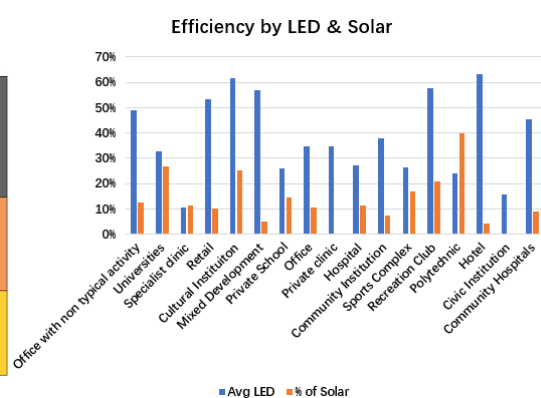
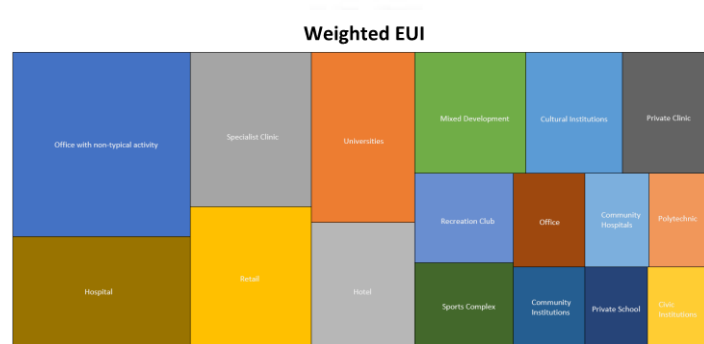


# Green Buildings 2030 Masterplan of Singapore

# EUI Analysis

Building Category	Avg EUI	Weighted EUI	Avg AC % Area	Weighted AC % Area	Avg LED %
Healthcare	194.25	281.93	46%	61%	35%
Commercial	235.01	232.28	77%	77%	44%
Educational	167.83	186.74	74%	93%	28%
Sports & Recreation	167.02	149.56	40%	35%	51%
Civic & Community	140.64	108.59	47%	36%	36%



# Data Centres

## Data Centers Overview

Data Centre	Loc.	Sites	Provider	Public Sites	Total Power	GFA	>3 Tier	SS 564 Certified	<1.55 PUE	<=1.3 PUE	>5 MW	BCA Award
Total	137	188	44	129	1300 MW/H	9.3 MM	32	23	16	5	46	67

### Goals

1. Do you know your baseline in terms of your current energy usage, carbon emissions, waste and water usage?
2. Do you have sustainability goals and metrics implemented?
3. Are your goals documented and reported in a transparent and measurable way?
4. Have you considered the life cycle aspects of future investments into your data center?
5. Are your goals also evaluated to mitigate potential supply chain issues?

## Renewable Energy Usage

1. What renewable options are available from your utility provider in your geographical location?
2. If renewable energy sources are not available what possibilities are there for power purchasing agreements or renewable energy certificates?

### Water Usage

1. Do you have a zero-water cooling solution, or do you have a plan for water usage reduction?
2. Are you up to date with best practices currently on the market?
3. What tools are you using to forecast, collect and analyze your data?
4. How are you improving the energy efficiency of your plant?

## Waste Management

1. How is your waste managed today, and do you have an operational process for waste handling and recycling?
2. Have you implemented any tools for extending the expected lifetime of your equipment?

2022 Goal:	2023 Goal:
<p>1. Increase sales volume by 10% through targeted marketing campaigns.</p> <p>2. Improve customer retention rates by implementing a loyalty program.</p> <p>3. Expand into new geographic markets by establishing partnerships with local distributors.</p>	<p>1. Increase sales volume by 15% through targeted marketing campaigns.</p> <p>2. Improve customer retention rates by implementing a loyalty program.</p> <p>3. Expand into new geographic markets by establishing partnerships with local distributors.</p>

Net ZERO  
Scope 1 and  
Scope 2  
Carbon  
Emissions

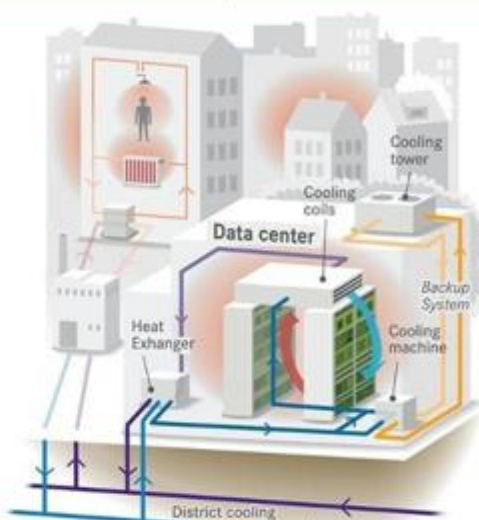
Recycle at least  
30% of our  
business waste  
Achieve 1.4  
WUE

### 2023 Goal:

Aggressively  
targeting Net  
ZERO Scope 1  
and

Scope 2 carbon emissions as we continue to grow their portfolio

Recycle at least  
50% of our  
business waste

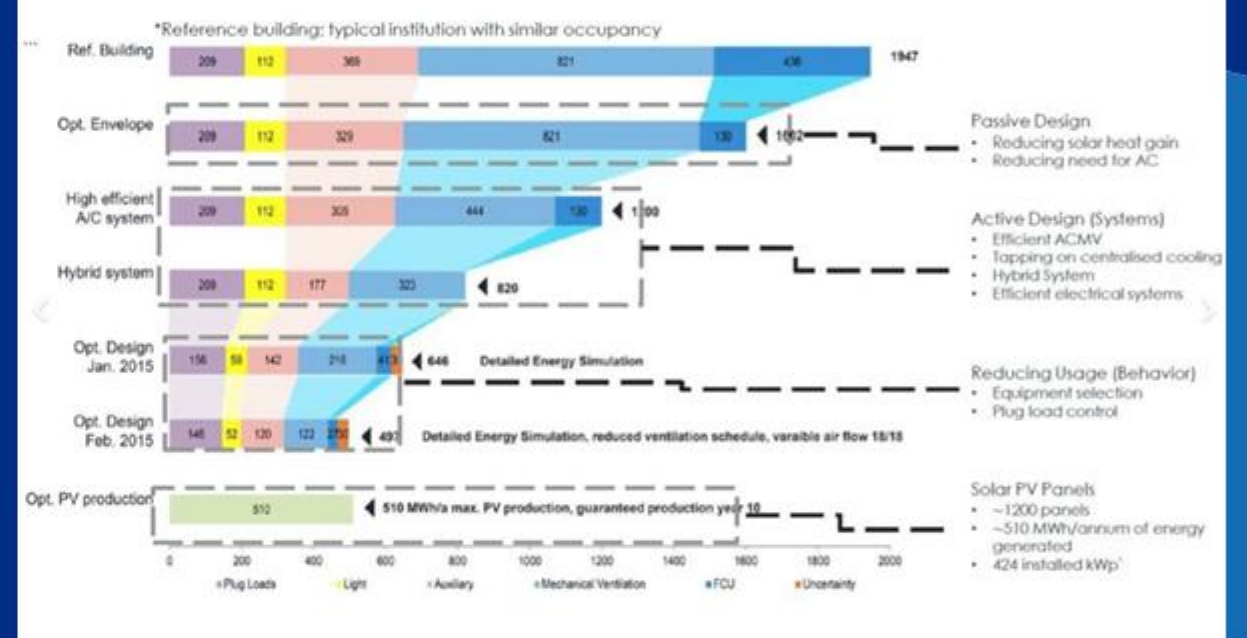


# IHLs - SDE4



There are three key reasons for the improved performance:

- **Enhanced energy production:** The PV panels are not only capable of meeting the building's energy demand, but are expected to feed higher surplus of energy back to the electricity grid over their whole lifespan (25 years) due to higher PV efficiency and better overall performance;
- **Tight building control and operation management:** Allowed a reduction of the building Energy Use Intensity (EUI) – the building's energy use divided by its area, from a designed 65 kWh/m<sup>2</sup>/year to an operational 55 kWh/m<sup>2</sup>/year; and
- **Hybrid cooling system performance:** Energy consumption for cooling is reduced by more than 20 per cent compared to conventional air-conditioning



# Hospitals

## Decarbonisation Solutions for Healthcare

Energy & Emissions	Water	Waste
Use of renewable energy	Rainwater harvesting	Food waste compost
Electric vehicles	Water treatment plant	Waste treatment plant
Heat recovery ventilation	Water-efficient appliances	Recycle all waste externally
Green roofs	Greywater system	Reusable utensils and linens
Energy-efficient appliances		
Insulation upgradation		
Vertical farm.Grow food on-site.		
Use of waste heat from the hospital to heat water		
Motion sensors to control lighting		

## Analysis of Solutions

Solutions	Cost	Efficiency	Carbon emissions reduction
Use of renewable energy	\$1 million	50-70%	100 tonnes/year
Electric vehicles	\$50,000	30%	2 tonnes/year
Heat recovery ventilation	\$100,000	15%	7.5 tonnes/year
Green roofs	\$50,000	10%	5 tonnes/year
Energy-efficient appliances	\$500	5%	2.5 tonnes/year
Insulation upgradation	\$100,000	10%	5 tonnes/year
Vertical farm.Grow food on-site.	\$1 million		100 tonnes/year
Use of waste heat from the hospital to heat water	\$100,000		6 tonnes/year
Motion sensors to control lighting	\$1000		2 tonnes/year
Rainwater harvesting	\$10,000		1 tonnes/year
Water treatment plant	\$50,000		4 tonnes/year
Water-efficient appliances	\$500		0.02 tonnes/year
Food waste compost	\$5000		0.5 tonnes/year
Waste treatment plant	\$1 million	50%	50 tonnes/year
Reusable utensils and linens	\$10,000		0.7 tonnes/year