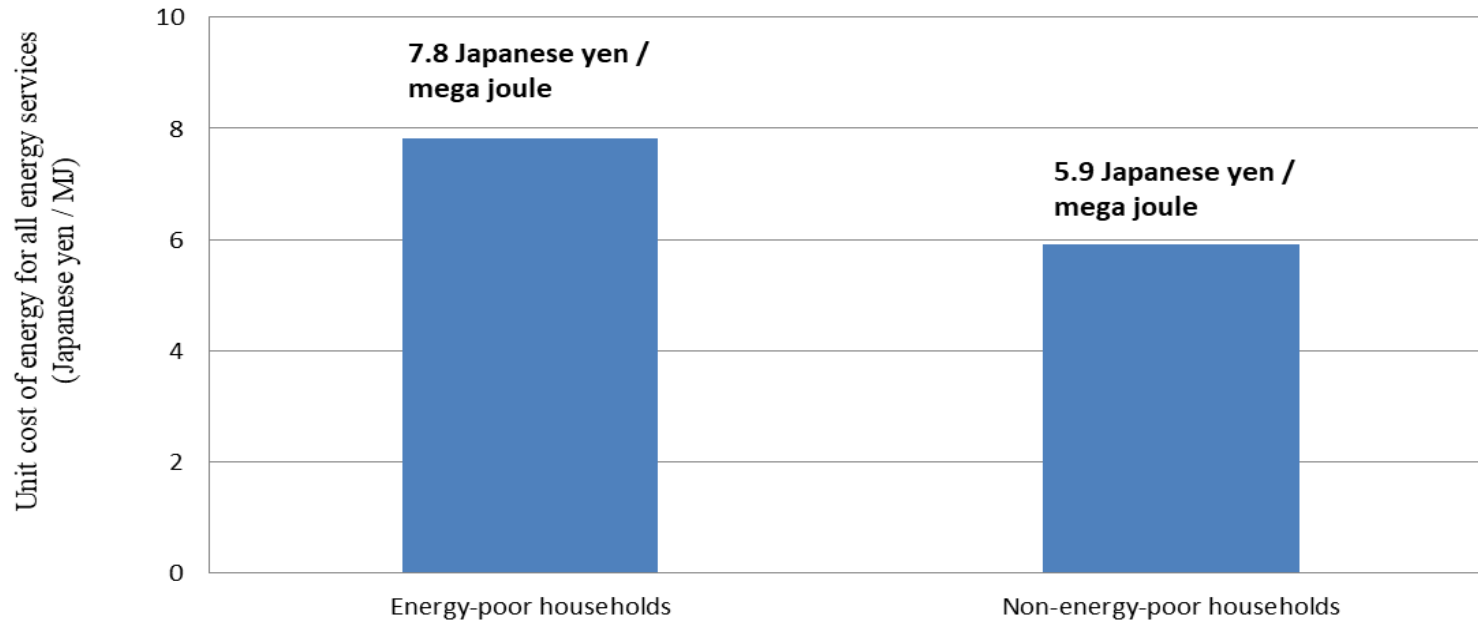
*Note:* This is a preliminary estimate

*Source:* Okushima (2019b)

# Energy poverty premium (EPP)

- An 'energy poverty premium' exists in Japan
    - ⇔ EP pay more for energy services (per MJ) than non-poor
    - ⇔ the poor pay more for essential goods and services (by unit cost)
- Possible reasons: differences in energy infrastructure, transport costs, etc.

Even now, EP are facing higher prices of ES than the more affluent people!



Source: Okushima (2019a)

# Policy for an inclusive, just energy transition

3 attributes of EP  
(Traditionally focused)

Vulnerability factors  
lying behind  
(Today's focused)

Social tariffs (Price regulation for EP)

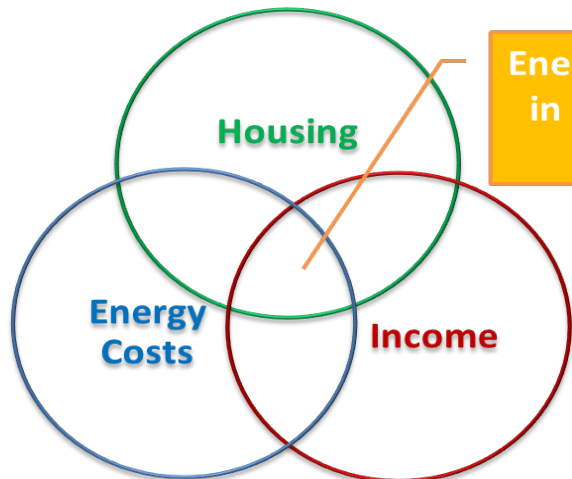
&

Income support for EP

&

Improving energy-efficiency of housing  
Support 'retrofit' for EP housing

Climate  
&  
Access to low(er) carbon  
energy



Energy Poverty

in O

Redistribute the benefit of renewables  
'more progressively' to EP

= make RE more accessible to EP

(one's control or responsibility)

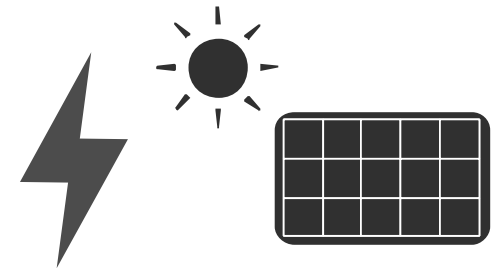
# Policy suggestion: solar energy to EP

- Ensuring the access to solar energy for EP households
  - ◆ One option: providing low- or no-cost solar panels for EP

BUT,

EP's houses are unfitted for solar PV deployment in many cases...

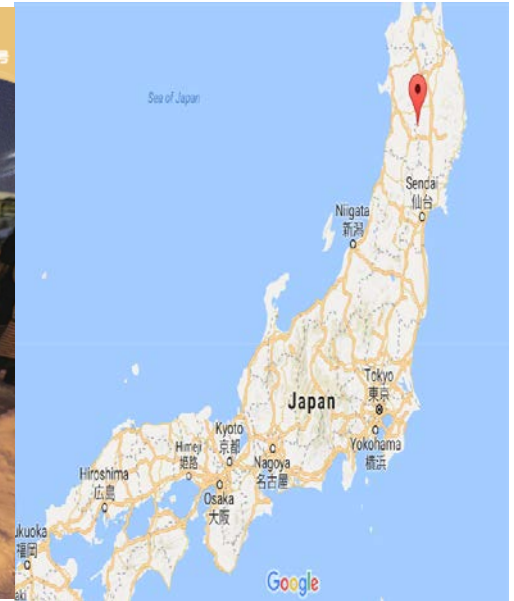
- ◆ Another option: providing low- or no-cost electricity generated from community solar or publicly-owned solar facilities





# Policy suggestion: biomass energy to EP

- Promoting other renewables in line with the ‘local context’ is also a fruitful option for a just low-carbon energy transition
- One possible approach: promoting the use of wood stoves, replacing kerosene stoves, especially in the northern regions
  - ◆ Replacing kerosene (imported fuels) by firewood (regional unutilized renewables)
  - ◆ Ensuring the access to low-carbon energy for EP, in terms of winter heating



Source: Nishiwaga-town HP

# Thank you very much for your kind attention !

Note: All the figures in this presentation were calculated by myself or ourselves, not official ones. Hence, the presenter assumes full responsibility for them.

## References:

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