SUNSEAP

AFFORDABLE CLEAN ENERGY FOR EVERYONE

SIEW 2021

ERI@N Thinktank Roundtable

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Guiding Building And Facility Owners In Their Transition To A Low Carbon Future

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Vice President
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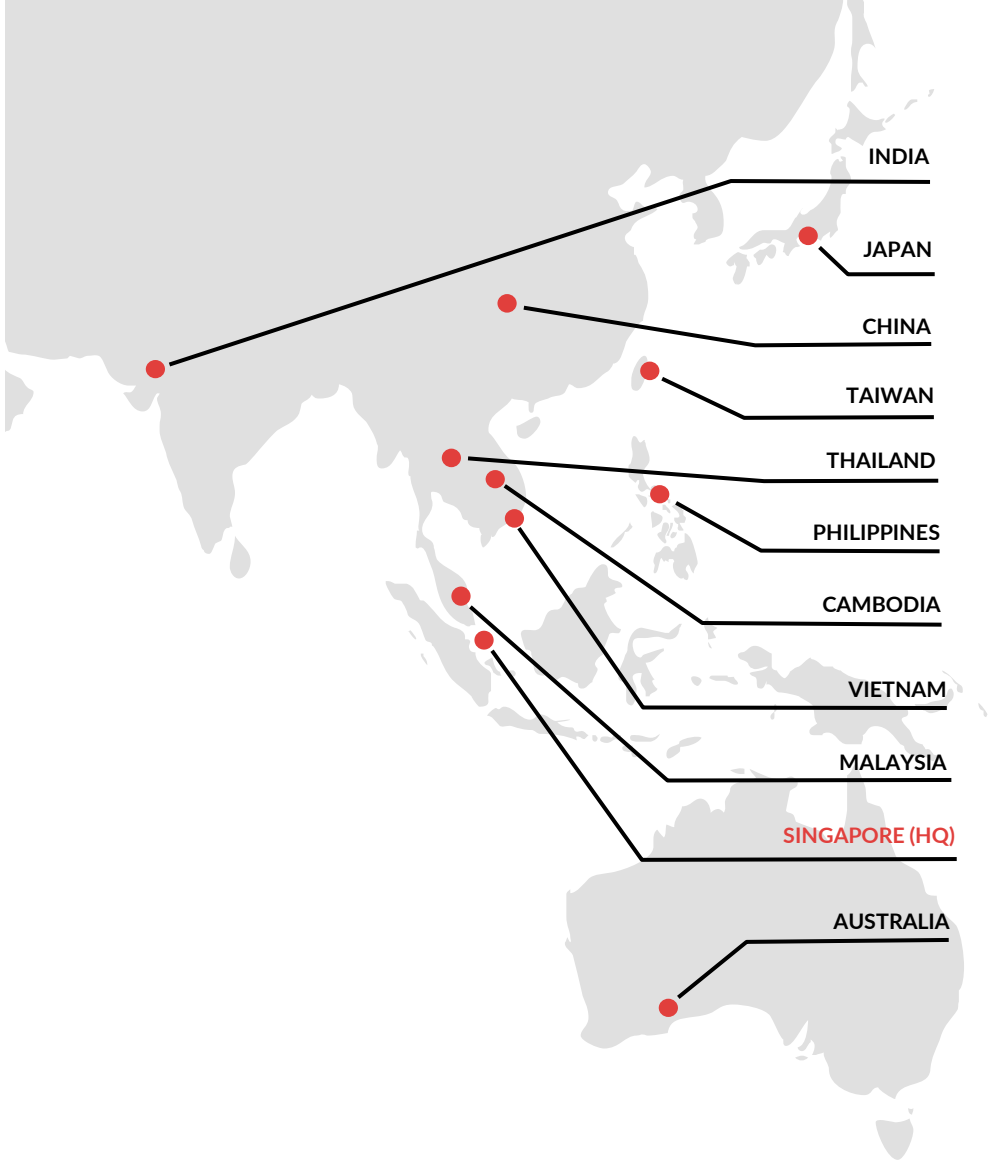

We are a full spectrum clean energy solutions provider

With more than **2 GWp** of solar capacity contracted, across **11 countries** and **6 regional offices**, Sunseap is Singapore's most established solar PV developer.

Our Valued Clients

Sunseap is proud to serve clients of all sizes and across all market segments, from residential consumers to commercial businesses and government organisations.

HOUSING & DEVELOPMENT BOARD · PSA The World's Port of Call · Keppel · Microsoft · amazon · facebook

Our Trusted Partners

Sunseap is also supported by an extensive network of financial institutions and business partners. Together, we are able to provide a greater range of financial and engineering services for our clients.

TEMASEK HOLDINGS · UOB · DBS · BOUSTEAD · BANPU · ING

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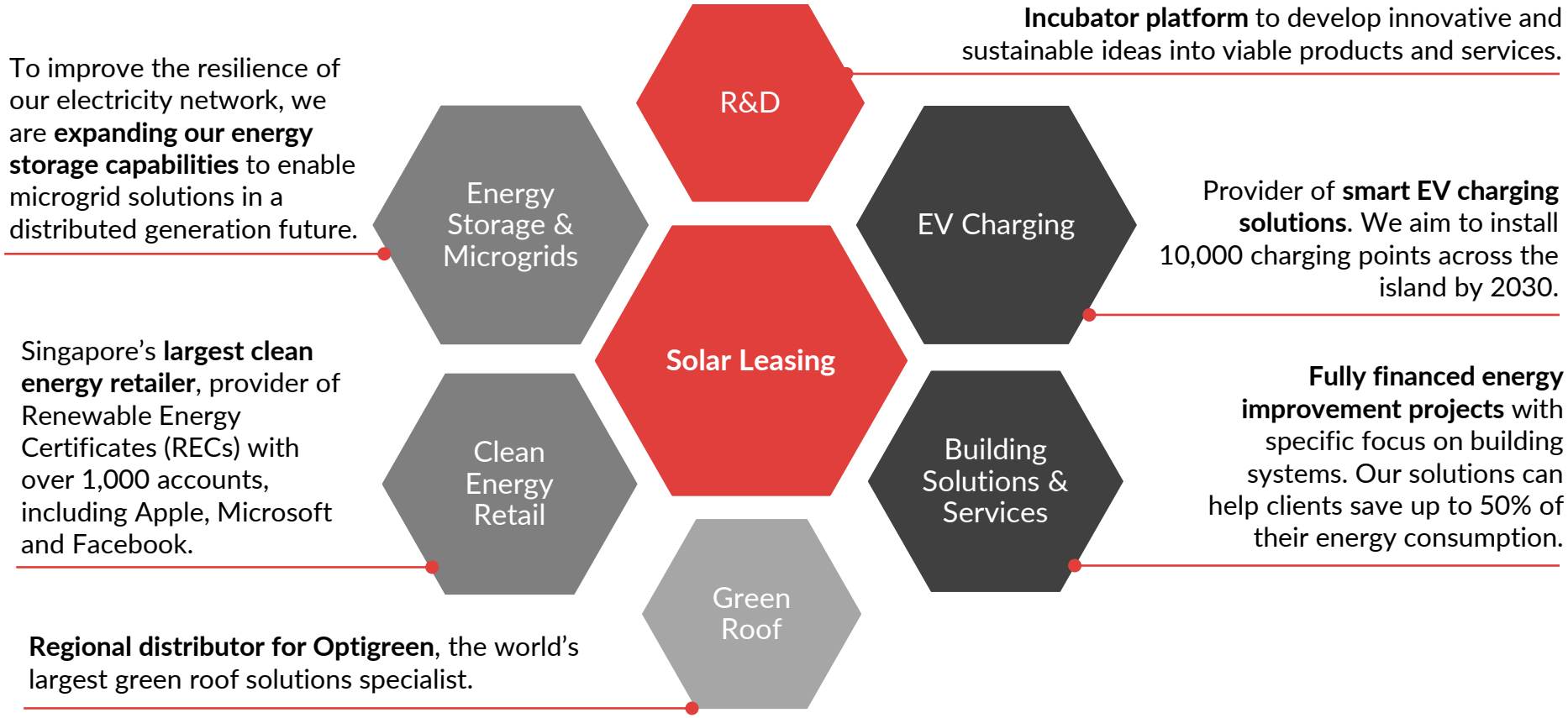
Providing a suite of energy and sustainability solutions

While solar leasing forms the cornerstone of our business, we have also expanded to offer the full spectrum of clean energy solutions. This ranges from rooftop solutions to EV charging, building energy performance consultancy, contracting, and energy storage.

Our businesses at a glance



Incubator platform to develop innovative and sustainable ideas into viable products and services.

To improve the resilience of our electricity network, we are **expanding our energy storage capabilities** to enable microgrid solutions in a distributed generation future.

Provider of **smart EV charging solutions**. We aim to install 10,000 charging points across the island by 2030.

Singapore's **largest clean energy retailer**, provider of Renewable Energy Certificates (RECs) with over 1,000 accounts, including Apple, Microsoft and Facebook.

Fully financed energy improvement projects with specific focus on building systems. Our solutions can help clients save up to 50% of their energy consumption.

Regional distributor for Optigreen, the world's largest green roof solutions specialist.

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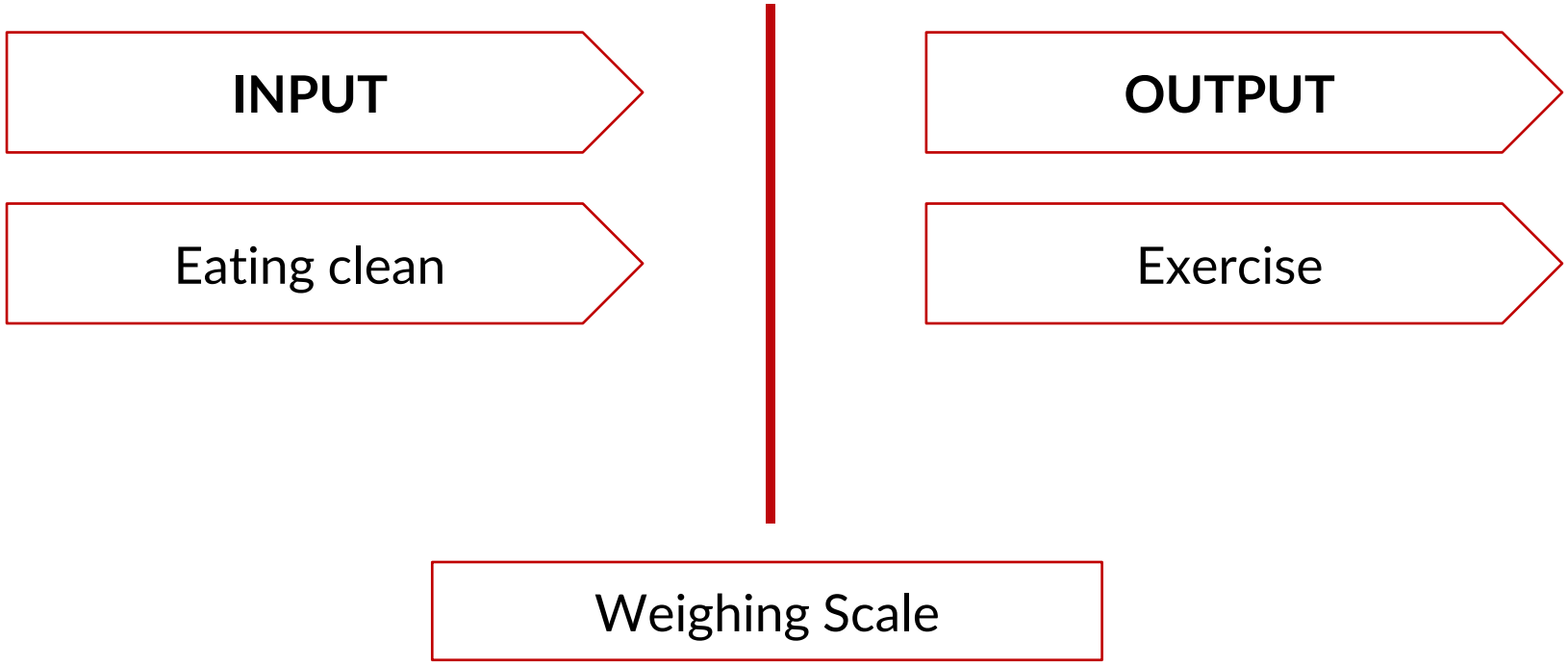
Decarbonization… is like a weight-loss journey

1. Understand where you stand now
2. Set your targets
3. Draw up a plan
4. Understand that it is a journey – it doesn't happen overnight!
5. Weigh-in at every milestone
6. Prepare to make sacrifices but know that the efforts will eventually pay off
7. Seek professional help



In a building context

INPUT

- Solar (and/or other DERs)
- Energy Storage Systems
- Renewable Energy Certificates
- Clean energy imports

OUTPUT

- Energy efficiency
- Passive features/design

Digitalization of Energy
Measurement & Verification

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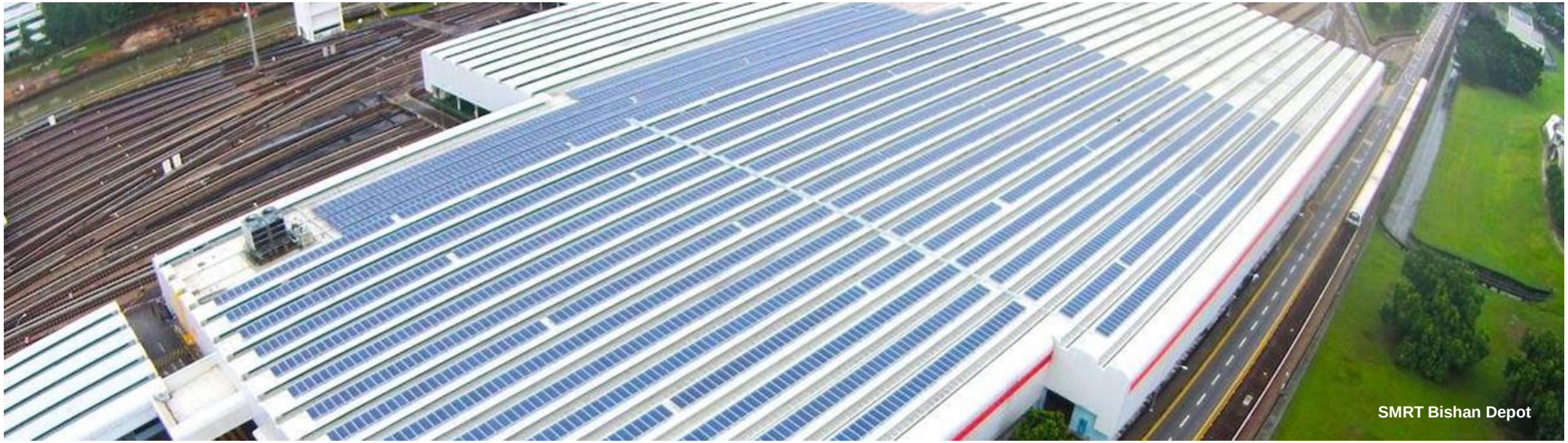
Solar is the most reliable source of renewables in Singapore

There are various commercial models for clients to choose from, from CAPEX-free Power Purchase Agreement (PPA) to conventional EPC-type outright ownership.

Design	Finance	Build	Maintain
Tailored design of solar PV system to suit client's requirements	Zero capital expenditure Sunseap finances the entire project	Sunseap conducts the engineering, procurement and construction of the solar PV system	The system will be fully maintained by Sunseap, including monitoring and replacements, to ensure optimal operations



SMRT Bishan Depot

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…and can be deployed under different circumstances

Woodlands Offshore Floating system, 5 MWp

Solar Farm in Vietnam, 168 MWp

Jurong Port, 9.5 MWp

Singapore American School, 1.2 MWp

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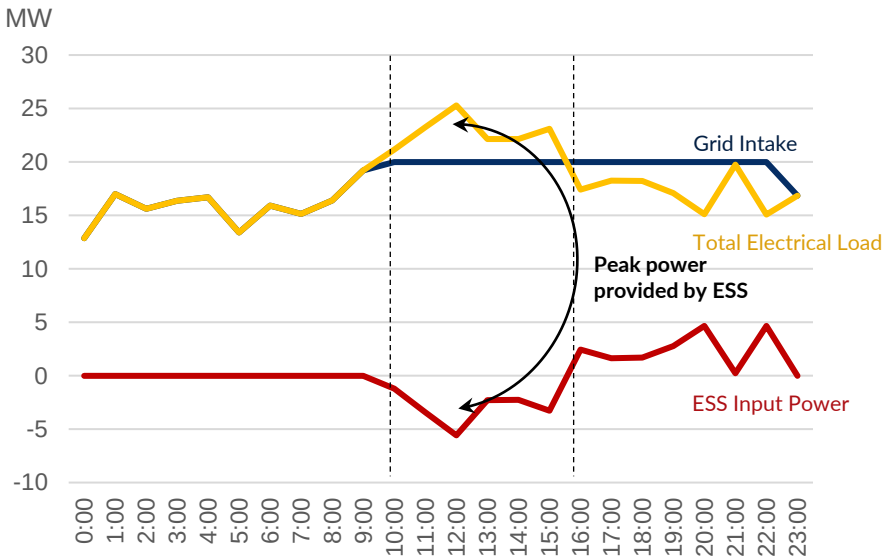
Peak-shaving through Energy Storage System (ESS)

ESS can provide an array of services to the end user, providing not only energy security but also extract energy efficiency and optimise energy consumption of the electrical system.

Load Profile of industrial facility



Applications of ESS

- **Peak-shaving to reduce demand charge**
- Power quality and frequency regulation
- Dynamic tariff response; energy arbitrage
- Contingency backup power
- Deferral of electrical equipment upgrade

How does ESS reduce your demand charge?

- Demand charge ($/kW per month) of a facility is commonly set higher than the average load to account for peak periods.
- ESS can reduce power intake from the grid during peak periods by supplementing the additional power.
- This reduces the power draw from the grid, therefore reducing the contracted capacity required.

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Energy Efficiency Retrofit

Air-conditioning and lighting typically makes up **more than 50%** of a building's total energy consumption.
30-60% energy cost reduction can be achieved via optimisation and retrofit to energy efficient models.

Complimentary energy audit of the building.
Understanding the existing system, operational schedule and requirements.

Assess situation and evaluate system equipment upgrades.
Non-obligatory proposal is provided to the client.

Upgrades can be fully financed; no upfront costs required.
Equipment and project management of the retrofit are included.

Potential co-sharing of monthly cost savings with the client.
Contract duration is based on amount of savings shared.

Warranty and maintenance provided during contract period.
Operating risks are fully covered.

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Selected Project References

Lighting retrofit and optimisation is a low-lying and fast turnaround upgrade that can provide substantial savings. Sunseap is experienced in managing a **variety of unique operational environments**.

SingPost Paya Lebar Headquarters

Postal sorting facility and offices

Scope:
Retrofitting of high bay lighting at postal sorting areas and common area lighting to LED.

Retrofit duration: 4 months
Monthly energy savings: 137,000 kWh
Monthly cost savings: $17,000

Hamilton Sundstrand Asia Pacific (Changi)

Aerospace component production facility

Scope:
Retrofitting of high bay lighting at precision engineering production area.

Retrofit duration: 2 months
Monthly energy savings: 35,000 kWh
Monthly cost savings: $4,000

Selected Project References

Lighting retrofit and optimisation is a low-lying and fast turnaround upgrade that can provide substantial savings. Sunseap is experienced in managing a **variety of unique operational environments**.

Woodlands Horizon
Flatted factory

Scope:
Retrofitting of driveway and common area lighting to LED.

Retrofit duration: 1 month
Monthly energy savings: 21,000 kWh
Monthly cost savings: $4,500

Storhub; 9 sites across Singapore
Self storage facilities and offices

Scope:
Installation of solar PV system
Retrofitting of air-conditioning system
Installation of green roof system

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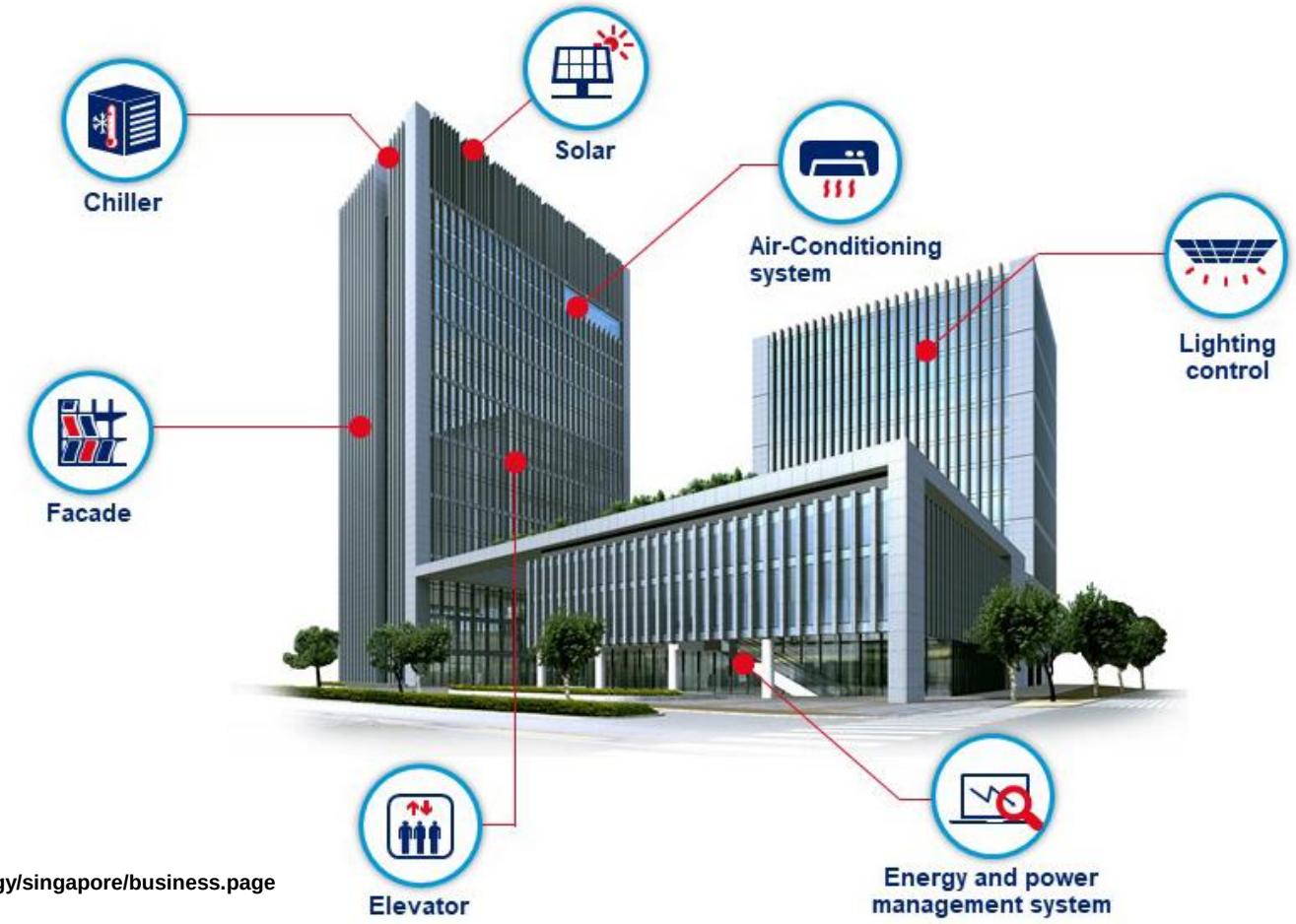
Defraying upfront costs with bank financing

UOB's U-Energy is Asia's first integrated financing platform that simplifies the adoption of energy efficiency projects. With this platform, building owners can easily connect with U-Energy partners (energy service companies (ESCOs)), and access flexible financing options for their energy efficiency projects.

U-Energy and its partners support air-conditioning, chiller, elevator, energy and power management system, façade, lighting control and solar projects across commercial, industrial and public buildings.



https://www.uobgroup.com/u-energy/singapore/business.page

Benefits of Green Roofs

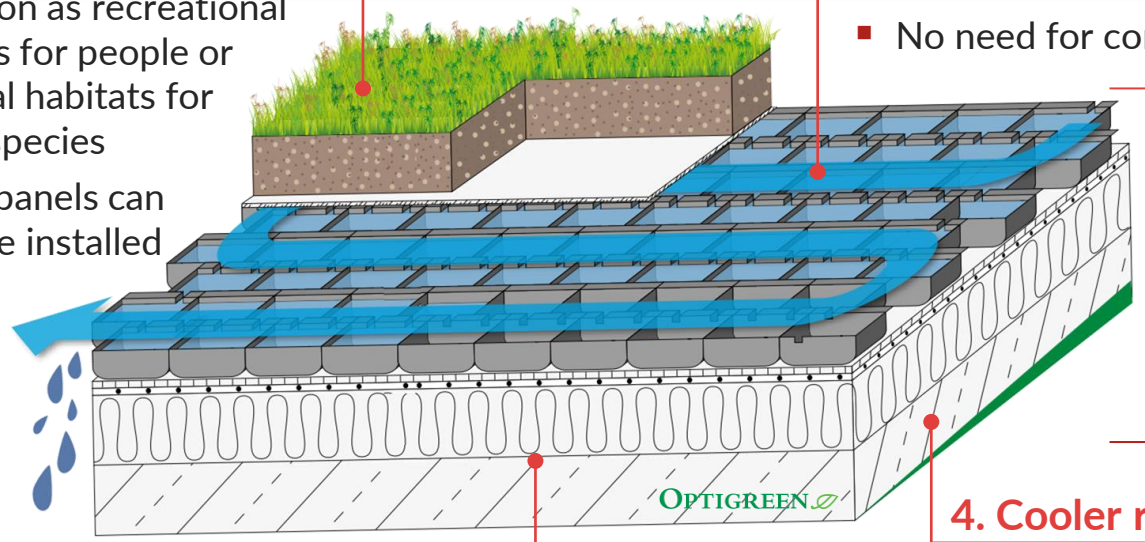
"Nature on superstructure". Apart from its aesthetic value, green roofs play a functional role in the greater picture of urban sustainability. We are the regional distributor for Optigreen® green roof solutions.

1. Productive space

- Green roofs can function as recreational spaces for people or natural habitats for local species
- Solar panels can also be installed

2. Improved water retention

- Retains 40-80% of annual rainfall
- Reduce flash floods and damages
- No need for complex drainage systems



3. Lightweight

- Total wet weight from 1.5 kN/m^2 or 150 kg/m^2
- The green roof layers can be loose-laid onto the roof

4. Cooler roofs

- Green roofs cut down heat transmission by up to 90%, reducing cost for cooling

5. Reduced roof maintenance

- Green roofs protect the waterproofing layer from exposure to the elements, reducing degradation and doubling its lifespan

Incentives

- NParks can co-fund up to **50% of installation costs** for existing buildings

For more information: https://www.nparks.gov.sg/skyrisegreenery/incentive-scheme

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Solar Green Roof

At Sunseap, we constantly push the boundaries of innovation. This rooftop is made up of a combination of solar PV system and Optigreen® green roof system to achieve enhanced roof durability and productivity.

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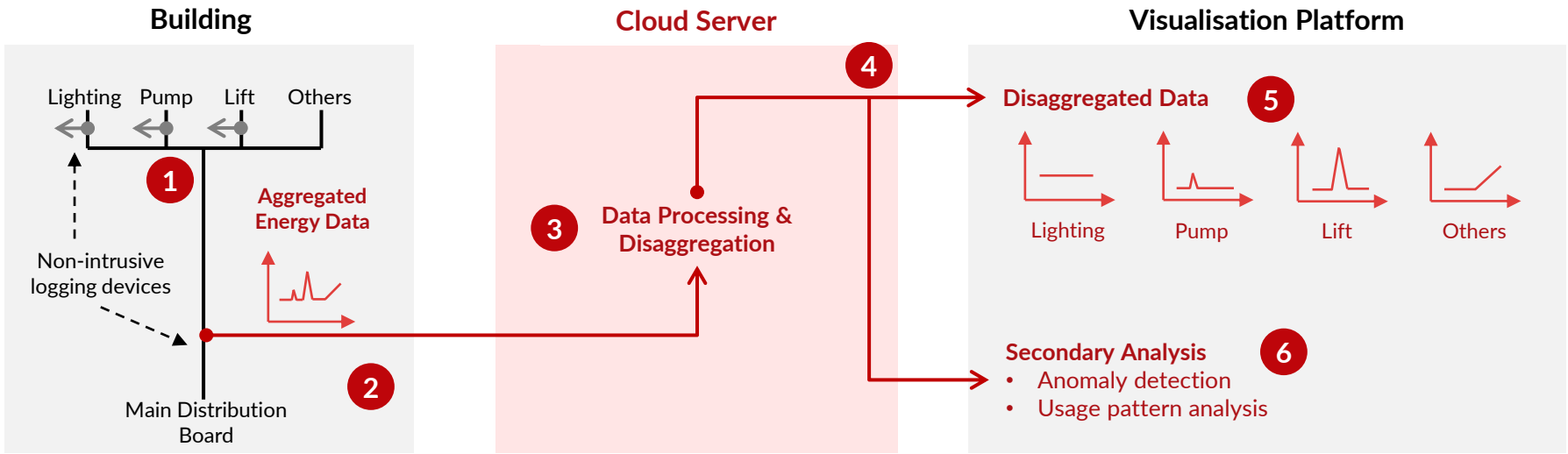
Energy Intelligence and Monitoring

Suited for existing buildings and facilities that are looking for a hassle-free approach in **energy monitoring and data analysis, provide actionable insights and realise potential cost savings.**

How it works:



1. Temporary logging of individual loads for machine learning via non-intrusive logging instruments.

2. Raw energy data is collected at the main distribution board.

3. Data is processed and disaggregated by an artificial intelligence algorithm.

4. Disaggregated data and analysis results are sent to a visualisation platform.

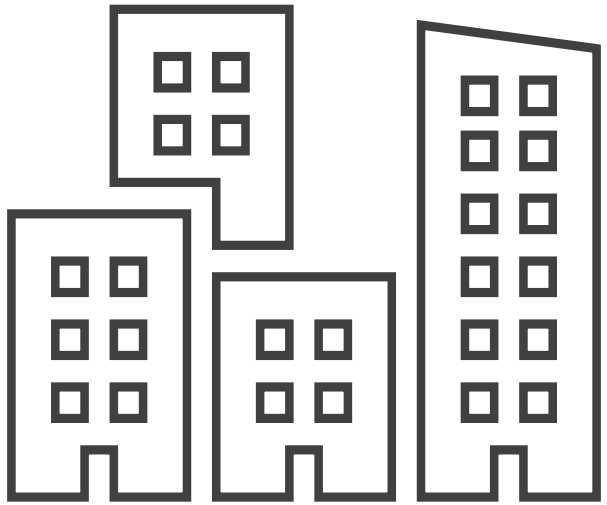
5. Energy data of individual electrical loads are displayed on the building management system platform.

6. Secondary analysis and status assessment of these loads can also be integrated with automatic response systems.

We are here to help

Sunseap can assist your transition to a low-carbon future through our unique set of solutions.

Building & Infrastructural Assets



- ✓ Meet regulatory requirements
- ✓ Reduce energy costs
- ✓ Achieve sustainability objectives

Energy Efficiency & Decarbonisation Potential

Roof

- **Solar PV System**
- Green Roof System

Building Systems

- Energy Audit, Green Mark
- **Lighting retrofits**
- **EV Charging**

Energy sources

- **Energy Storage**
- Virtual Power Plant

Energy Intelligence

- Non-intrusive Load Monitoring
- Maintenance Optimisation

Electricity Supply

- **Clean Energy**
- Renewable Energy Certificates
- Brown Energy

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Sunseap Group of Companies

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