README: Context of This Presentation

Purpose: To fulfil requirements of Project #1 of GA's Data Science Immersive Course (#39 class)

Role of Presenter: Investigative journalist who is passionate about the environment and helping the less fortunate.

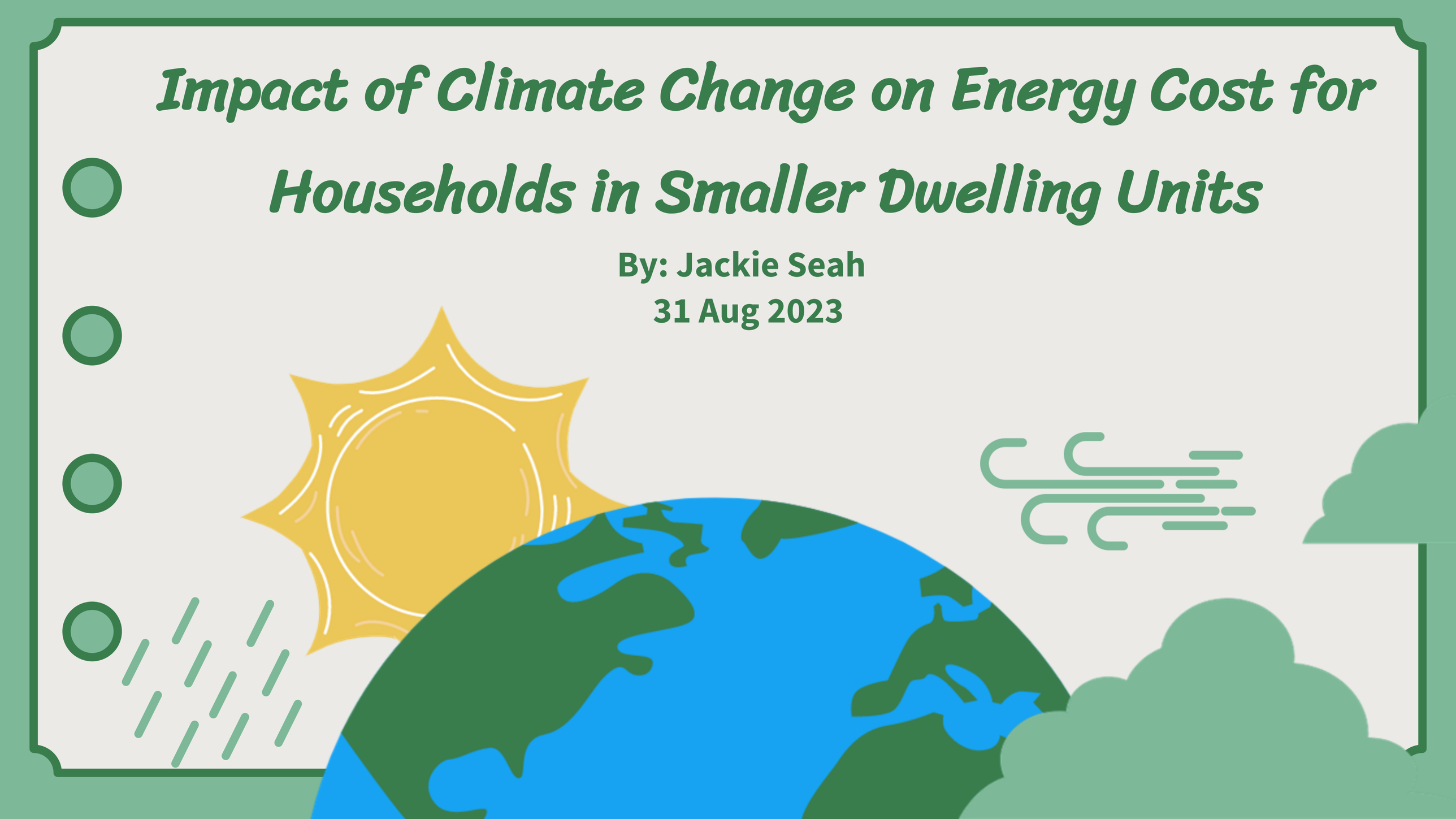
Target Audience: Officers in MOF, MSE, and EMA.

Problem Statement: Climate change is disproportionally impacting households living in smaller dwelling units.

Impact of Climate Change on Energy Cost for Households in Smaller Dwelling Units

By: Jackie Seah

31 Aug 2023



Agenda

- How climate change is affecting Singapore’s weather.
- How Singapore’s weather is affecting electricity consumption.
- How electricity consumption is affecting $$$ impact on household in smaller dwelling units.
- Recommendations
- Q&A

" Climate change is one of the gravest threats facing mankind and Singapore. What is at stake is the survival and future of our small island state. "

Joint segment on Sustainability at MSE's COS Debates 2021 –

Opening Speech by Ms Grace Fu, Minister for Sustainability and the Environment

Climate Change is Real and Affecting Singapore's Weather

Rising Temperature

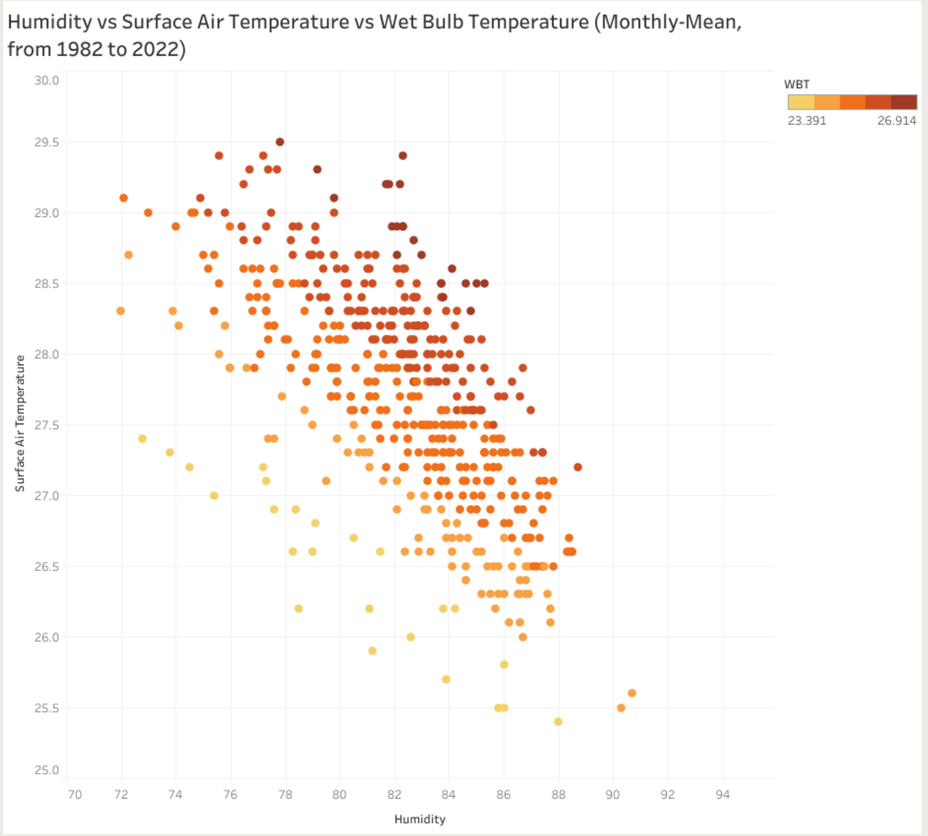
Temperatures in Singapore have risen by 0.25°C per decade from 1948 to 2015, with 2016 and 2019 as the hottest years.

Higher Rainfall

Annual total rainfall have risen by 101mm per decade from 1980 to 2016

- *In humid Singapore, both increasing temperature and rainfall serves a "double whammy" in terms of increasing wet bulb temperature*

- *"Wet bulb temperature" is a measure used for heat stress on humans. It considers both humidity and surface air temperature.*



	Dry Bulb Temperature (oC)	Relative Humidity (%)	Wet Bulb Temperature (oC)
Qatar	40	30	26
Singapore	32	80	29

To fight the heat, many Singaporeans at home turn on their air conditioners and fans.

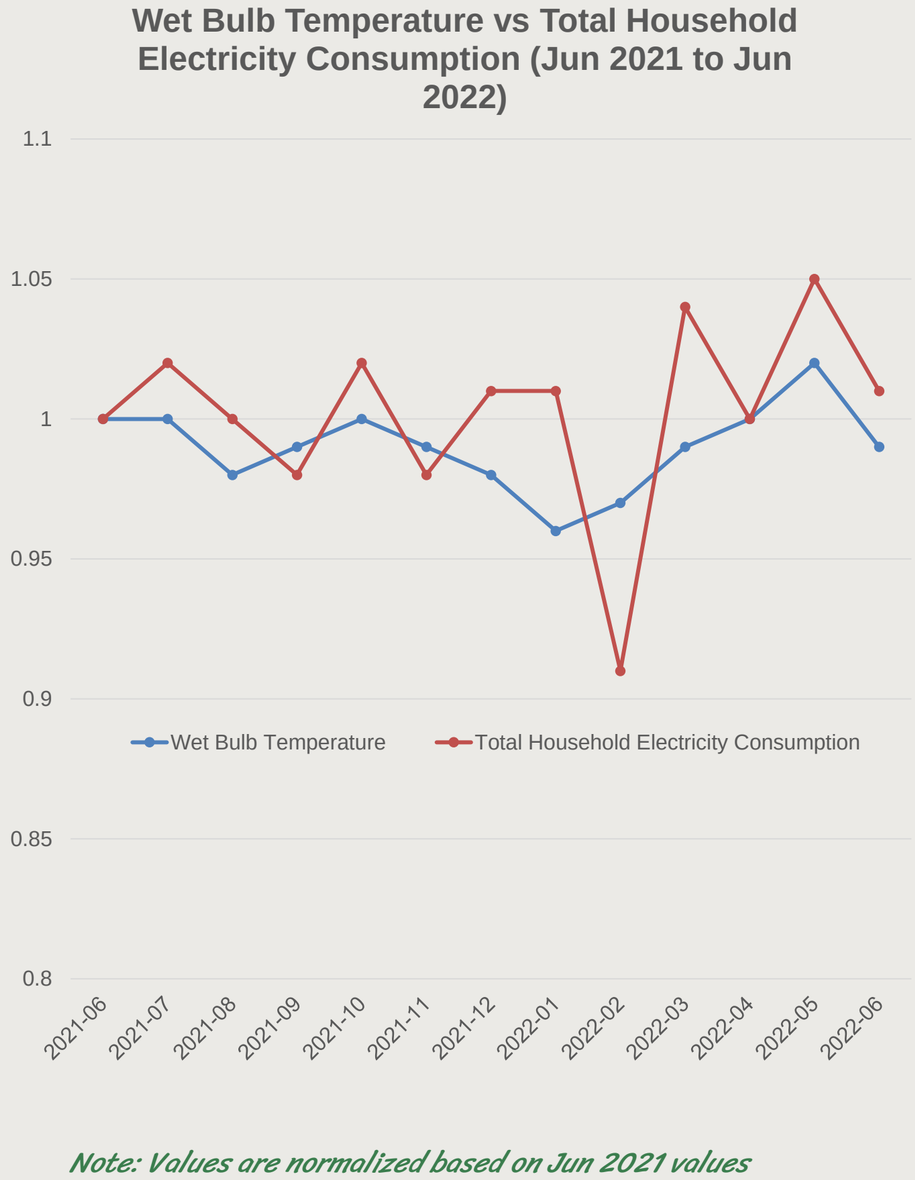
However, it comes at a cost.

24%

% of household electricity consumption due to air conditioning (also the largest component)

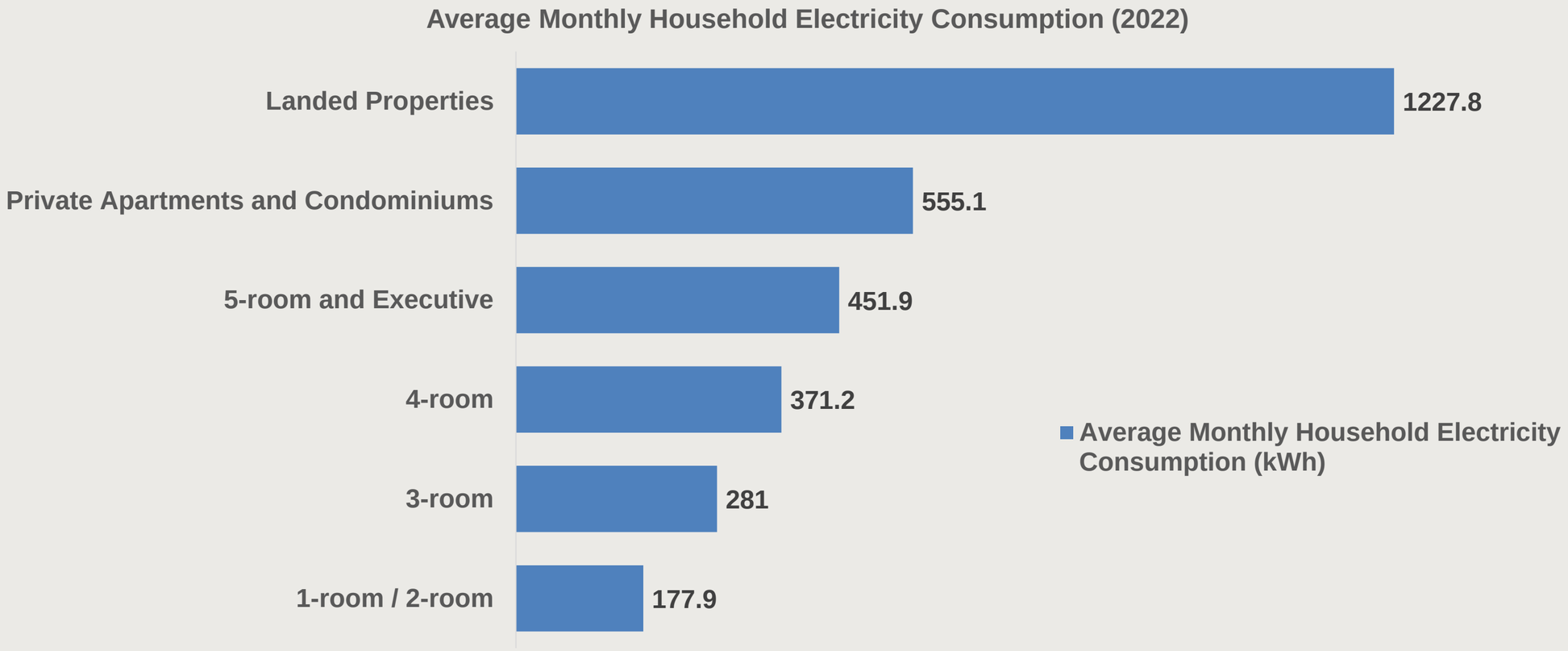
80%

% of households who own air conditioning

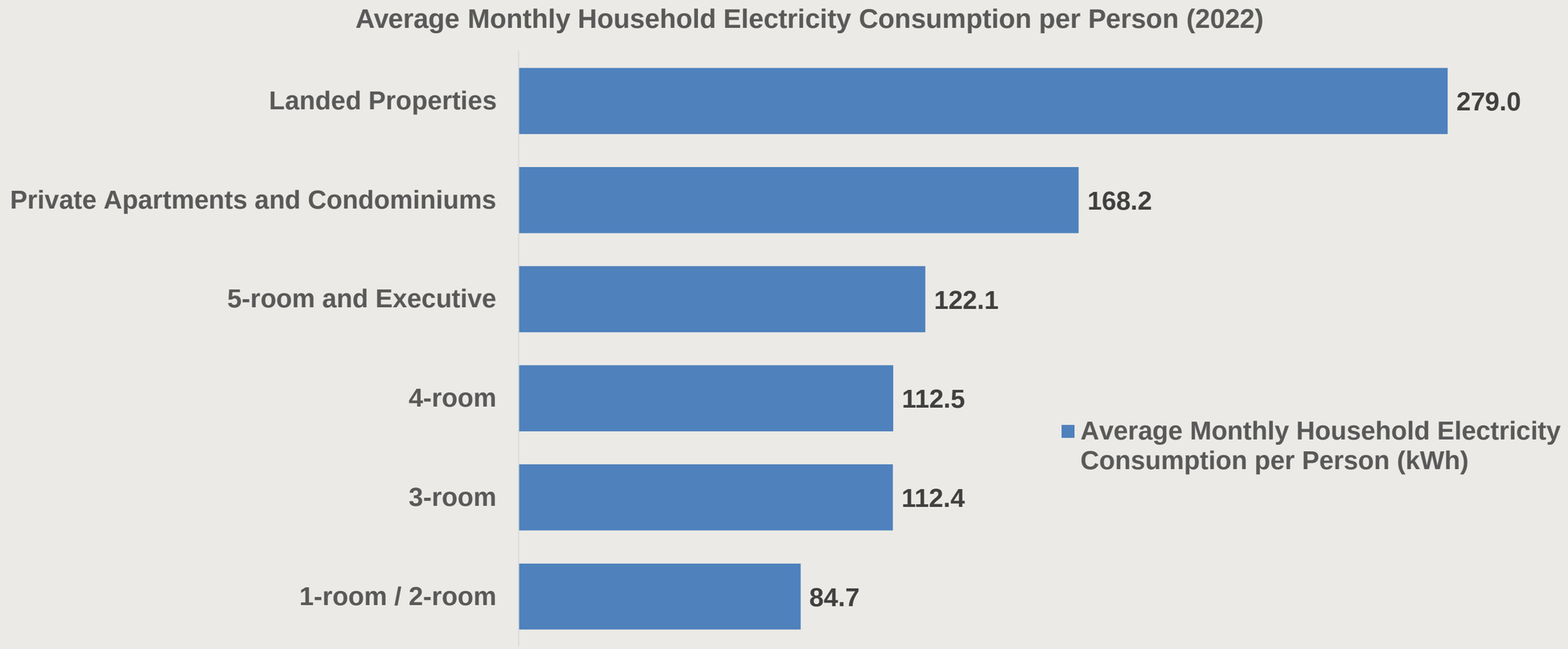


Note: Values are normalized based on Jun 2021 values

Bigger dwelling units consume more electricity.

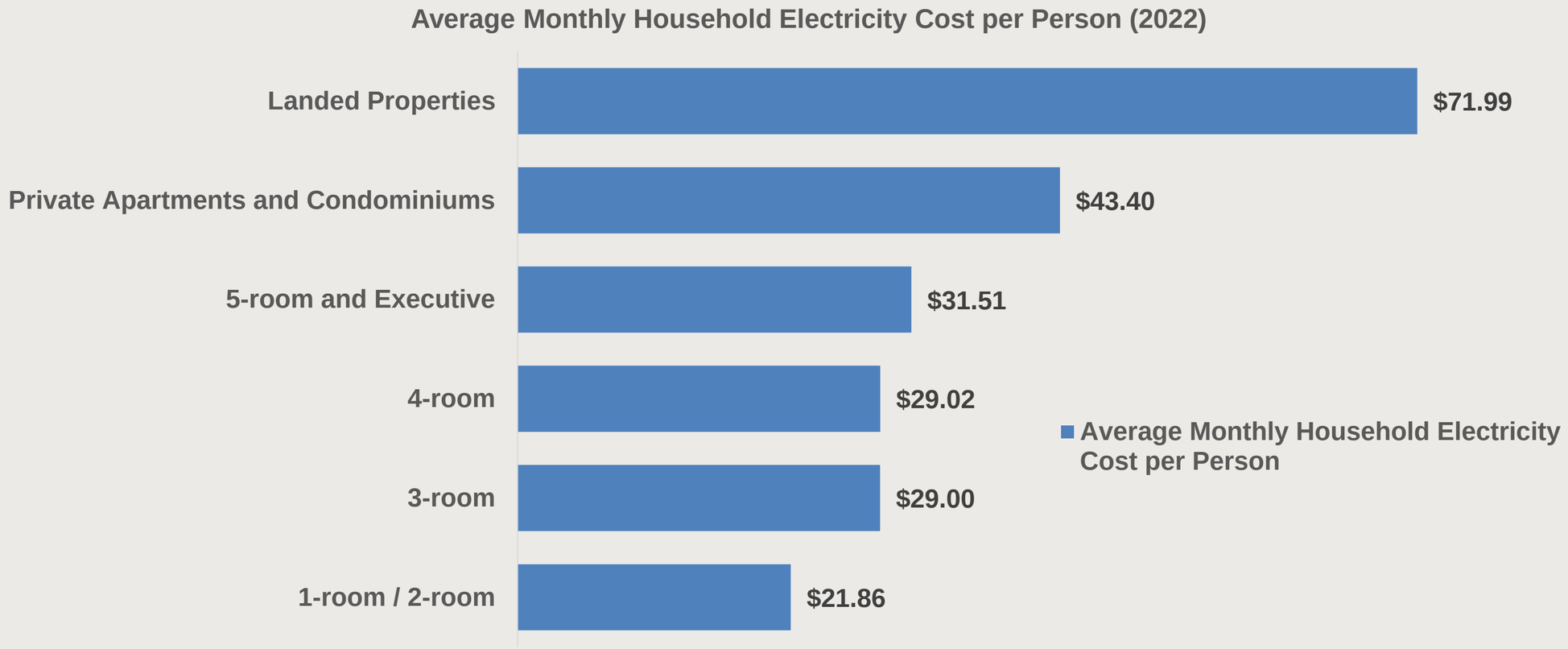


Per person, households staying in large dwelling units consume more energy.

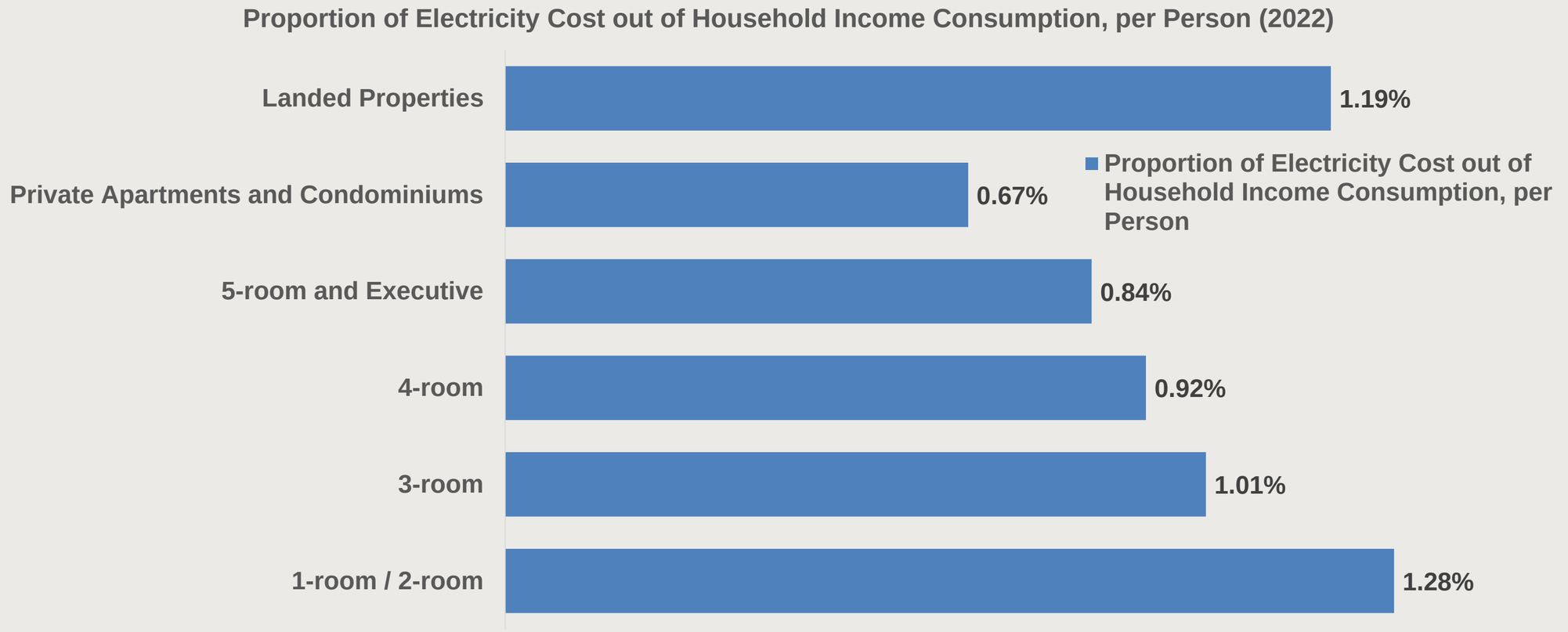


Average Household Size (2020)	1-room / 2-room	3-room	4-room	5-room and Executive	Private Apartments and Condominiums	Landed Properties
	2.1	2.5	3.3	3.7	3.3	4.4

Adding in the electricity tariffs, the monthly electricity bill, per person, ranges from $22 to $72



Despite consuming less electricity per person, the electricity cost impacts households staying in smaller flats more.



	1-room / 2-room	3-room	4-room	5-room and Executive	Private Apartments and Condominiums	Landed Properties
Average Household Income (2022)	$3,588.00	$7,189.00	$10,385.00	$13,814.00	$ 21,497.00	$ 26,659.00

Problem: Climate change will impact households in smaller dwelling units more.

Climate Change

Surface air temperature and rainfall increase, leading to higher wet bulb temperature.

Electricity Consumption

Higher wet bulb temperature leads to higher electricity consumption due to use of air conditioning/fans and that air conditioners need to work harder in hotter environments

$$$ Impact

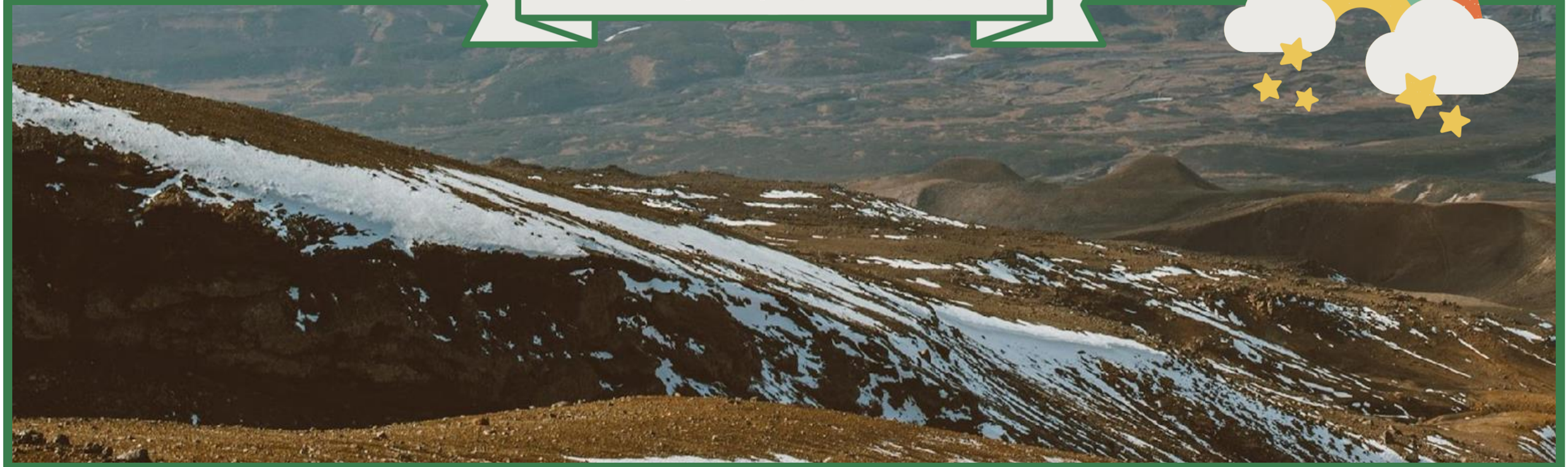
Higher electricity consumption leads to higher cost, and it disproportionally impacts households in smaller dwelling units.

Recommendation

Long Term Climate Policies	The eventual goal is still to keep climate change to a minimum.
Scaling of Electricity Tariffs based on consumption	Similar to the " water conversation tax", where households with exceeding use of water is taxed further, the same for electricity.
Additional subsidies for households in 1-3 room HDB flats	Short term measure to relieve $$$ pressure off household in smaller dwelling units.

Questions?

Thank You



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Data sources made can be found in the annex.

Annex: Data Sources

- Joint segment on Sustainability at MSE's COS Debates 2021 – Opening Speech by Ms Grace Fu, Minister for Sustainability and the Environment

https://www.mse.gov.sg/resource-room/2021-03-04-joint-segment-mse

- NCCS: Impact of Climate Change in Singapore

https://www.nccs.gov.sg/singapores-climate-action/impact-of-climate-change-in-singapore/

- Data on Singapore’s Humidity, Surface Air Temperature, Wet Bulb Temperature from NEA (data.gov.sg)
- Data on Singapore’s electricity consumption, tariffs from EMA (data.gov.sg)
- NEA’s Household Energy Consumption Study
- DOS’ Household Expenditure Survey
- Powerpoint template: Slides Carnival