

Climate Inequality in Taiwan : Current Status and Policy Challenges

Dr. Chia-Wei Chao

Research Director, Taiwan Climate Action Network

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Transition" toward De-carbonized Urban Systems**



Content



Why we need to talk about climate inequality

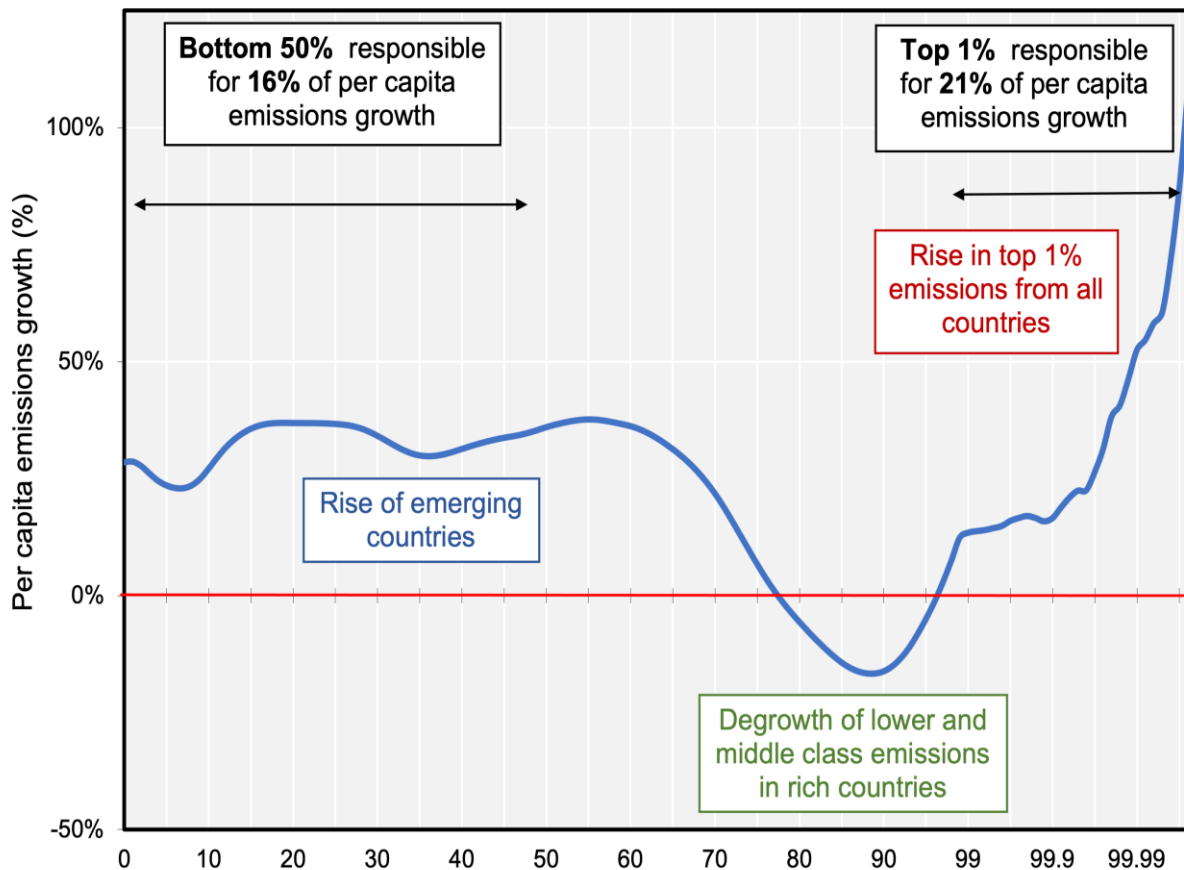


Current Status in Taiwan

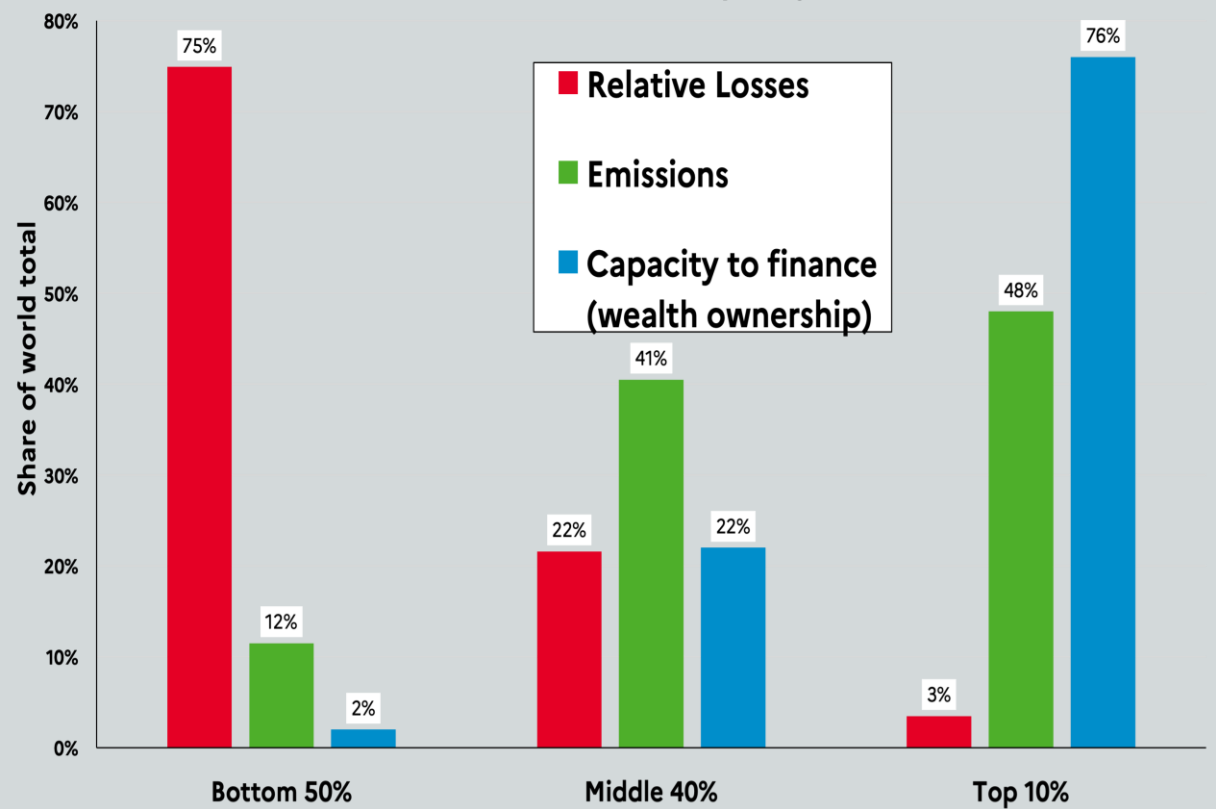


Policy Challenges

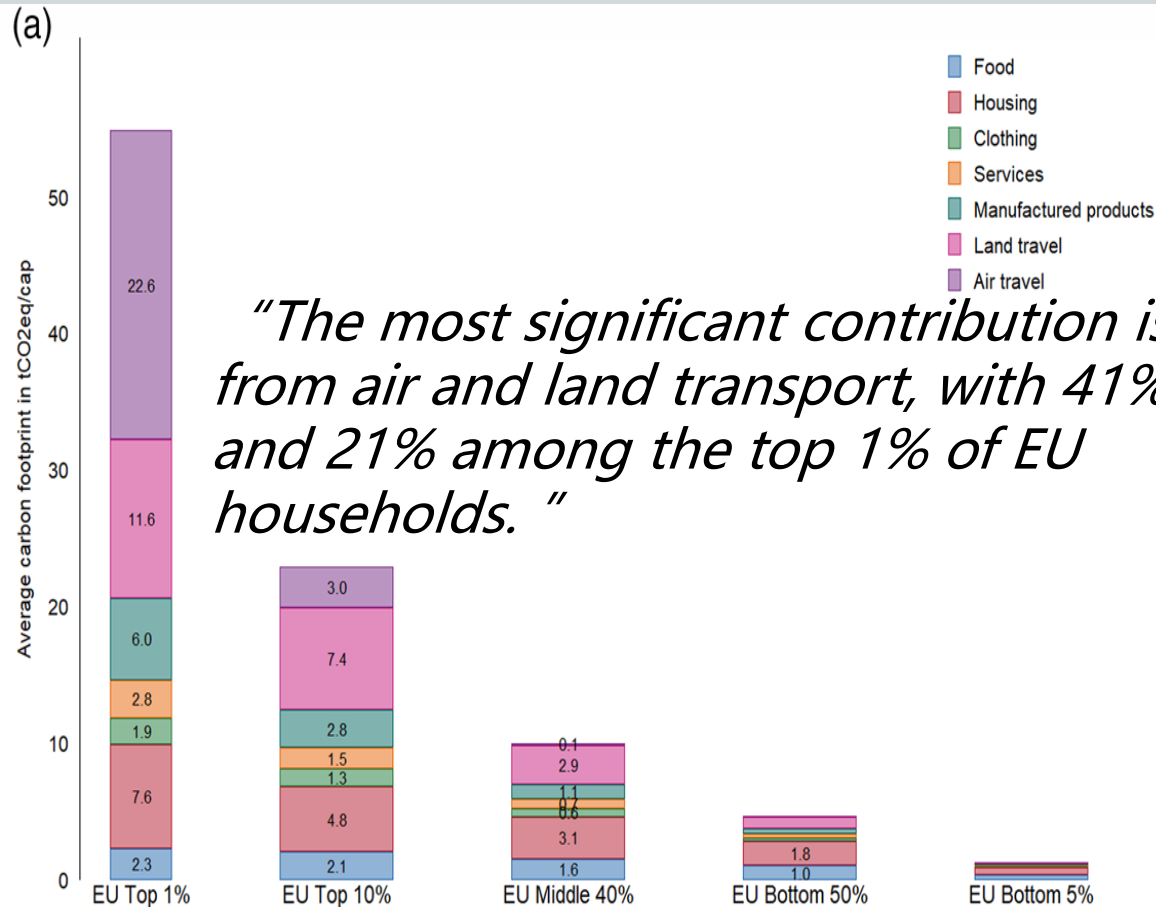
1% VS 99% at Net-Zero Stage (1/2)



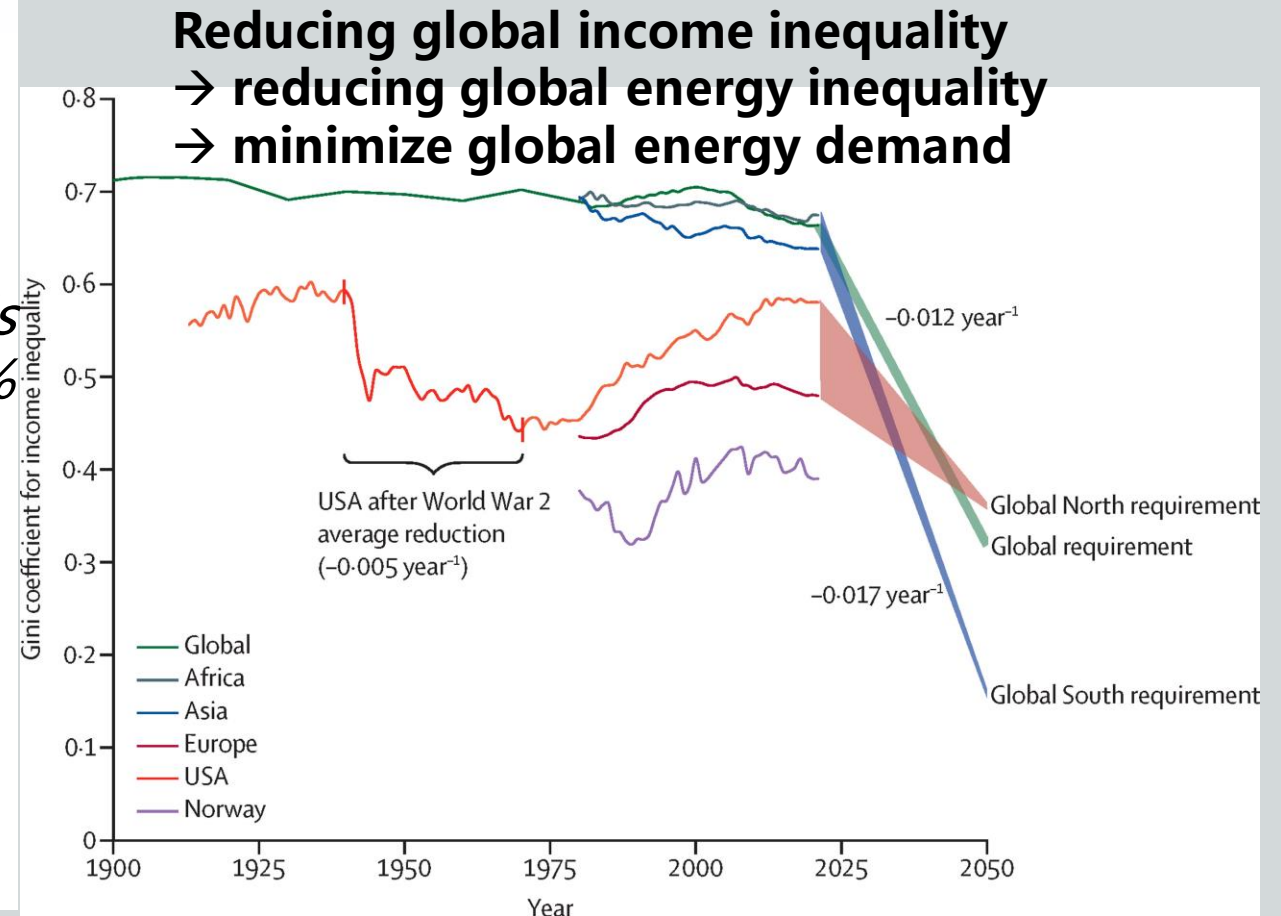
Global carbon inequality: Losses vs. emissions vs. capacity to finance



1% VS 99% at Net-Zero Stage (2/2)



Ivanova & Wood (2020).



Millward-Hopkins and Oswald (2023)

Inequality Mainstreaming in Climate Policy

		What kind of climate policy?		
		Decarbonize energy-supply	Increase decarbonized energy access	Switch in energy end-uses (building, transport, industry)
Which social group is targetted?	Bottom 50%	Industrial policy: Public investment in renewables (on or off-grid); Social protection: increased transfers to workers affected by the transition	Public investments in low-carbon energy access (e.g. clean cookstoves, zero-carbon social housing)	Develop public transport systems: low-carbon BRT, rail, car-sharing strategies; energy retrofitting in social housing; cash-transfer to compensate increase in fossil energy prices
	Middle 40%	Same as above + Financial incentives to encourage middle-class investments in low-carbon energy. Bans on new fossil investments.	Subsidies for new housing construction; buildings energy regulation; penalty/bans on sales of inefficient housing	Same as above; stricter regulations and taxes on polluting purchases (SUVs, air tickets); subsidies on low-carbon alternatives (elec. vehicles).
	Top 10% & Top 1%	Wealth or corporate taxes with pollution top-up to finance the above & accelerate divestment from fossils; Bans on new fossil investments	Wealth or corporate taxes with pollution top-up (see left); fossil fuel subsidy removal	Strict regulation on polluting purchases (SUVs, air tickets); wealth or corporate taxes with pollution top-up (see left); carbon cards to track & cap high personal carbon footprints



Practices to reduce Climate Inequality

■ Low Income Support

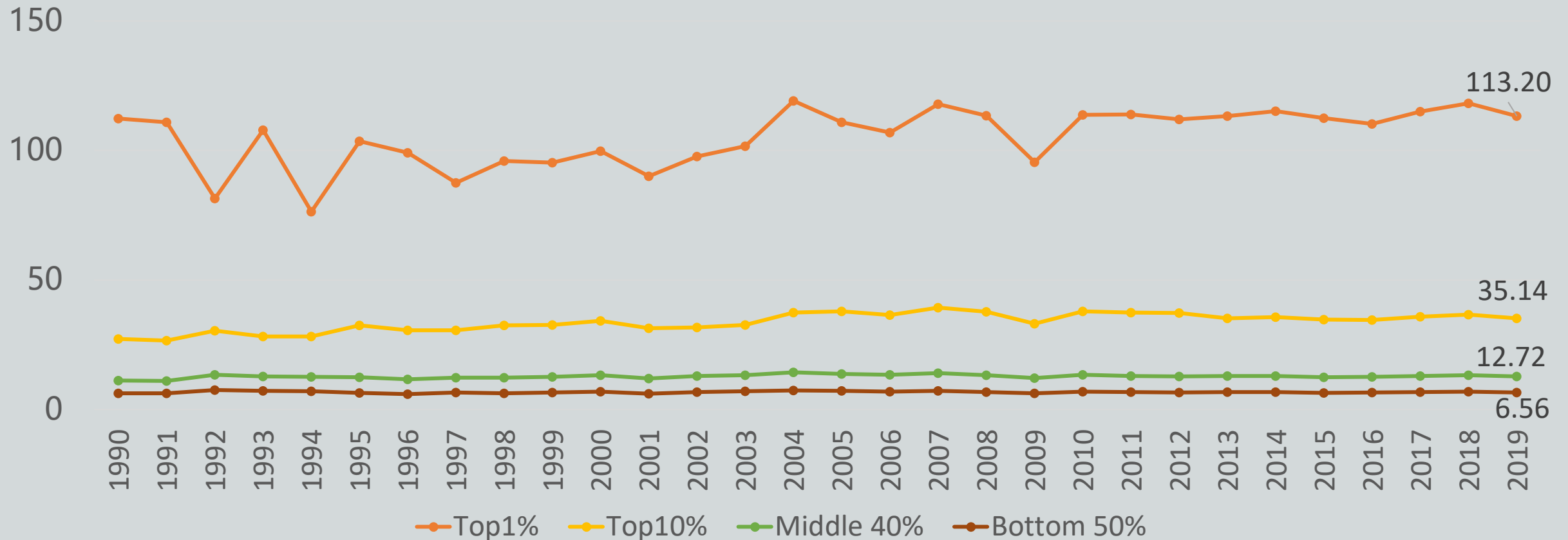
- EU Social Climate Fund
- US Justice 40
- Carbon Tax Dividend in Canada.

■ Deal with Super Emitters

- EU and France consider to tax heavily on private jet.
- “Sufficiency” policy.

Carbon Inequality in Taiwan (1/3)

Average Carbon Footprint of Different Income Group



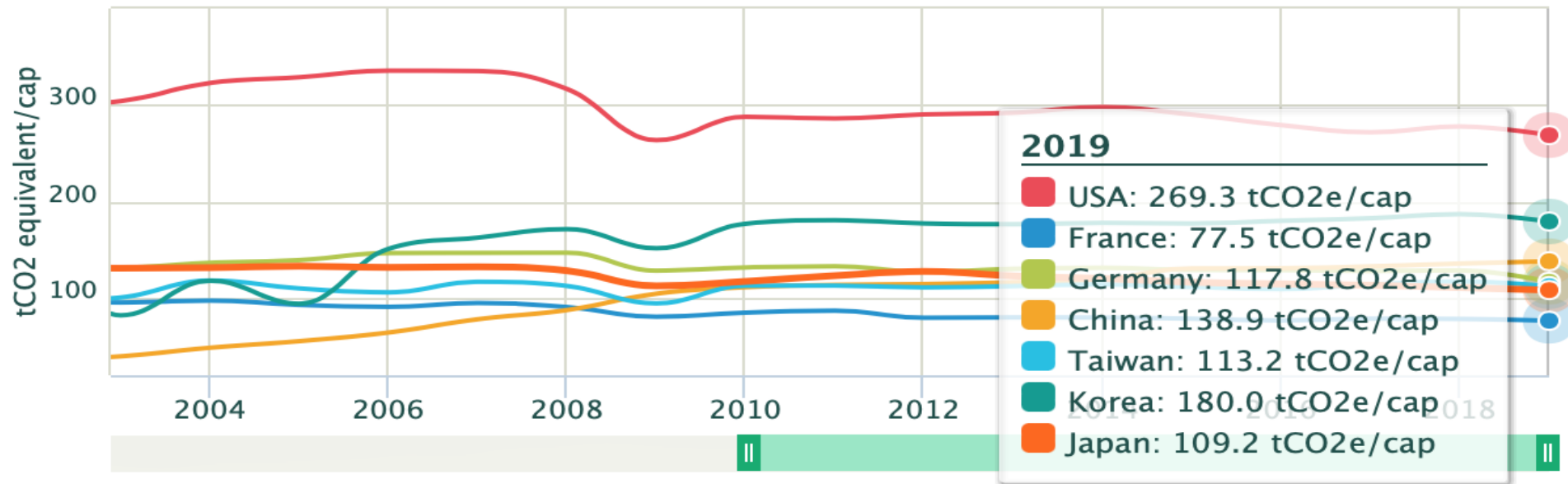
Based on World Inequality Database

Carbon Inequality in Taiwan (2/2)

tCO2e/cap

Average per capita group emissions

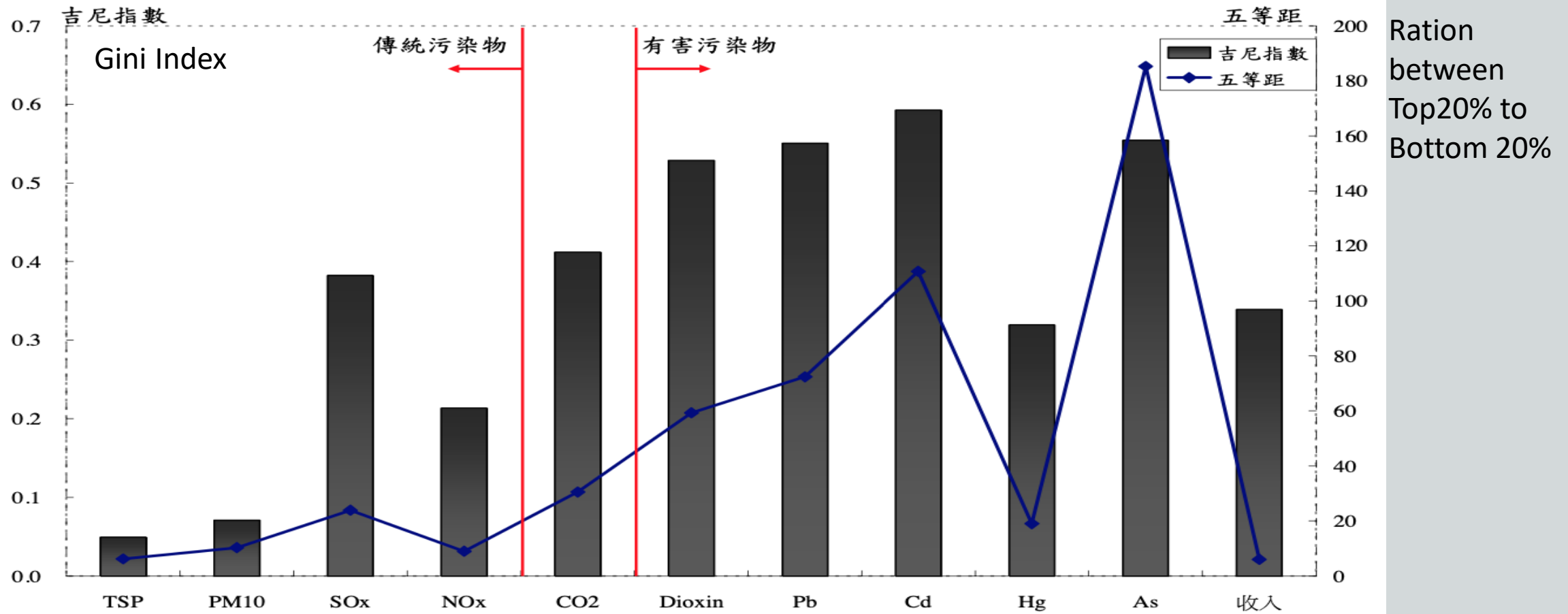
[More options](#)



[Clear](#)

USA ✕ France ✕ Germany ✕ China ✕ Taiwan ✕ Korea ✕ Japan ✕

Carbon Inequality in Taiwan (3/3)



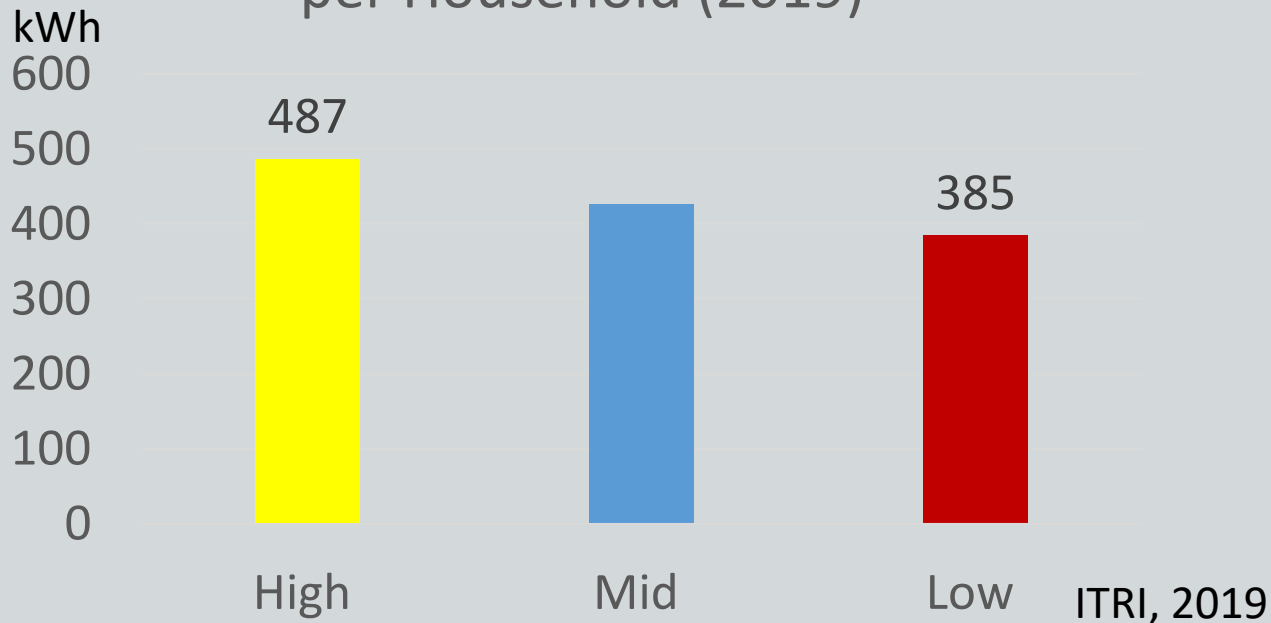
Hung, Chao and Ma, 2008.

Income Level and Energy Consumption

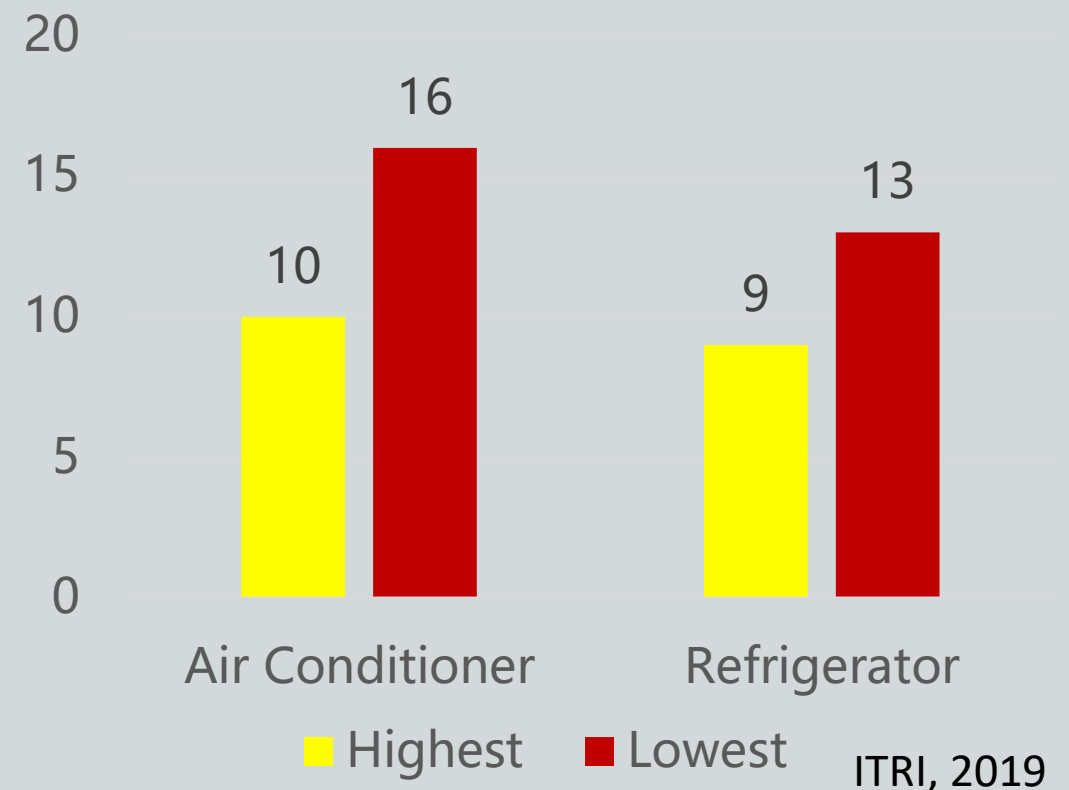
Income Elasticity of Taiwanese Household (TRI, 2020):

- Total Energy – 0.52%
- Electricity – 0.87%
- Natural Gas – 0.29%

Monthly Electricity Consumption
per Household (2019)

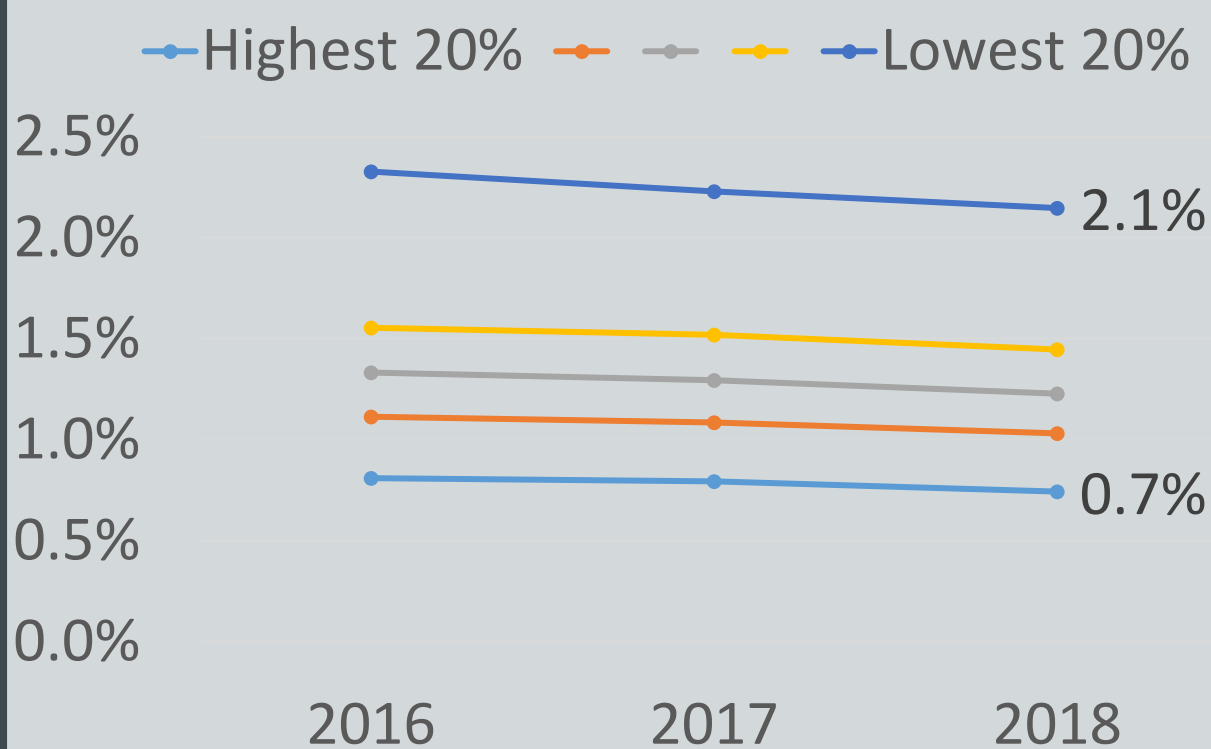


Average Lifetime of Appliances

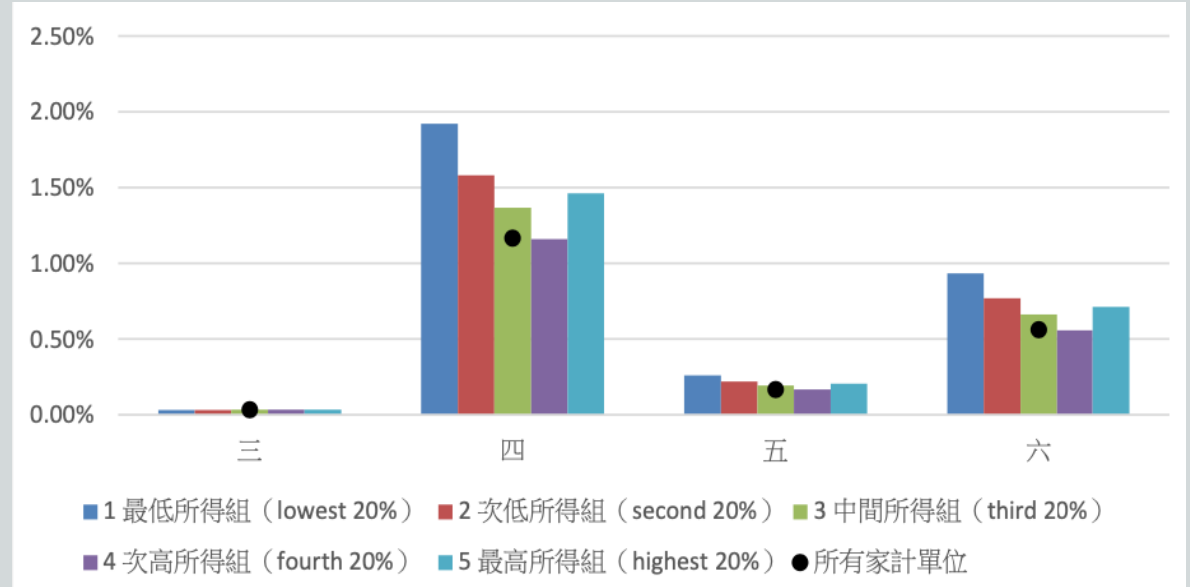


Potential Distributional Effect of Net-Zero Policy

Share of Electricity Spending of Annual Expenditure



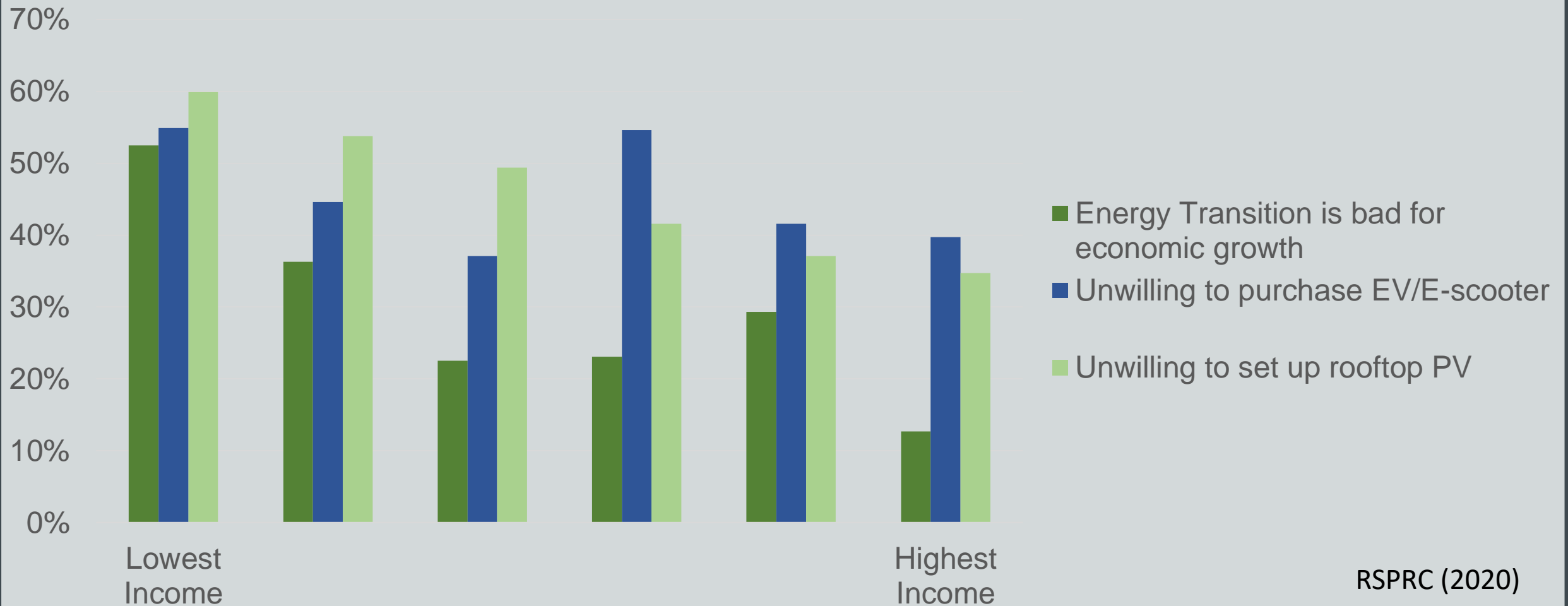
- Distributional Analysis of Carbon Pricing in TW
- No strong regressive effect.
- Revenue dividend can reduce inequality.



Evaluated by Author

Shaw et al. 2021. Impacts of EU and US Carbon Border Adjustment Mechanisms on Taiwan's Environment and Economic

Public Support for Climate Action



RSPRC (2020)

Just Transition Hotspot and Income Inequality

Industry	Employment (thousand employers)	Share Of GDP	Share of CO ₂	Potential Impact	Income Level (ratio to ave.)
Electronic	853	15.0%	10.6%	○	1.4
Metal Product	393	1.9%	1.5%	+	0.71
Mechanical Equip.	365	2.5%	0.5%	+	0.78
Food and Beverage	191.1	1.6%	1.2%	∞ / ▽	0.79
Plastic Product	153.4	0.8%	1.3%	+	0.79
Vehicle Production	179	1.4%	0.6%	∞	0.86
Fiber & Textile	98	0.7%	1.9%	○/▽	0.7
Iron and Steel	87.1	1.6%	9.1%	○/▽	1.08
Petrochemical	69	2.2%	14.4%	○/▽	1.38
Cement	68.6	0.6%	3.1%	○/▽	0.8
Chemical Product	86	0.8%	0.4%	+	1.1
Paper and Pulp	42	0.3%	1.7%	○/▽	0.75
Oil Refinery	11.8	0.9%	4.5%	-	1.55

- Fossil fuel mining : 1331
- Transportation Service:455 k
- Car Maintenance: 41 k

- Offshore Wind : 2 k
- P V : 8.5 K
- ESCO : 3~4 K



○ Energy Cost Increase ; + Climate Regulation ; ∞ Re-skill ; ▽ Scale down ; - Phase-out

Policy Challenges (1/2)



Lack of Equality narrative

Failed Just Transition Assessment

Investment without strings attached

Policy Challenges (2/2)

Climate Change Response Act just passed, carbon levy will be implemented by 2024.



Distributional
impact hasn't
been analyzed.

Targeted Revenue
Allocation to Earn
Public Support



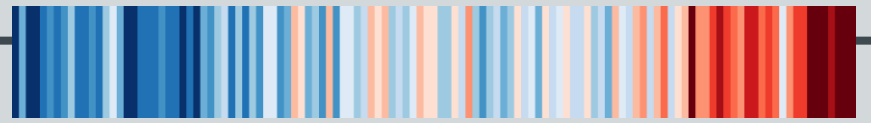
Filling the Gaps

■ Knowledge Gaps

- Analyzing Carbon Inequality based on Family Expenditure.
- Bring the income inequality into official climate and energy related survey.
- Meta analysis on climate perception of different income group.

■ Policy Gaps

- A Taiwan Social Climate Fund.
- Attaching income related string on E-mobility and appliance subsidies.
- Maximize the narrative of just transition.



Taiwan Climate Action Network

twitter : MacondoChao

