2022 Singapore Sustainability Update

Adaptations and changes in the Built Environment

1 INTRODUCTION

From the onset of the 21st century, Singapore embarked on her journey towards being a sustainable nation. Sustainability was a hot topic ever since independence with our first Prime Minister Mr. Lee Kuan Yew understanding our lack of natural resources would pose a major threat to our nation's survival.

Fast forward to 2022, we are now embarking on The Singapore Green Plan 2030 which is a national sustainability movement which seeks to rally bold and collective action to tackle climate change.

The Green Plan charts ambitious and concrete targets over the next 10 years, strengthening Singapore's commitments under the UN's 2030 Sustainable Development Agenda and Paris Agreement, and positioning us to achieve our long-term net zero emissions aspiration as soon as viable.

This paper seeks to highlight the five key programs of the Green Plan.

2 CITY IN NATURE

About 200 hectares will be set aside for nature parks and every household will live within a 10-minute walk of a park. By planting one million more trees across our island, which will absorb another 78,000 tonnes of CO2, we will enjoy cleaner air, cooler temperatures and more shaded areas. By 2030, Singapore will be a green and beautiful City in Nature.

3 ENERGY RESET

While large scale renewable energy project may not be feasible, our focus turns to being more energy efficient and use of clean energy via shifting to natural gas as the cleanest source of fossil fuel. The deployment of solar energy in 2030 is envisaged to be five times of today. Furthermore, 80% of all buildings will be green mark certified by 2030 (as of end 2021, 49% of Singapore's buildings have been greened) and 80% of new buildings (by Gross Floor Area) to be Super Low Energy buildings from 2030 with the public sector taking the lead (See Annex A for SLE Roadmap). Plans are in place for urban settings to create the ideal environment to fully embrace electric vehicles (EVs). Combined, all these efforts will reduce our energy consumption by more than 8 million megawatt hours per year which in turn reduces domestic greenhouse gas emissions by at least 3 million tonnes per year by 2030.

4 GREEN ECONOMY

In February 2022, as announced by Minister for Finance Mr. Lawrence Wong at Budget 2022, Singapore will raise our climate ambition to achieve net zero emissions by mid-century. To enable the transition to a low-carbon future, we will raise the carbon tax levels progressively from 2024. This will support our climate ambition and secure a greener and more sustainable living environment for future generations, while being economically competitive in a low-carbon future. (see Annex A for Carbon Pricing Act)

With the roll out of the 2019 broad-based carbon tax, projects that help enterprises reduce their greenhouse gas emissions are being strongly supported. Singapore has made good progress in green fiancé and the vision is to become a leading centre for Green Finance in Asia and globally.

Tackling climate change is a key competitive advantage and will present new opportunities for growth and job creation. Companies can tap on the new Enterprise Sustainability Programme to develop capabilities in this area to ride this green wave. Home-grown innovations will be encouraged under the Research, Innovation & Enterprise Plan 2025, as we attract companies to anchor their R&D activities in Singapore to develop new sustainability solutions for the world.

5 RESILIENT FUTURE

There is a need to safeguard our future and preparations are underway to deal with climate change that will last into the next century, building up our national resilience for the future. By increasing greenery and piloting the use of cool paint on building facades, we will moderate the rise in urban heat.

As a food loving nation, we must make our food supply more resilient. We have announced our 30-by-30 target – to meet 30% of our nutritional needs through locally produced food by 2030.

6 SUSTAINABLE LIVING

Living in a circular economy, with a high rate of recycling, means that precious resources can be reused such as NEWater. New initiatives like turning incineration bottom ash into NEWSand for use in construction can contribute to our target to reduce waste to landfill by 30% by 2030.

There are nationwide initiative to raise awareness on sustainability and empower citizens to reduce their carbon footprint via increasing use of mass public transport from 64% to 75% by 2030. Meanwhile, we will encourage walking, cycling and active mobility by expanding our cycling network from 460 km to around 1,320 km by 2030.

7 CONCLUSION

The move towards sustainability in the industry is inevitable as the world is similarly moving in the same direction. Countries around the world are adopting green solutions such as solar, hydro and wind energy. Iceland for example, now gets almost 100% of its energy from renewable sources and it does so from hydroelectricity and its geothermal power plants. In Singapore, there is a greater urgency to do so as we cannot rely on our neighboring countries to fulfil our needs. This will continue to remain as a vital ingredient for our growth as a nation as we move ahead in nation building and development.

ANNEX A

THE CARBON PRICING ACT (CPA)

The Carbon Pricing Act (CPA) and its accompanying Regulations came into operation in Singapore on 1 January 2019. The tax is applied on facilities that directly emit at least 25,000 tCO2e of greenhouse gas (GHG) emissions annually. In all, the carbon tax currently covers 80% of our total GHG emissions from about 50 facilities from the manufacturing, power, waste, and water sectors. Facilities in other sectors would also indirectly face a carbon price on the electricity they consume as power generation companies are expected to pass on some degree of their own tax burden through increased electricity tariffs.

In this framework taxable facilities will also have to pay a carbon tax set at a rate of S$5 per ton of carbon emissions from 2019 to 2023. However, this is set to be raised to S$25/tCO2e in 2024 and 2025, and S$45/tCO2e in 2026 and 2027, with a view to reaching S$50-80/tCO2e by 2030. The progressive and phase increase of the carbon tax is a key strategy to assist businesses to transit to a low carbon economy.

The main purpose of the carbon tax is to penalize industries that produces heavy carbon emissions since the higher the emissions the higher the tax. On the other hand, however, the government is also encouraging the shift to sustainable practices with the introduction of grants such as the Energy Efficiency Fund when stakeholders shift to more energy efficient practices.

SUPER LOW ENERGY (SLE) BUILDING TECHNOLOGY ROADMAP

The previous editions of the Green Building Masterplan had set a target of greening 80% of Singapore's buildings (by gross floor area, GFA) by 2030. As of end 2021, 49% of Singapore's buildings have been greened.

To further enhance the efforts on sustainability, the Building and Construction Authority (BCA) is embarking on the Super Low Energy (SLE) Building Technology Roadmap as shown in figure 1.

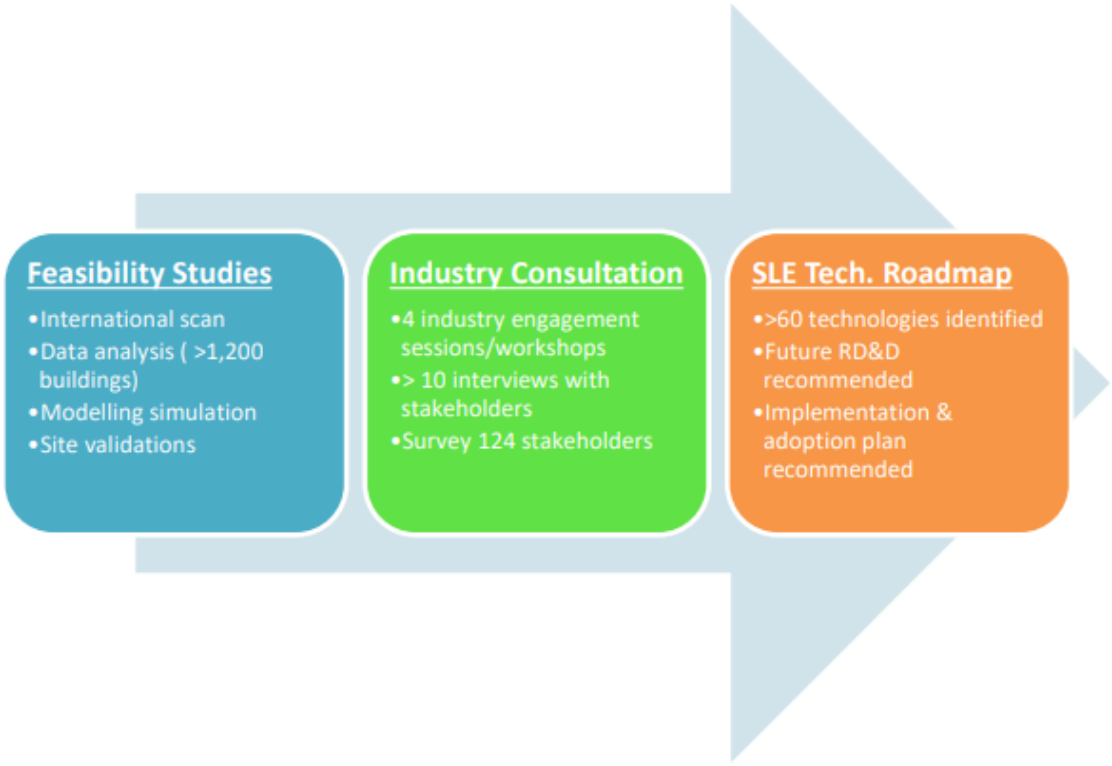

Figure 1 Super Low Energy (SLE) Building Technology Roadmap

As buildings consume one-third of the nation's total energy consumption it is crucial that these buildings reduce or possibly eliminate emissions. One of the 2030 targets is to have 80% of new buildings (by Gross Floor Area) to be SLE buildings. This is currently being achieved by incentives such as the Green Mark scheme where developers/building owners can get grants or additional GFA should they attain a higher tier Green Mark rating.

An SLE building is defined as the best-in-class performing Green Mark Building that achieve at least 60% energy savings. To move towards that direction BCA has come up with the development of the SLE technology roadmap. This roadmap defines initiatives which start as early as the design stage.

7.1 Passive Strategies

From the onset of design, it is important that developers ensure designers work towards implementing passive solutions which help to facilitate energy usage during operations. These initiatives could come in the form of sun shading, daylight optimization and allowing natural ventilation. For example, at Changi Airport Terminal 3, designers opted for the use of skylights to optimize natural lighting in the terminal's departure hall.

7.2 Active Technologies

Active systems, typically mechanical systems such as air conditioning, mechanical ventilation, lighting, vertical transportation, etc, are responsible for the bulk of the energy consumption in a building. Having design and allow for efficient equipment, it will drastically reduce energy

consumption. With reference to the example at Changi Airport Terminal 3, the air conditioning distribution vents are located close to the ground instead of the ceiling. This drastically reduces the energy requirement where instead of cooling the whole space, only the circulation areas are being cooled.

7.3 SMART ENERGY MANAGEMENT SYSTEM

Having a smart Building management system (BMS) would leverage on technology to monitor and manage energy use in the building. This works on control sensors to automatically turn on or off systems as and when it is required.

7.4 RENEWABLE ENERGY TECHNOLOGIES

Lastly, turning to renewable technologies will help reduce the building's need for energy consumption, the most common being solar energy. It is the most feasible source of renewable energy for buildings in Singapore and in recent years the country has seen a significant rise in the number of buildings adopting this technology in their buildings.

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