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Ministry of Transport Awards Ceremony 2025/26

MINISTER'S VALUE-FOR-MONEY ACHIEVEMENT AWARD

Land Transport Authority
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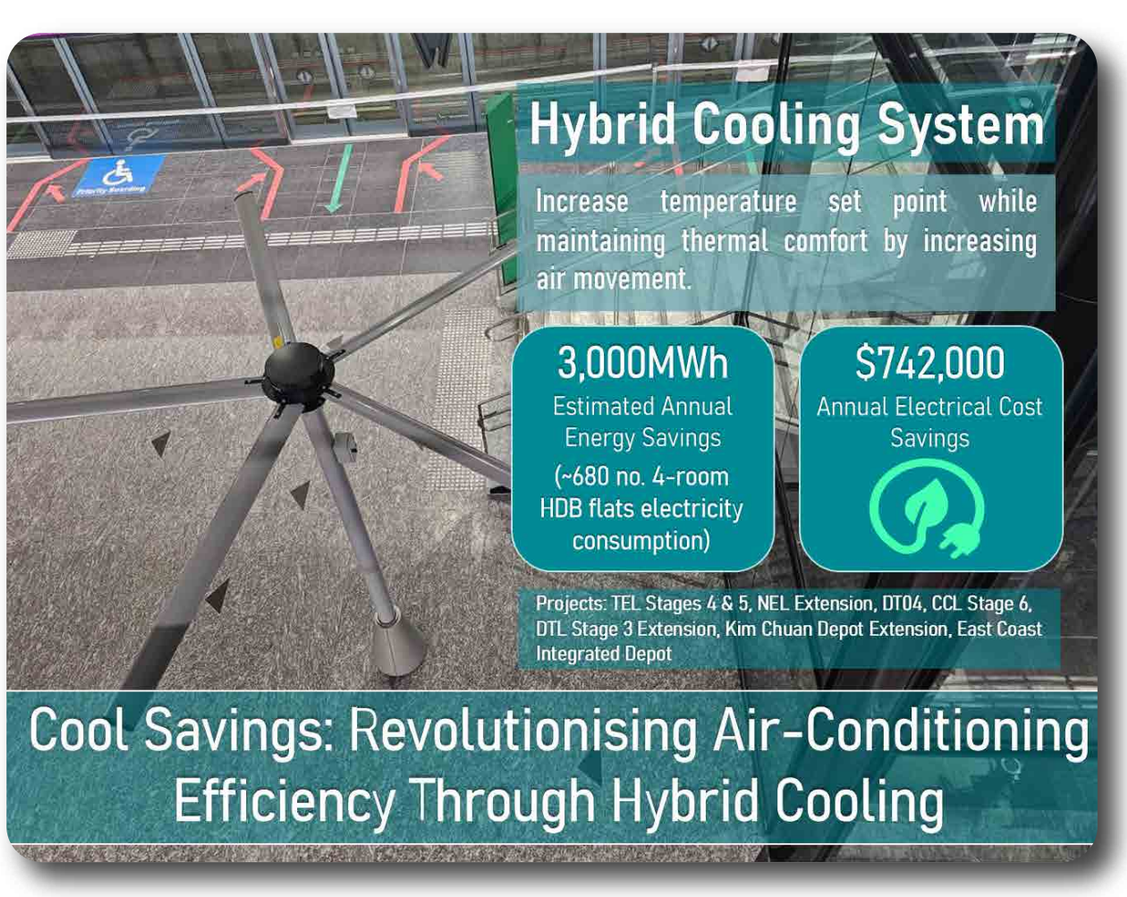
MERIT AWARD

COOL SAVINGS: REVOLUTIONISING AIR-CONDITIONING EFFICIENCY THROUGH HYBRID COOLING



PROJECT TEAM

Yee Boon Cheow	Advisor
Dr. Samuel Chan	Advisor
Er. Melvyn Thong	Advisor
Er. Hadi Wijaya	Advisor
Rinaa Ragupalan	Team Leader
Ernest Poon Chee Keong	Member
Er. Wong Kum Kit	Member
Liu Na	Member
Er. Ang Kok Wee	Member
Alex Ng	Member
Yeo Wee Kok	Member
Chng Wei Kee	Member

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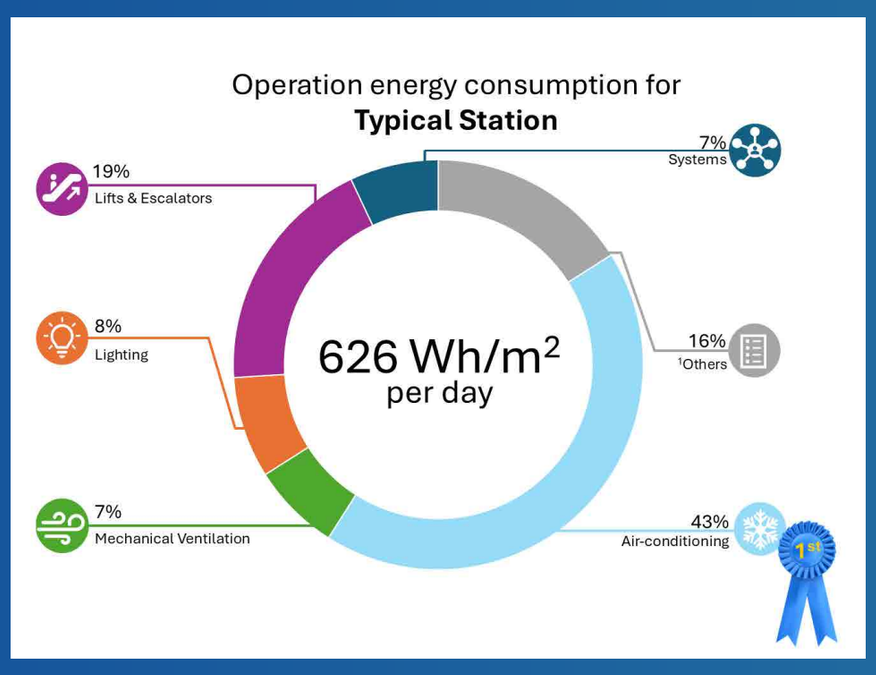
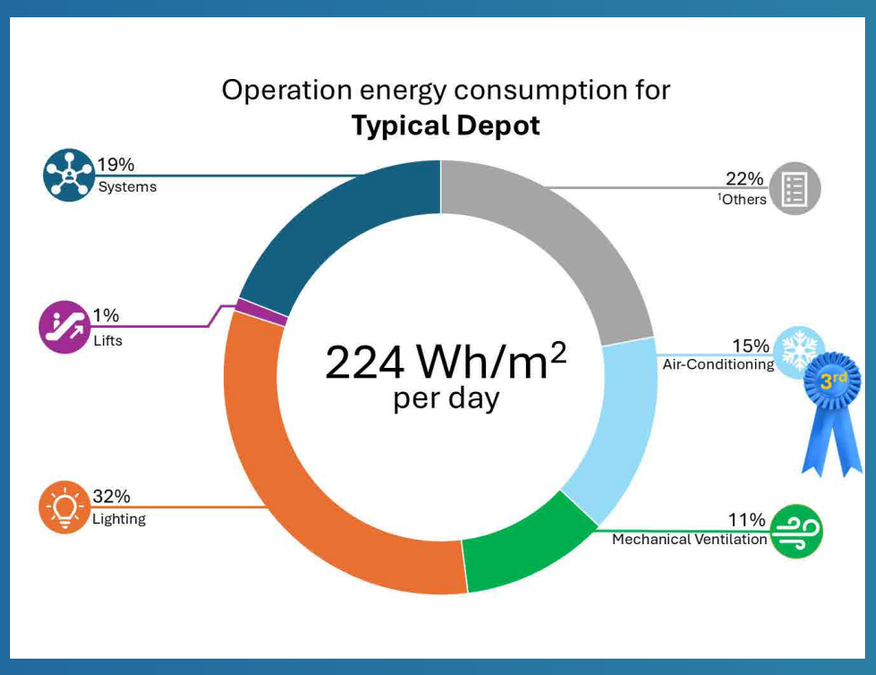
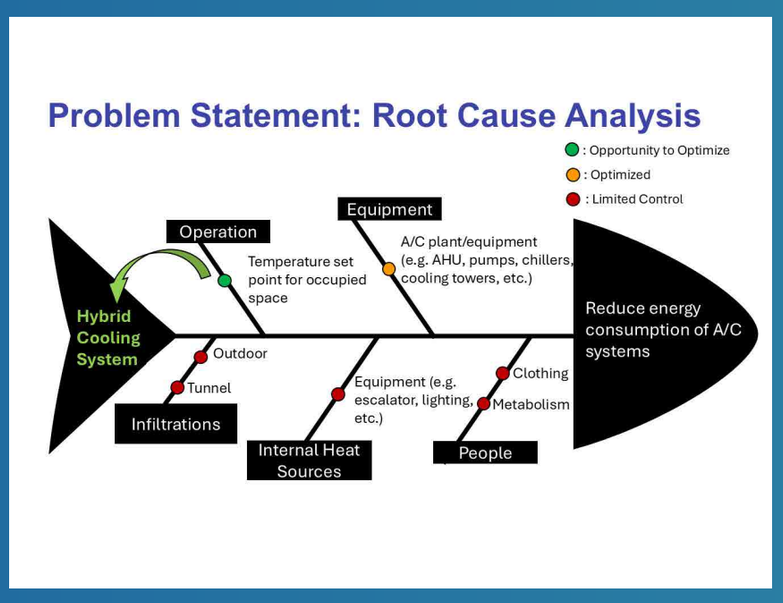
NEED FOR PROJECT





- Air-Conditioning (A/C) systems were the 1st and 3rd biggest energy guzzlers in MRT stations and depots respectively.
- Operating temperature of station public area and offices was 25°C.

- There was a need to reduce energy consumption of A/C systems of stations and depots by increasing the temperature set point for occupied space.
- The challenge was to ensure that the increase in temperature set point would not affect the human comfort of the occupants.



PROBLEM STATEMENT

Need to increase the temperature set point at MRT stations and depot while maintaining thermal comfort for occupants.

OVERVIEW | NEED FOR PROJECT | SOLUTION | IMPACT

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SOLUTION

- Implemented the Hybrid Colling System at selected 17 MRT stations and 2 depots* -
  - Raised operating temperature from 25°C to 27°C
  - Increased air movement by adding circulating fans.

**TEL Stage 4 (8 Stations), Punggol Coast Station, Hume Station, CCL Stage 6 (3 Stations), TEL Stage 5 (2 Stations), DTL Stage 3 extension (2 Stations), Kim Chuan Depot Extension, East Coast Integrated Depot*

SOLUTION STATEMENT

Developed the Hybrid Cooling System which reduced the energy consumption by setting a higher temperature of 27°C while adding circulating fans to maintain thermal comfort of occupants at the MRT stations and depots.

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IMPACT

Impact

Total Expected Savings

(TEL 4 & 5 Stations, CCL6 Stations, Punggol Coast Station, Hume Station, DTL3e Stations, East Coast Iintegrated Depot, Kim Chuan Depot Extension)

	Without Hybrid Cooling	With Hybrid Cooling	Net savings
Operation & Maintenance Cost	$7.89M	$7.14M	+$0.75M
Total (Over 20 yrs)	$157.8M	$142.8M	**+$15M**

Station + Depot Combined Savings ~ $13M over 20 years

(after deducting capital investment of $2M)

Effectiveness

2,940,000kWh
Estimated Annual Energy Savings
(~671 no. 4-room HDB flats annual electricity consumption)

$742,000
Annual Electrical Cost Savings

1,140 ton
of CO_2 reduced annually

Intangible Benefit
of reducing pollution emitted from the power generation plant

- The Hybrid Cooling System achieved cost savings in electricity, energy and carbon emission while maintaining thermal comfort for occupants.
- Reduced pollution emitted from the power generation plant.

- **Electrical Cost Savings: $0.74mil annually or $13mil over 20 years.**
- **Energy Savings: 2.94mil kWh annually (~671 no. 4-room HDB flats annual electricity consumption)**
- **CO2 Savings: 1,140 ton annually.**

OUTCOME STATEMENT

The Hybrid Cooling System supported a healthier and more sustainable environment, with potential for broader adoption across other air-conditioned buildings and infrastructure within LTA and future developments in Singapore.