

GreenGov.SG – Initiatives for Public Sector Buildings

27 Oct 2021

Presented at: ACES 2021

Presented by: Darryl Teo, Deputy Principal Engineer (NEA)



Presentation Outline

1. GreenGov.SG (Excel, Enable, Excite)

2. Overview of Guaranteed Energy Savings Performance (GESP) contracting model


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GreenGov.SG (Excel, Enable, Excite)

GreenGov.SG Initiative

- Launched in 2021
- Key enabler of the national sustainability agenda mapped out in the **Singapore Green Plan 2030**

What is GreenGov.SG?



- Whole-of-Government movement
- Aims to incorporate sustainability in our operations, infrastructure, policies and culture
- Builds on earlier efforts under “Public Sector Taking The Lead In Environmental Sustainability” (PSTLES) initiative



SG GREEN PLAN

Climate change is a global challenge, and Singapore is taking firm actions to do our part to build a sustainable future.

The Singapore Green Plan 2030 is a national sustainability movement with ambitious and concrete targets, which builds on our existing climate mitigation and adaptation measures.

It is a living plan which will evolve as we work with Singaporeans and partners from all sectors to co-create solutions for sustainability.

Our collective action will make a difference. Let's build a greener and more liveable home together.

1. City in Nature
A Green, Liveable and Sustainable Home for Singaporeans

- Add 1000ha of green spaces and 100km of park connectors
- Every household will live within a 10-min walk from a park
- Plant 1 million more trees across Singapore by 2030

2. Sustainable Living
Strengthen Green Efforts in Schools

- Work towards two-thirds reduction of net carbon emissions from schools sector by 2030
- At least 20% of schools to be carbon neutral by 2030

Green Commuters

- 75% of all trips to be on mass public transport by 2030, up from 64% today
- Triple cycling path network to 1,320km by 2030 from 466km in 2020
- Reduce amount of waste to landfill per capita per day by 20% by 2026, with the goal of reaching 30% by 2030
- Encourage water conservation and water efficient practices for households and industries

3. Energy Reset
Cleaner-energy Vehicles

- Require all newly-registered cars to be of cleaner-energy models from 2030
- Expand network of electric vehicle charging points to 30,000 by 2030

Sustainable Fuels

- Promote sustainable fuels for international trade and travel

Greener Infrastructure & Buildings

- Raise sustainability standards of our buildings through the next edition of the Singapore Green Building Masterplan

Sustainable Towns & Districts

- HDB Green Towns Programme to reduce energy consumption in HDB towns by 15% by 2030

Green Energy

- Quadruple solar energy deployment by 2025
- Green Singapore's electricity supply by tapping on cleaner electricity imports

4. Green Economy
Sustainability as New Engine of Jobs and Growth

- New Enterprise Sustainability Programme to help local enterprises adopt sustainability practices
- Develop Singapore as a carbon services hub, and as a leading centre for green finance in Asia and globally
- Develop Jurong Island to be a sustainable energy and chemicals park

New investments to be Carbon and Energy Efficient

- Seek out new investments that are among the best-in-class in carbon/energy efficiency

5. Resilient Future
Safeguarding our Coastlines against Rising Sea Levels

- SSB dedicated to coastal and drainage flood protection measures
- Complete engineering design & implementation plans for coastal protection measures at East Coast, Lim Chu Kang, Sengkang, and Jurong Island by 2030

Safeguarding Food Security

- Produce 30% of our nutritional needs by 2030 by growing our agri-food industry through key strategies, including developing land and sea space

Keeping Singapore Cool

- Moderate the rise in urban heat with cool paint and by increasing greenery


Jointly led by:

- Ministry of the Environment and Water Resources (MEEW)
- Ministry of National Development (MND)
- Ministry of Education (MOE)
- Ministry of Transport (MOT)
- Ministry of Health (MOH)
- Ministry of Manpower (MOM)
- Ministry of Social and Family Development (MSF)
- Ministry of Defence (MINDEF)
- Ministry of Home Affairs (MHA)
- Ministry of Information and Public Relations (MIPR)
- Ministry of Labour (MOL)
- Ministry of Law (MOJ)
- Ministry of Sustainability and the Environment (MSE)
- Ministry of Trade and Industry (MITI)
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- Ministry of Trade and Industry (MITI)

www.GreenPlan.gov.sg

GreenGov.SG Initiative

3 Pillars of GreenGov.SG



GreenGov.SG to raise the bar on sustainability through 3 'E's:

Excel

- Introducing ambitious targets and new measures

Enable

- Embedding sustainability in our core business areas to enable sustainable economy and green citizenry

Excite

- Building a culture of sustainability



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1. City in Nature

A Green, Liveable and Sustainable Home for Singaporeans

- Add 1000ha of green spaces and 160km of park connectors
- Every household will live within a 10-min walk from a park
- Plant 1 million more trees across Singapore by 2030

2. Sustainable Living

Strengthen Green Efforts in Schools

- Work towards two-thirds reduction of net carbon emissions from schools sector by 2030
- At least 20% of schools to be carbon neutral by 2030

Green Commuter

- 70% of all trips to be on mass public transport by 2030, up from 64% today
- Triple cycling path network to 1,320km by 2030 from 460km in 2020

Green Citizenry: Less waste and consumption

- Reduce amount of waste to landfill per capita per day by 20% by 2028, with the goal of reaching 50% by 2030
- Encourage water conservation and water efficient practices for households and industries

3. Energy Reset

Cleaner-energy Vehicles

- Require all newly-registered cars to be of cleaner-energy models from 2030
- Expand network of electric vehicle charging points to 60,000 by 2030

Sustainable Fuels

- Promote sustainable fuels for international trade and travel

Greener Infrastructure & Buildings

- Raise sustainability standards of our buildings through the next edition of the Singapore Green Building Masterplan

Sustainable Towns & Districts

- HDB Green Towns Programme to reduce energy consumption in HDB towns by 10% by 2030

Green Energy

- Quadruple solar energy deployment by 2025
- Green Singapore's electricity supply by tapping on cleaner electricity imports

4. Green Economy

Sustainability as New Engine of Jobs and Growth

- New Enterprise Sustainability Programme to help local enterprises adopt sustainability practices
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5. Resilient Future

Safe-guarding our Coastlines against Rising Sea Levels

- SSOB dedicated to coastal and drainage food protection measures
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Excel – Introducing Ambitious Targets and New Measures

Expanded Scope

- GreenGov.SG will go beyond government-owned offices to include public sector infrastructure and operations.
- Number of premises covered will double - from 800 to 1,600 buildings.



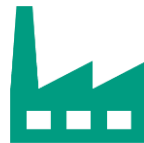
Healthcare
Facilities



Hawker Centres



Autonomous
Universities







Infrastructural
Facilities



Public Transport
Infrastructure

Excel – Introducing Ambitious Targets and New Measures

2030 Targets	 10% improvement in Energy Utilisation Index (EUI) ¹ from 2018 - 2020 levels
	 10% improvement in Water Efficiency Index (WEI) ² from 2018 - 2020 levels
	 30% improvement in Waste Disposal Index (WDI) ³ from 2022 levels
	 Peak Public Sector Emissions Around 2025

¹ Energy used per unit area.

² Water used per person per day.

³ Waste disposed of per person per day.

Excel – Introducing Ambitious Targets and New Measures

10% improvement in Energy Utilisation Index (EUI)¹ from 2018 - 2020 levels

Key Measures

- All new and retrofitted buildings to achieve Green Mark Platinum (Super Low Energy), where feasible.
- Government data centres to achieve the Green Mark Platinum standard by 2025
- All buildings to adopt **Guaranteed Energy Saving Performance (GESP) contracting model** when embarking on chilled-water plant retrofits.



Peak Public Sector Emissions Around 2025

Key Measures

- Public sector to increase solar energy deployment to 1.5 GW-peak by 2030.
- All cars newly procured and registered by the public sector will be clean energy vehicles from 2023 onwards, with 100% electrification by 2035.
- All agencies will pursue efficiency improvements in their operations and buildings.



¹ Energy used per unit area.

² Water used per person per day.

³ Waste disposed of per person per day.

Enable – Embedding Sustainability in our Core Business Areas

Green Procurement: Creating Demand for Greener Products and Services

Raise efficiency requirements for electrical and water appliances

Air-conditioners	<ul style="list-style-type: none"> Minimum 5-tick* rating efficiency for split unit air-cons ≤ 10kW Minimum 3-tick* rating efficiency for split unit air-cons > 10kW Minimum 3-tick* rating efficiency for Variable Refrigerant Flow models
Refrigerators	<ul style="list-style-type: none"> Minimum 3-tick* rating efficiency
Televisions	<ul style="list-style-type: none"> Minimum 4-tick* rating efficiency
Lamps	<ul style="list-style-type: none"> LED models generally
Water fittings and equipment	<ul style="list-style-type: none"> Minimum 3-tick* for water fittings (e.g. basin taps, shower taps, flushing cisterns)

*For models under the Mandatory Energy Labelling Scheme (MELS) or Water Efficiency Labelling scheme (WELS)

Mandate the purchase of more environmentally sustainable products



Water Fittings



Building Products



Event Venues

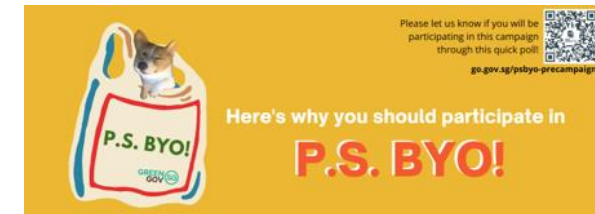
Factor in sustainability-related policies and practices when evaluating tenders starting with events venue and accommodation and public waste collection contracts.

The public sector seeks to influence service providers and suppliers to be more sustainable and create a ripple effect in the wider economy.

Excite – Building a Culture of Sustainability

Raising Awareness & Enabling Action

- Inform and educate public officers through campaigns, dialogues, learning journeys.
- A whole-of-government BYO campaign was launch in Jun 2021 to cultivate environmentally friendly habits amongst public officers
- Create a ripple effect – public officers' green habits can influence co-workers, family members and friends.



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Overview of Guaranteed Energy Savings Performance (GESp) contracting model

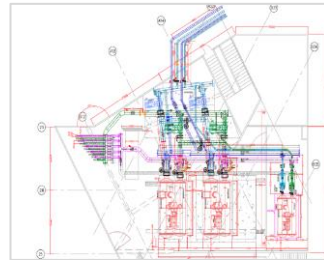
What is Guaranteed Energy Savings Performance (GESP) Contracting Model?

A turnkey model where an accredited Energy Services Company (ESCO):

Carries out an investment grade **energy audit** and recommends energy conservation measures (ECM)



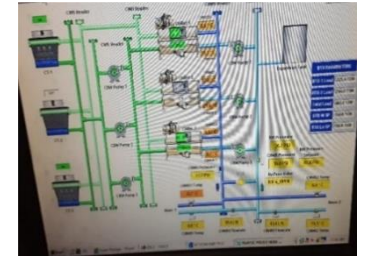
Carries out detailed **design of chilled-water system** & selected ECMs



Implements ECMs including **robust measurement & verification** for system optimisation & performance tracking



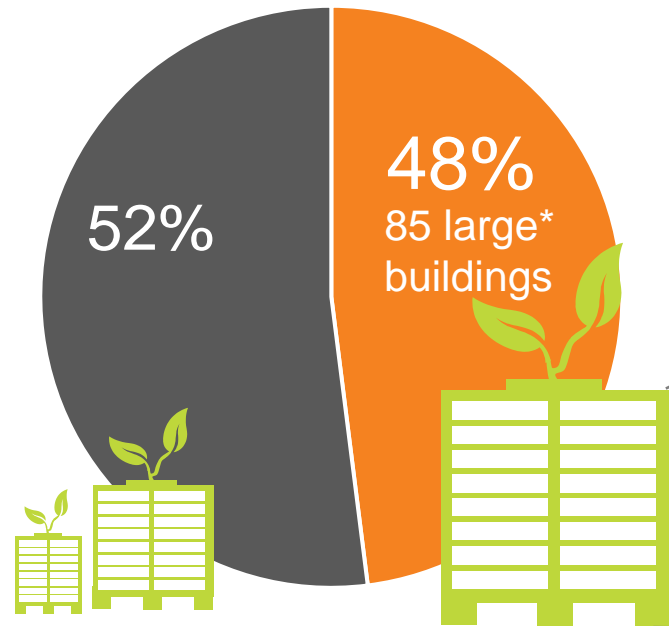
Guarantees annual savings/ efficiency of the retrofits **(typically 5 years)**



- Advocated for large Public Sector building owners to improve energy efficiency and meet **GreenGov.SG targets**
- Projects mainly cover chilled water plant systems, which are the key energy-consuming system in buildings, air distribution units, lighting and other measures that permit direct measurement of energy savings

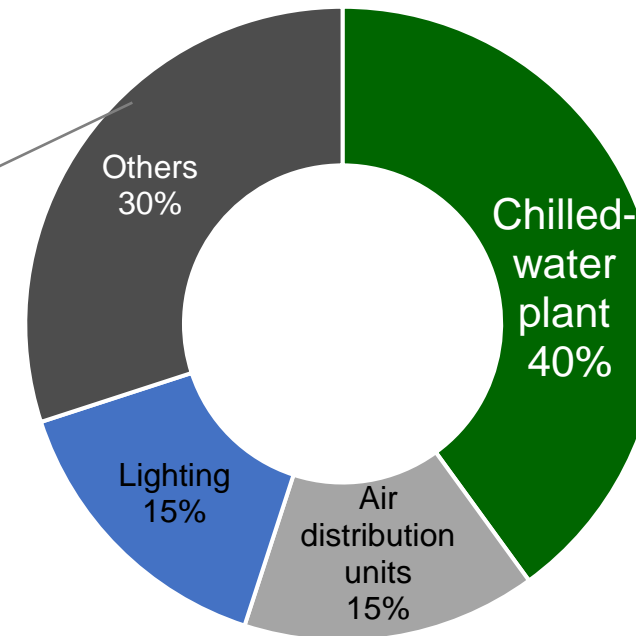
Why Focus on Air-conditioning Retrofits?

Large buildings accounts for **48%** of total public sector electricity consumption



*Air-con floor area > 10,000m²

The largest energy consumer in large buildings is air-conditioning



Typical system consumption breakdown of large buildings

Retrofitting of chilled water plants to more efficient ones will help Public Sector agencies in achieving their energy conservation target

How Does a GESP Contract Work?

Client's investment

Consultancy Fee (for Phase I)

Fee for ESCO to:

- Conduct Investment Grade Energy Audit
- Develop Detailed Design

Contract Price (for Phase II)

Implement



ESCO's Offer/Obligations

Guarantee Chiller Plant Efficiency (kW_E/kW_T) or (kW/RT)

For chiller plant retrofit (0.62 kW/RT or better)*

For AHU, if applicable (0.2 kW/RT or better)*

Guarantee Annual Savings (S\$)

For other energy intensive equipment

Provide maintenance for all equipment

- Comprehensive - new equipment
- Preventive - existing equipment

Repay lost savings if energy performance is not achieved

“Make-good” to achieve guaranteed performance, else repay full amount of lost savings at end of term

Implement stringent M&V requirements and ensure M&V instruments accuracy


*Based on GreenGov.SG requirements

Benefits of GESP Contracting Model


- **Guaranteed Energy Savings/Performance**
 - Allows building owner to meet Energy Efficiency Requirement (e.g. $\text{eff} < 0.65\text{kW/RT}$ for Green Mark)
 - ESCO failing to meet committed savings/performance under the GESP contract will be liable to compensate building owners based on the difference in performance
- **Improved Energy Efficiency from Best-in-class Design**
 - Design is at system level to ensure best equipment configuration instead of individual equipment level
 - Best practices incorporated (e.g. M&V requirement, auto tube cleaning system)
- **Accountability**
 - Design, installation and maintenance by a single contractor (ESCO)


As of
Sep 2021

42 
Public Sector buildings retrofitted
or undergoing retrofiting


20%
reduction in energy
use


\$13 million
annual savings


33 kT
annual carbon
abatement



The public service will lead the charge towards a more sustainable and low-carbon future, through the GreenGov.SG

**GREEN
GOV** 

Thank you.