




Product and Price Survey of High-Efficiency Air Conditioning Models in Singapore

Analysis of Survey Findings

ASEAN Cool Initiative – Singapore Study Tour

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PRESENTATION OUTLINE

- Introduction to the survey
- Survey methodology
- Findings from the survey
- Key takeaways

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A non-governmental, not-for-profit organization, established in 1984 to foster the sustainable energy development in developing countries and emerging economies.

Experience in EE and RE projects in more than 50 countries Worldwide, including 11 PICs

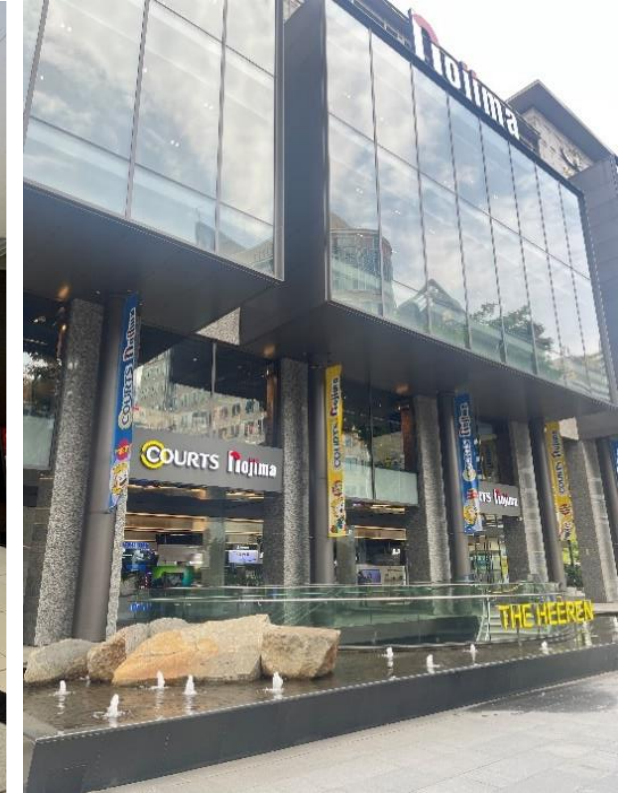
Clients: Governments, foundations, multilateral development agencies, and private sector



Introduction to the RAC Survey in Singapore

- **Objective:** To review and determine cooling capacities and efficiency values of off-the-shelf RAC models
- **Scope of the survey:** Single-Split RACs regulated by the National Environment Agency, and sold through retailers and online stores in Singapore
- **Assignment Duration:** September – October 2024
- **Survey Methodology:** Two-pronged Approach – In-store survey combined with online data collection
 - 10 stores run by medium to large retailer chains (Courts, Best Denki, Harvey Norman, Gain City, and Mega Discount Store) visited in September 2024
 - Online data collected from NEA's registration database, retailers' online shops, and online marketplaces (e.g., Lazada and Shopee)
 - Basic data includes brands, models, cooling capacities, efficiency ratings, prices

Physical RAC Retailers in Singapore



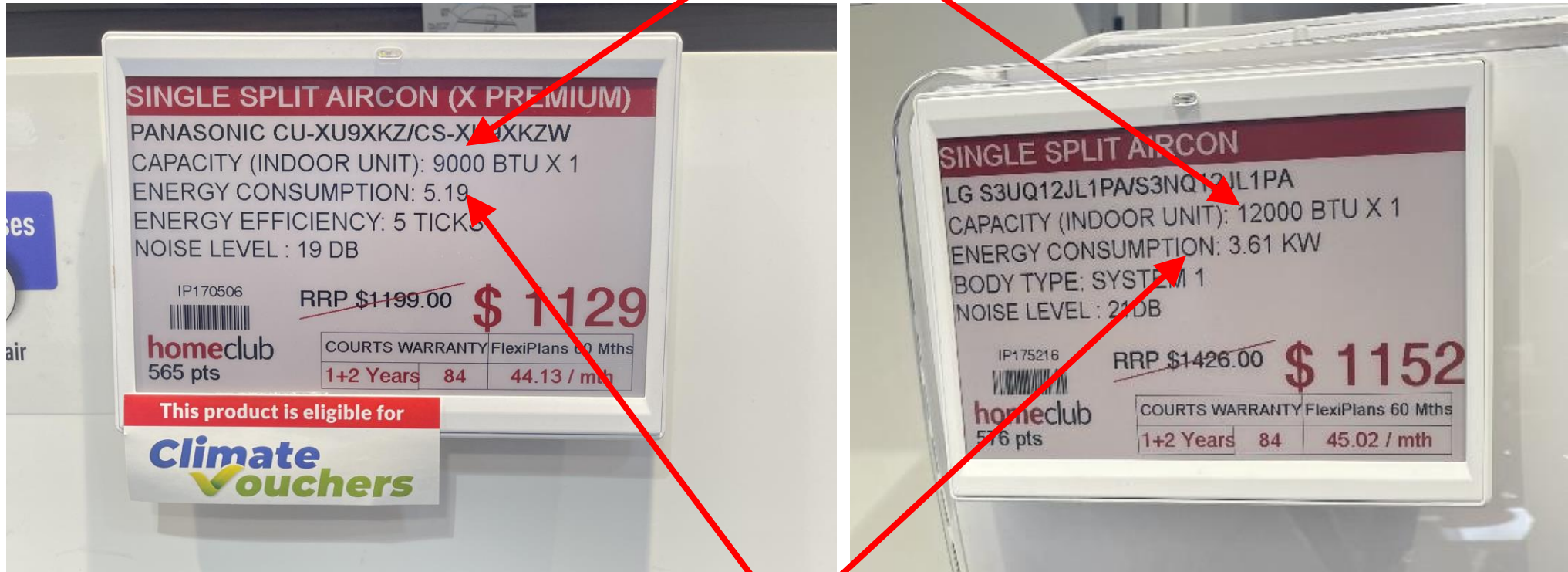
- Some retailers do not carry single-split RAC products.
- Data on 223 RAC models compiled.

RAC Models and Cooling Capacity Designation

- **There are 133 registered single-split RACs in Singapore (Sep 2024). All but one are inverter-type RACs with R32 refrigerant.**
 - **COP** and **weighted COP** are the efficiency metrics for RACs in Singapore.
 - GWP of refrigerants for RACs also regulated in Singapore.
- **All 223 RAC models offered by retailers and online stores are inverter-type RACs with R32 refrigerant.**
- **NEA's regulation on MEPS and labeling uses kW as RAC cooling capacity but the local industry usually quotes cooling capacities in Btu/h.**
 - Retailers often round the cooling capacity figures up or down, like 9,000 or 12,000 Btu/h

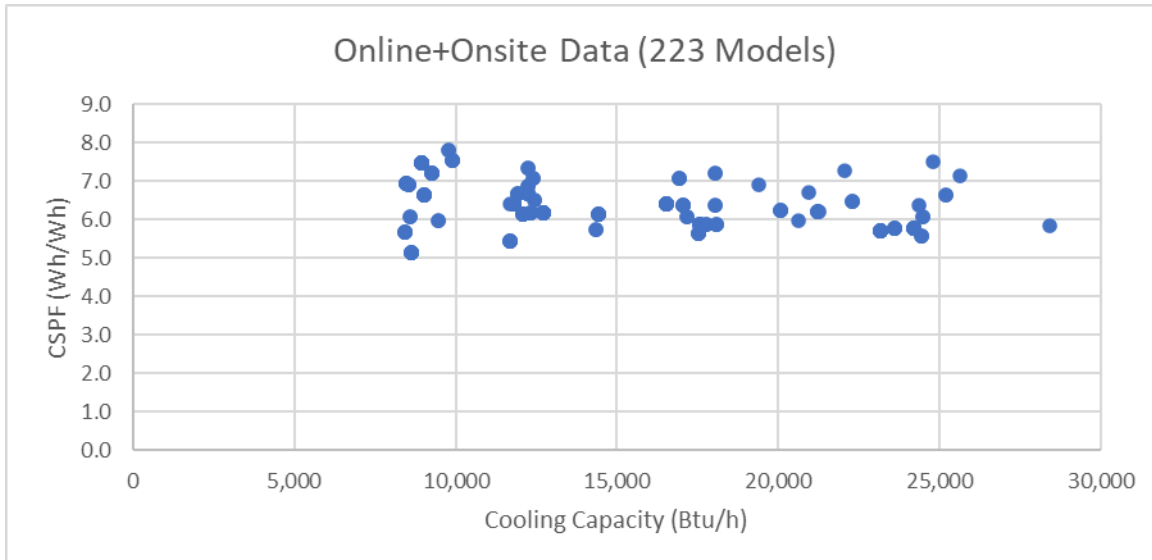
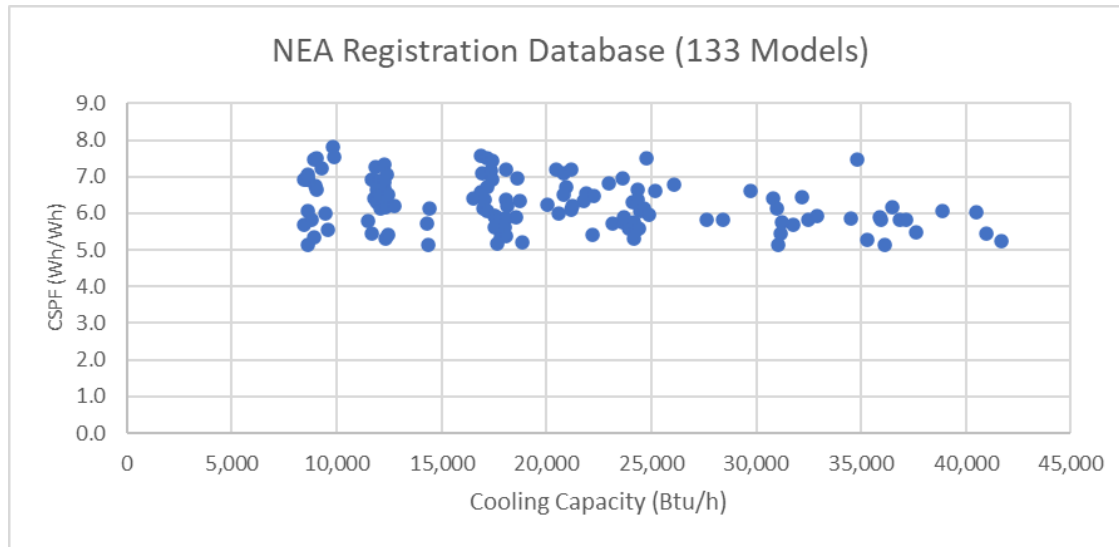
RAC Price Tags

Rounded Cooling Capacities



Energy Consumption ???

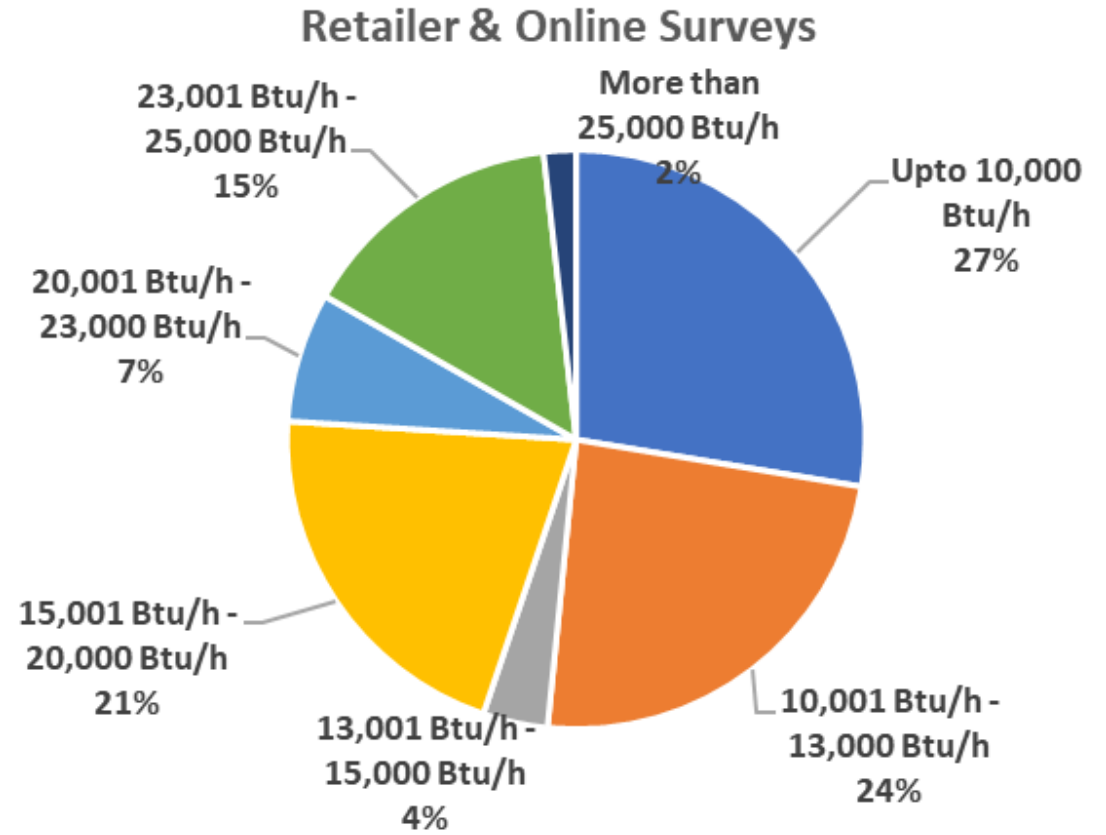
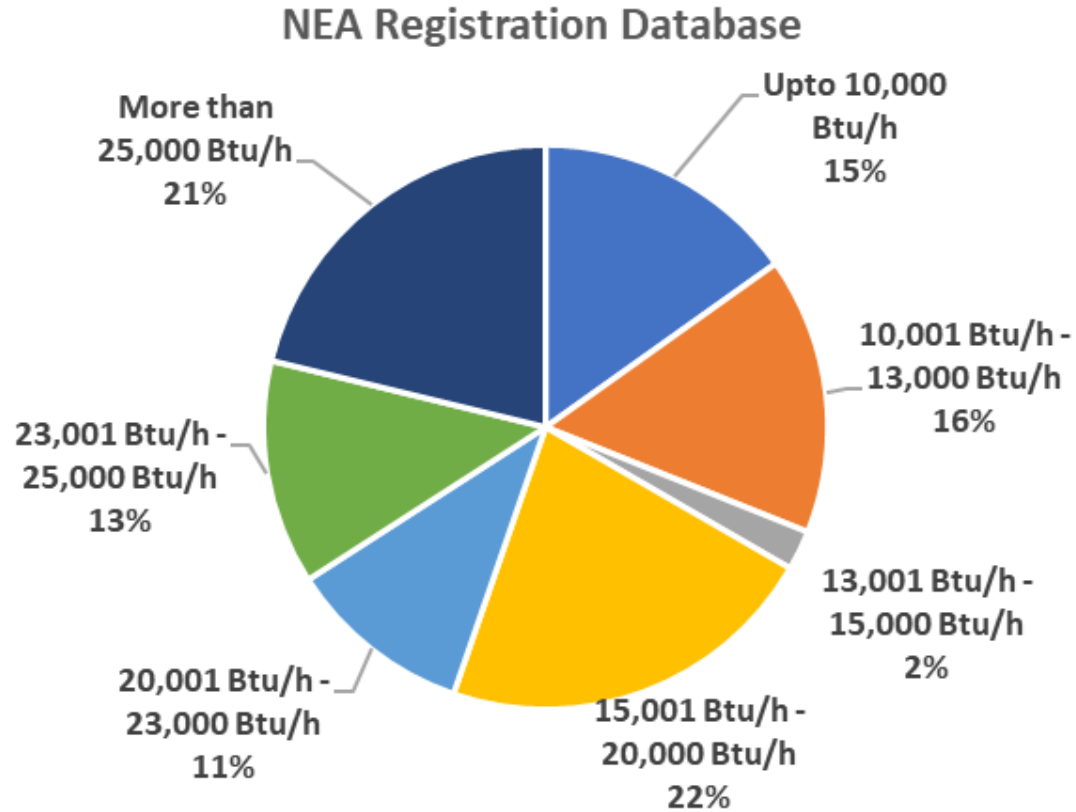
Common RAC Cooling Capacities



■ Seven groups of common cooling capacities identified

- 1) Up to 10,000 Btu/h (Up to 2.93 kW or about 1.0 HP)
- 2) More than 10,000 up to 13,000 Btu/h (More than 2.93 kW up to 3.80 kW or about 1.5 HP)
- 3) More than 13,000 up to 15,000 Btu/h (More than 3.80 kW up to 4.39 kW)
- 4) More than 15,000 up to 20,000 Btu/h (More than 4.39 kW up to 5.86 kW or about 2.0 HP)
- 5) More than 20,000 up to 23,000 Btu/h (More than 5.86 kW up to 6.74 kW or about 2.5 HP)
- 6) More than 23,000 up to 25,000 Btu/h (More than 6.74 kW up to 7.32 kW or about 3.0 HP)
- 7) More than 25,000 Btu/h (More than 7.32 kW)

Popular Cooling Capacities



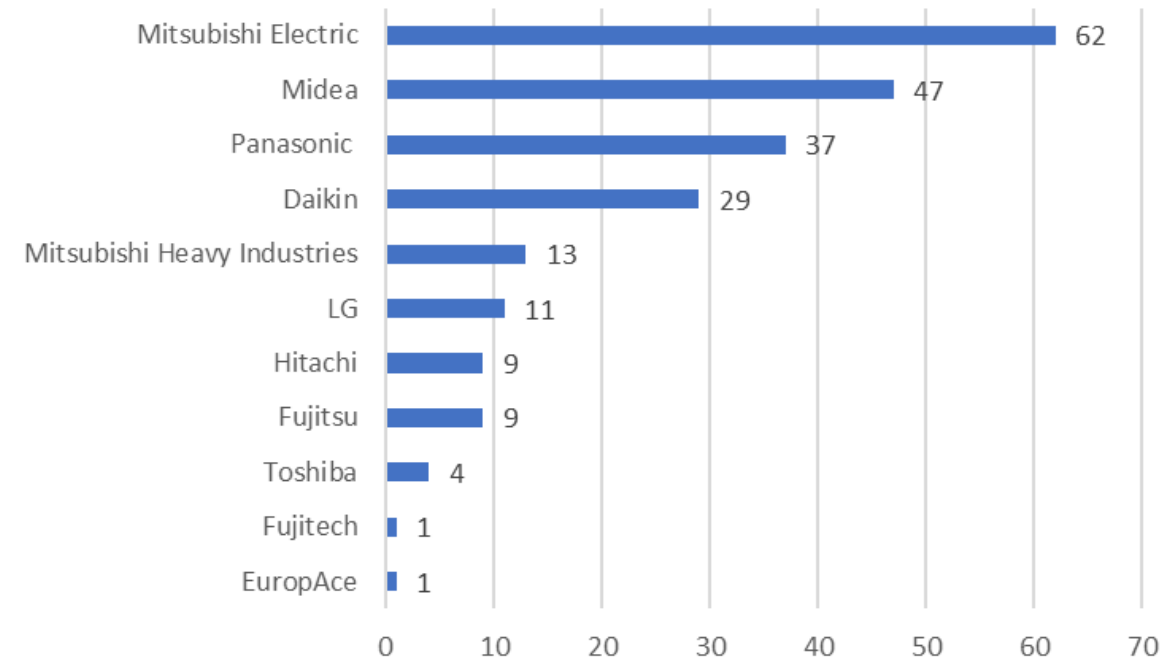
Popular Brands and Models

- **Four popular brands offered by retailers and online stores**

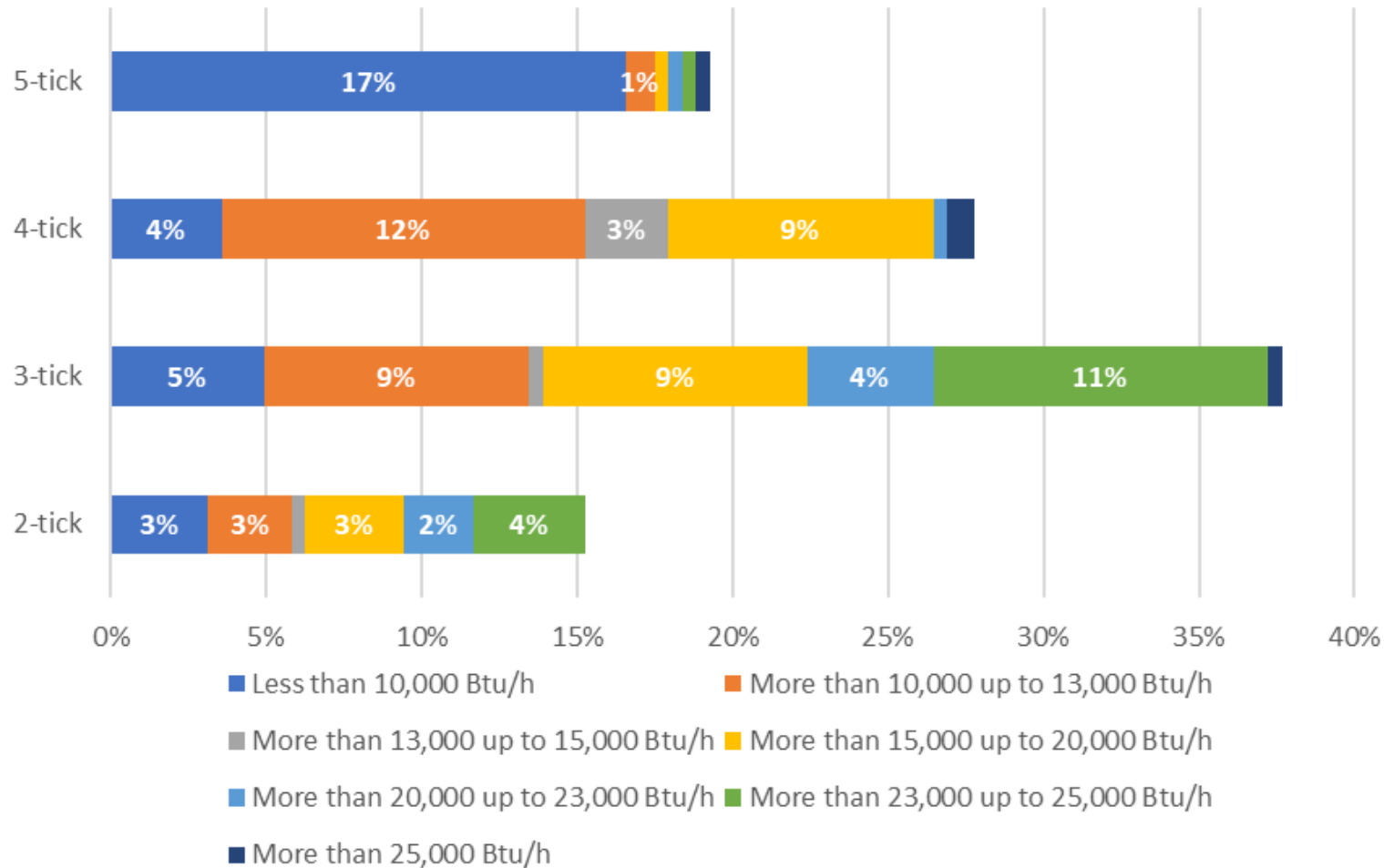
- Mitsubishi Electric, Panasonic, Midea and Daikin

- **Popular models include:**

- Mitsubishi Electric, Daikin, Midea 9,000 Btu/h
- Mitsubishi Electric 13,000 Btu/h
- Mitsubishi Electric 17,000 Btu/h
- Mitsubishi Electric 23,000 Btu/h



Consumers' Choices of RAC Efficiencies



- **3-tick rating group offers the most variety of cooling capacity.**
- **Majority of 5-tick RACs have cooling capacities below 10,000 Btu/h.**

Average RAC Efficiencies

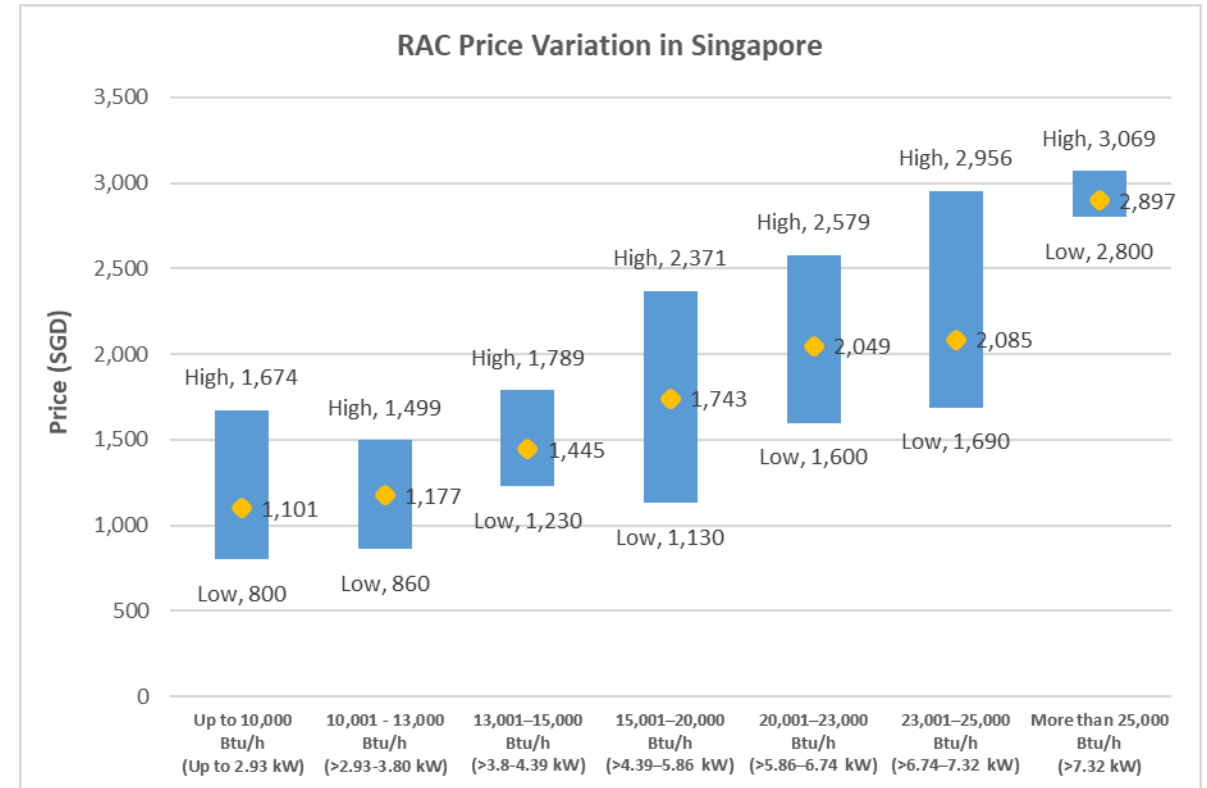
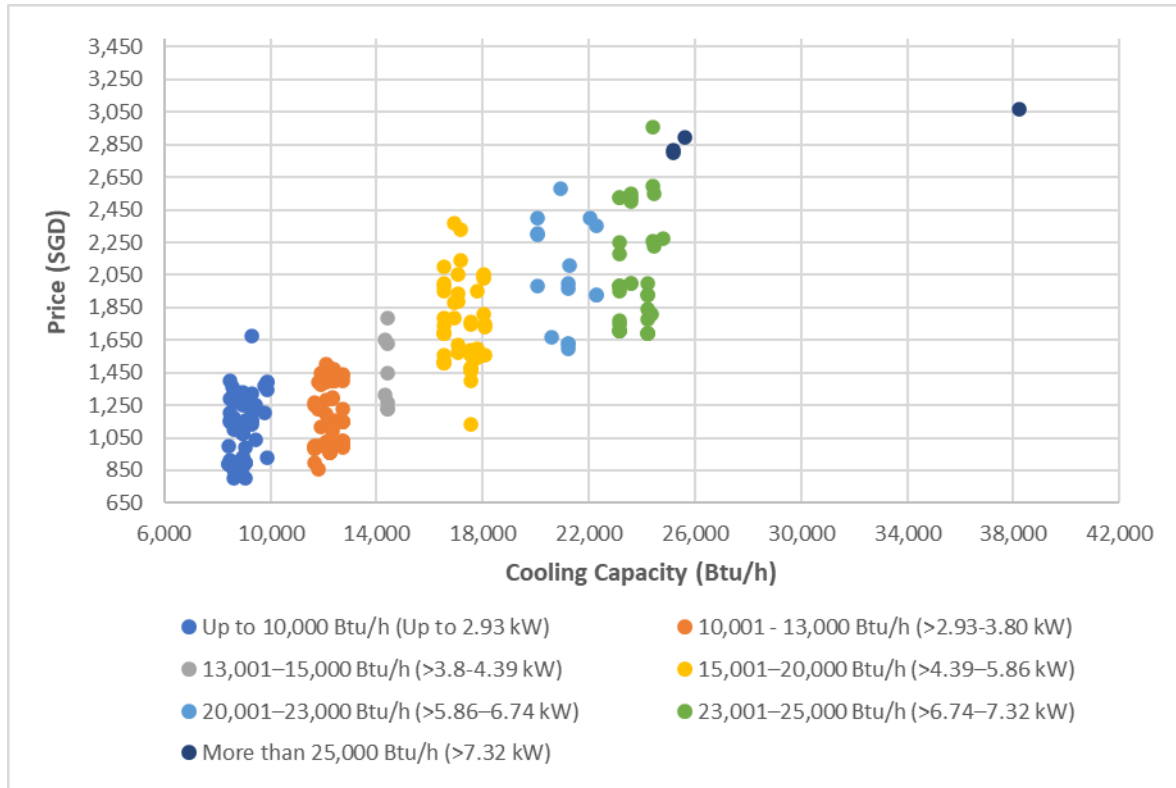
Cooling Capacity	Average CSPF (Wh/Wh)	
	NEA Database	Onsite and Online Stores
Less than 10,000 Btu/h (Less than 2.93 kW)	6.61	6.75
10,001 - 13,000 Btu/h (2.93 kW - 3.80 kW)	6.42	6.32
13,001 - 15,000 Btu/h (3.80 kW - 4.39 kW)	5.67	6.03
15,001 - 20,000 Btu/h (4.39 kW - 5.86 kW)	6.30	6.25
20,001 - 23,000 Btu/h (5.86 kW - 6.74 kW)	6.48	6.34
23,001 - 25,000 Btu/h (6.74 kW - 7.32 kW)	6.05	5.82
More than 25,000 Btu/h (More than 7.32 kW)	5.93	6.56

Retail Prices

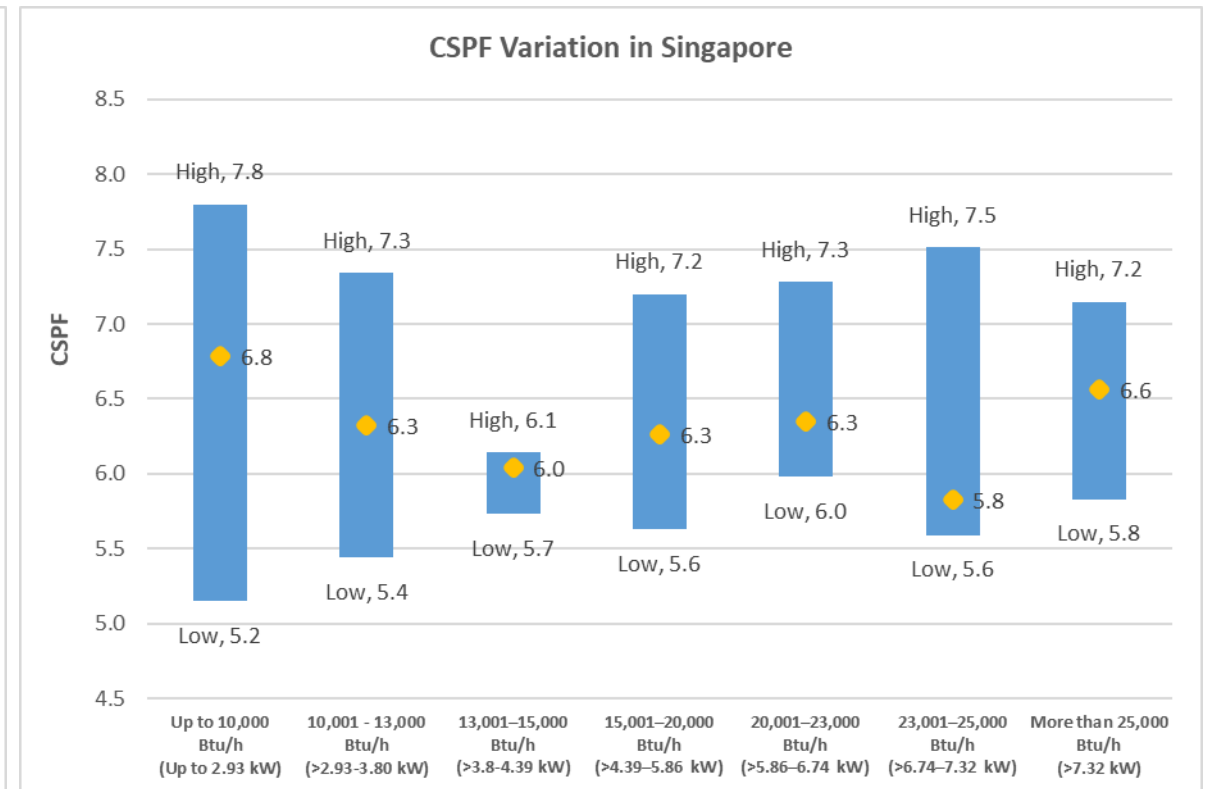
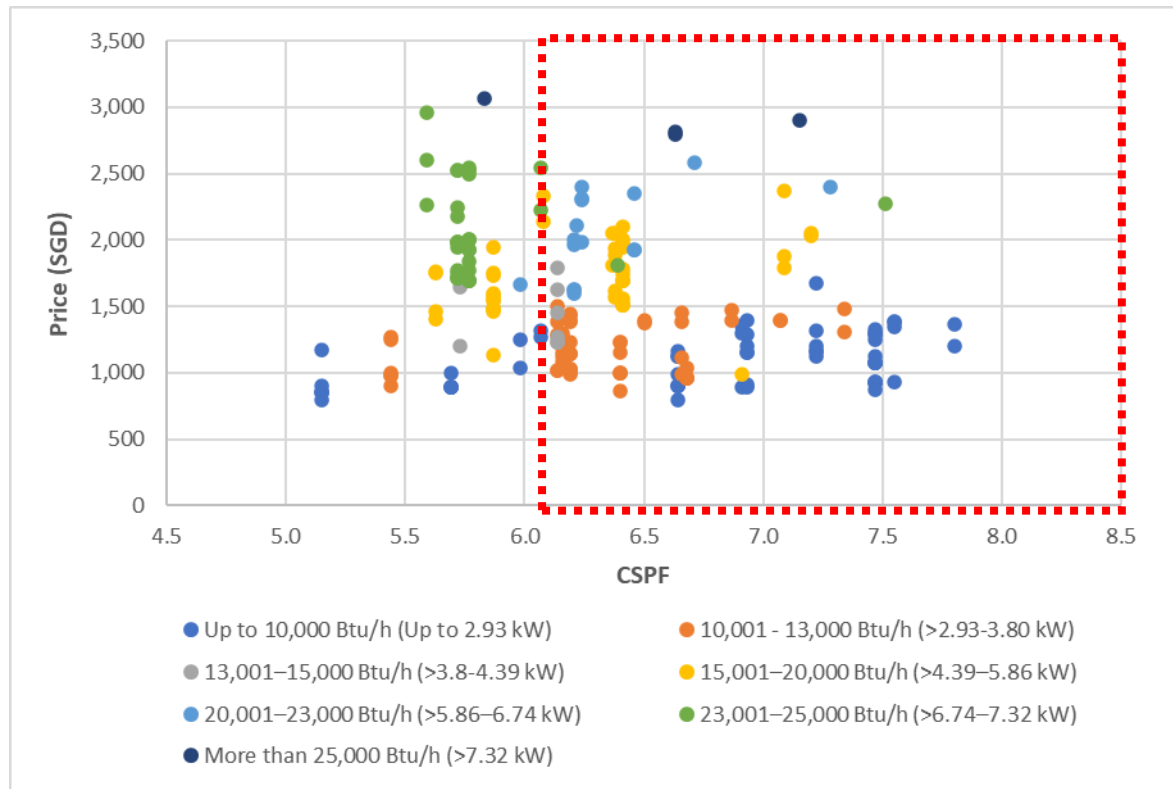
- Most retailers and salespersons are aware of the **Climate Friendly Households Programme (CFHP)**.
 - SGD 300 climate voucher as a discount
 - The Climate Vouchers will be valid until 31 December 2027.



Prices Versus Cooling Capacities



Prices Versus Efficiencies



Key Takeaways

- **65% of RAC models available through retailers and online stores in Singapore have efficiency values higher than 6.09 CSPF.**
 - For $\leq 4.5\text{kW}$, 80% of RAC models have efficiencies higher than 6.09 CSPF.
- **With the Climate Vouchers, retailers are encouraging consumers to go for 5-tick RAC models.**
 - CSPF of 5-tick RAC models could be as high as 7.8 CSPF.
- **No distinct relationship between prices and efficiencies for RACs with the same cooling capacities in Singapore. A consumer can find a high efficiency RAC model at the same price as a low efficiency model.**



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