

Building and Construction Authority



SINGAPORE GREEN BUILDING MASTERPLAN PUBLIC ENGAGEMENT REPORT

February 2021



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Introduction

1 As Singapore is a highly urbanised island state, buildings account for over 20% of the nation's carbon emissions. Green buildings are hence an important part of Singapore's climate change mitigation strategy. In 2005, the Building and Construction Authority (BCA) launched the Green Mark scheme to promote sustainable and environmentally friendly buildings in Singapore. Together with green advocates from industry and academia, we also initiated the formation of the Singapore Green Building Council (SGBC) in 2009. Since then, SGBC has played a key role in driving the green building movement in Singapore. To-date, more than 40% of our buildings (by gross floor area [GFA]) have been greened. To green 80% of Singapore's buildings by 2030, BCA and SGBC are working with key stakeholders on the next Singapore Green Building Masterplan¹ (SGBMP) to push the boundaries of energy efficiency and environmental sustainability in buildings.

2 To do so, we need all stakeholders onboard. The co-creation of the SGBMP deeply involved a total of 82 industry stakeholders, from different points of the value chain such as architects, consultants, developers, engineers, contractors, suppliers, researchers and others, as part of the SGBMP working committee. Members of the Committee were involved in different taskforces that looked into developing the next vision and outcomes of the next lap of our green buildings journey, as well as the initiatives to get there. With a better understanding of the barriers faced by the built environment (BE) sector stakeholders and the industry's potential to stretch for higher targets, the Committee can collectively develop SGBMP initiatives that will effectively help drive the green building agenda forward.

3 To sustain this push for the green building agenda, a healthy ecosystem with enough demand drivers and enablers is required. Since the beginning of 2020, the Committee has been reaching out to the wider community and other stakeholder groups such as Financial

¹ The SGBMP is part of the Singapore Green Plan 2030 which aims to strengthen our existing national sustainability efforts.

Institutions in a concerted effort to better understand their views on green buildings and generate a broader mind share for the SGBMP. The key engagement outcomes are to:

- Raise awareness of the urgency to take climate action and how green buildings are a key strategy to mitigate climate change;
- Build a shared vision for the SGBMP through stakeholder engagement; and
- Seek wider support on the benefits of green buildings and greater involvement in ground-up environmental sustainability initiatives.

4 We deeply appreciate the participation by all who have shared their views, suggestions, comments and engaged in robust focus group discussions and through various online platforms, especially during uncertain times of the COVID-19 pandemic. From March to November 2020, we have reached out to more than 5,000 individuals through various engagement initiatives to gather insights for the development of the SGBMP. This report presents the findings and key suggestions from the discussions and public engagement initiatives.

Overview of Engagement

5 In the development of this fourth edition of Singapore's Green Building Masterplan (SGBMP), we had obtained views from an even wider group of stakeholders on how Singapore can advance together in the next lap of our green buildings journey and push the boundaries of energy efficiency and environmental sustainability in buildings. Stakeholders participated and provided views via a mix of engagement workshop, survey and digital engagement initiatives.

Engagement Exercise

6 In early 2020, the inaugural SGBMP Engagement cum Visioning Exercise was held at BCA Braddell Campus to set the vision and key outcomes ahead for Singapore's green built environment. There were approximately 100 invited participants who are industry leaders, and representatives from Trade Associations & Chambers (TACs), Institutes of Higher Learning (IHLs), public agencies, as well as future leaders of the built environment industry and youths.



7 The half-day Exercise began with a series of short sharing by industry leaders on the global trends and challenges of the built environment; current initiatives and aspirations by various stakeholders across the value chain from developers to end-users including youths,

to set the context for the focus group discussions². Participants were split into groups for further discussions on what should be the shared vision and key outcomes for the SGBMP, followed by sharing of key insights per group and a panel discussion. Each group had a good mix of industry, agency, academia and youth representation to encourage candid sharing of opinions and better appreciation of diverse perspectives.

Digital Engagement

8 A mix of digital engagement initiatives were also introduced from March to November 2020, to reach out to more members of the public.

Public Perception Survey (March to September). The survey aimed to gather preliminary insights on the public perception of green buildings and their readiness to take stronger action in mitigating climate change as well as ideas on possible initiatives to further our Green Buildings journey. We had developed three versions³ of the survey with slight variations in questions to cater to different core groups: the public, built environment industry practitioners and students. We received close to 3,500 responses, of which about 65% of the respondents were youths (< 35 years old). We had worked with the SGBC, various public ministries/agencies, TACs, IHLs, industry partners and youth environmental clubs/interest groups to share the survey through existing channels (i.e. websites, mailing lists) and social media platforms to gather responses.

Digital Engagement (May to September). As an extension of the visioning exercise, we leveraged digital initiatives⁴ to obtain further inputs from public on the shared vision for SGBMP. With the impact from COVID-19, we also ran a separate poll to seek built environment industry practitioners' views on priority areas for green buildings to better respond to pandemic situations, and potential impact on carbon emissions from buildings. Views were gathered via Mentimeter and hosted on SGBC's dedicated webpage on the

² For more details on the focus group discussion questions, please refer to Annex A.

³ The proportion of survey responses obtained are as follows: general public (41%), industry (10%) and students (49%).

⁴ For more details on the digital engagement platform, please refer to Annex B.

SGBMP [<https://sgbc.sg/sgbmp>] where respondents could find out what others are saying in real-time. More than 600 responses were gathered.

Public Poll on SGBMP Tagline (September to November). From public suggestions gathered via the perception survey and other engagement initiatives, the Committee had shortlisted five taglines for a public poll, carried out via Mentimeter to garner stronger support and shared responsibility for the SGBMP. The participation and results links were hosted on BCA website and shared on BCA, SGBC, supporting agencies, organisations and groups' social media platforms. More than 850 votes were submitted for the SGBMP tagline.

9 To gather more feedback and suggestions from public, we actively encouraged participation and sharing of views by publicising the above initiatives via webinars and social media. During the digital International Built Environment Week held in September 2020, we organised an engagement session for people interested to find out more about the SGBMP and provide more opportunities for them to share their views.

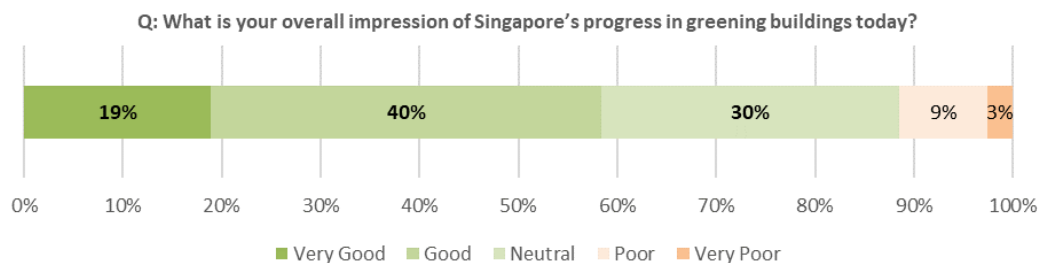
Findings and Key Suggestions

Current sentiment and public perception of green buildings

10 From the public perception survey on green buildings, some insights can be drawn about the current sentiments and perception towards green buildings.

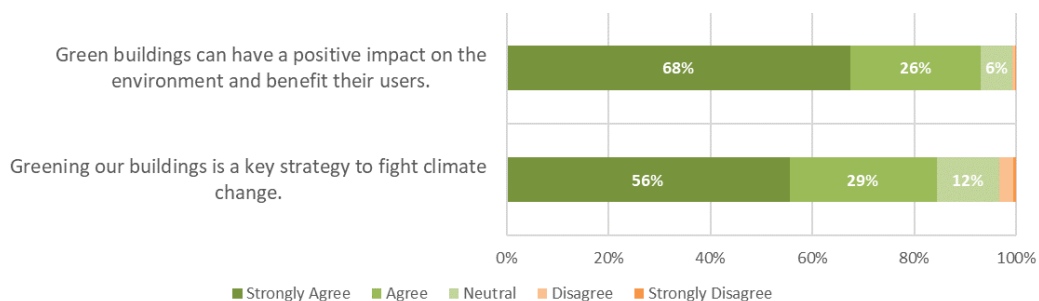
Positive impressions of Singapore's progress in green buildings

- Overall, close to 9 in 10 survey respondents had very good, good and neutral impressions of Singapore's progress in greening buildings today.
 - 59% of respondents had indicated a very good and good impression.

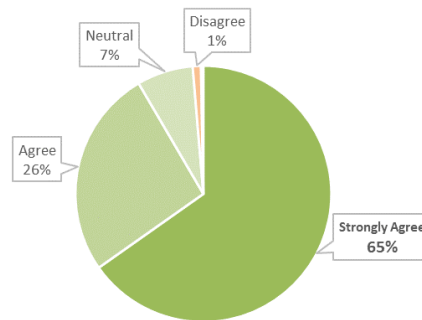


High level of awareness and strong sense of urgency for green buildings as a climate change mitigation strategy

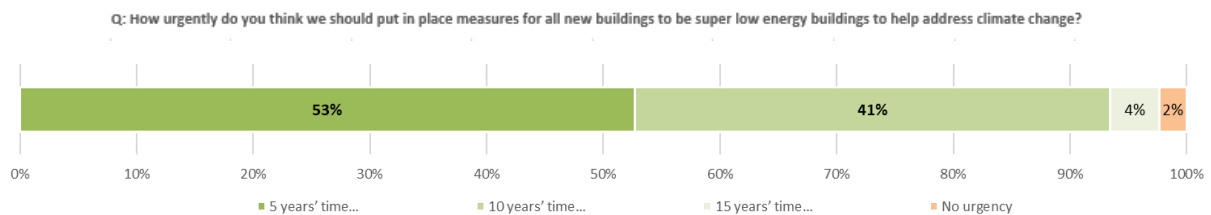
- There was a high level of public awareness of green buildings as a key climate change mitigation strategy; and strong agreement on the need to do more to green our buildings
 - 85 – 94% of respondents were aware of the positive impact of green buildings and recognised them as a key strategy to fight climate change.



- 91% of respondents agreed that we need to do more to green our buildings to tackle the impact of climate change.

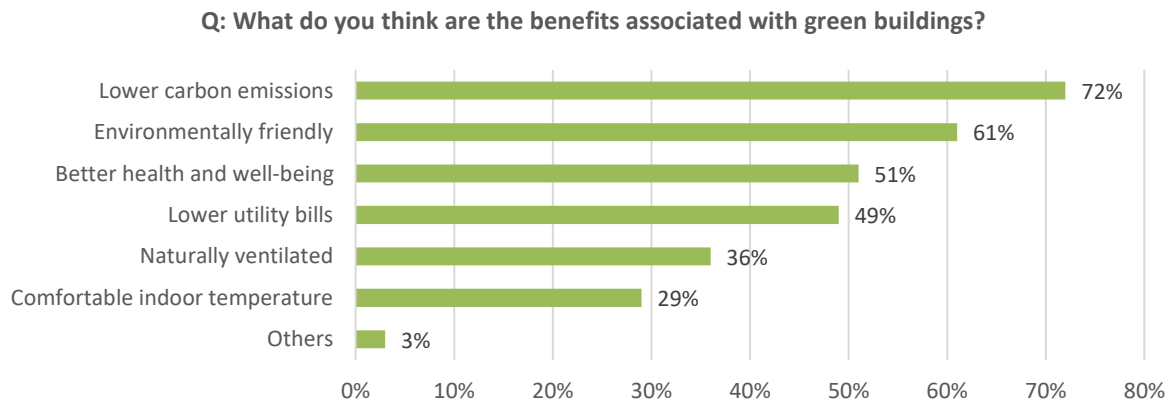


- There was a strong sense of urgency to take climate action through greening Singapore's built environment in the next 5 – 10 years.
 - 94% of respondents viewed that more urgent measures should be put in place in the next 5 – 10 years for all new buildings to be Super Low Energy buildings.



Lower carbon emissions strongly associated as a benefit of green buildings

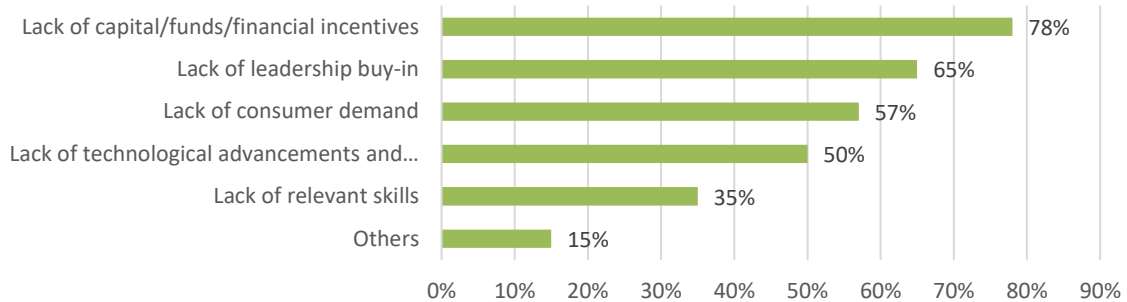
- Respondents commonly associated 'lower carbon emissions' (72%), 'environmentally friendly' (61%), 'better health and well-being' (51%) and 'lower utility bills' (49%) as the benefits of green buildings.



Lack of capital / funds as the biggest challenge faced by practitioners

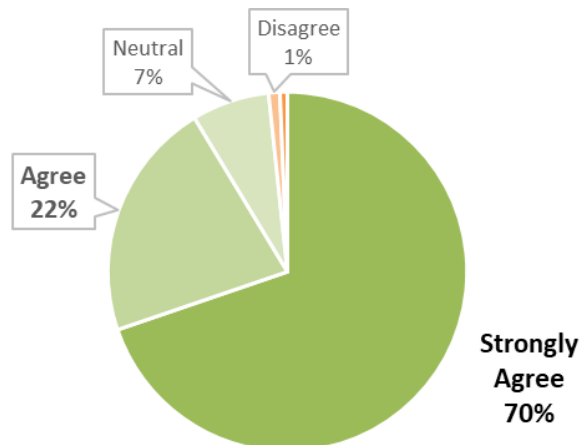
- Industry practitioners indicated that **‘lack of capital/funds/financial incentives’ (78%)**, ‘lack of leadership buy-in’ (65%) and ‘lack of consumer demand’ (57%) were the top three challenges for Super Low Energy buildings today.

Q: What do you think are the top 3 challenges for Super Low Energy green buildings today?

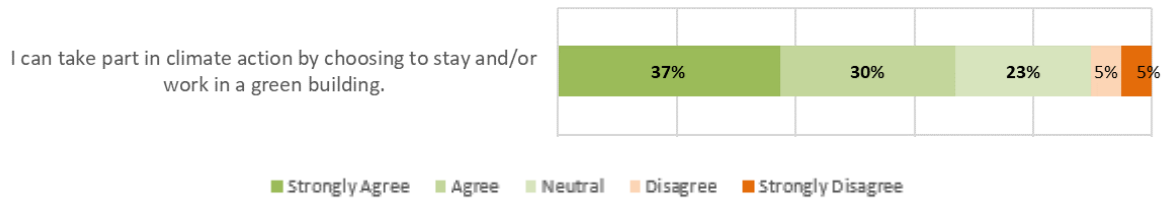


Strong agreement on collective and individual responsibilities to take climate action with green buildings

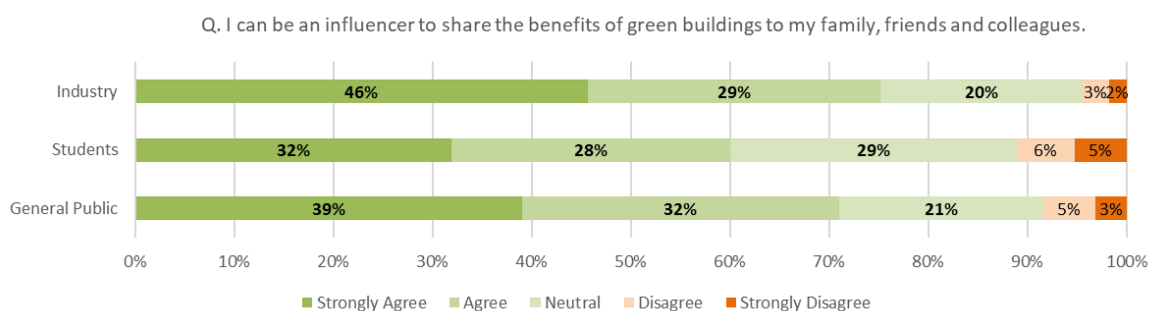
- 92% of respondents agreed that buildings' use of energy over its lifespan will negatively affect future generations if we do nothing.



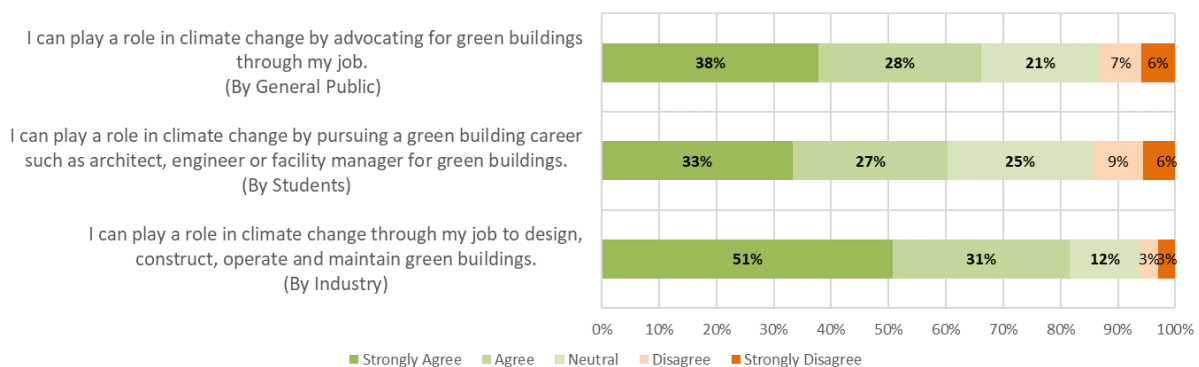
- 67% of respondents agreed that making choices to live/work in green buildings are ways to take climate action. Results were consistent across the different core groups.



- Industry (75%), General Public (71%) and Students (60%) respondents agree to share the benefits of green buildings in their spheres of influence.



- On willingness to take individual actions through vocations, Industry respondents strongly agreed on their roles in taking climate action through greening Singapore's built environment.
 - 82% of Industry respondents agreed that they can play a role in climate change by taking individual actions through their job compared to General Public (66%) and Students (60%) respondents.



11 From the responses gathered through our digital engagement, there was consensus that some long-term improvements would need to be made in the workplace, learning space and home environment following the COVID-19 pandemic. Respondents also pointed out that certain aspects of buildings can be improved to be more future-ready to mitigate against threats such as climate change and pandemics.

Suggestions for improvement

Work nature

- Digitalise work processes and place greater emphasis on digital solutions
- Employers and employees need to be adaptable and open to changing the nature of their work i.e. greater use of technology, increase number of virtual meetings, portability of workspace

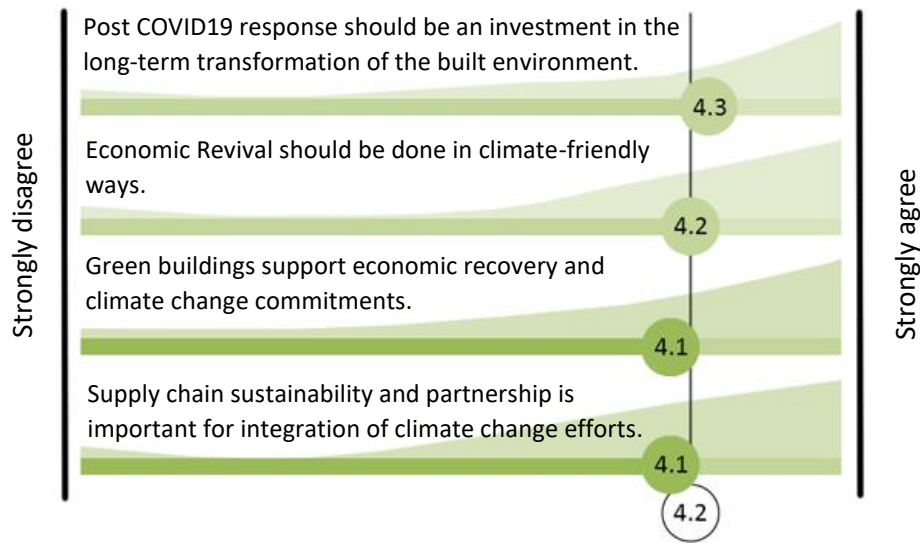
Space planning

- Free up office spaces in central areas for other purposes like housing and recreation
- Better home design considerations for greater integration of work, learning, exercise and play environments

Building design and operations

- Design for more natural ventilation and reducing air-conditioned spaces
- Flexibility in spatial designs to allow greater adaptability and reconfiguration for diverse needs
- Incorporate more health and wellness considerations in building design and operations i.e. better indoor air quality and hygiene with regular disinfectant treatments, contactless technologies
- Greater use of smart controls and data monitoring for preventive maintenance of building systems

Respondents also had similar key sentiments on the approach for green buildings post-COVID-19.



Picture: Public's views on approach for green buildings considering COVID-19 via Mentimeter

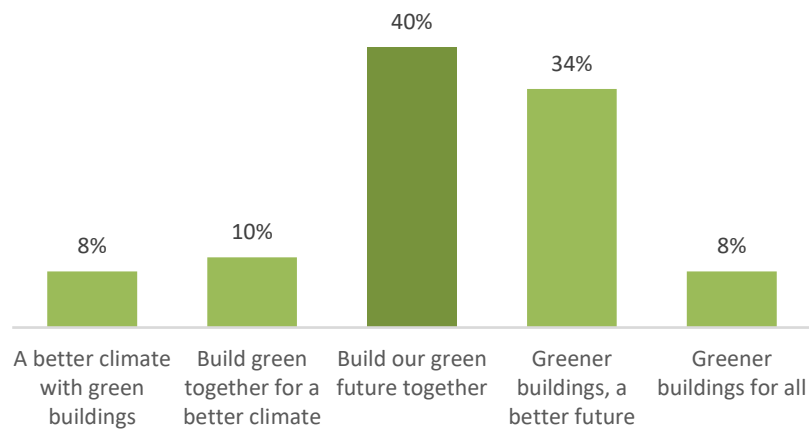
Views on the ambition for the Built Environment

12 The key engagement takeaways on the vision for the built environment included:

- *The need to **set higher and more ambitious green standards** as buildings have a long lifespan; building standards set now will be locked in for a long time*
- *The need to **push for quicker and greater adoption of Super Low Energy buildings** for both new and existing buildings, as aligned to global climate change movements*
- *An aspiration for Singapore to be **a leading example to other countries for green buildings***

13 The public called for more ambitious climate action targets given the urgent need to address climate change. Some participants shared that ***as buildings have a long lifespan, there is a stronger case to set higher minimum standards for buildings.*** There were also suggestions from participants ***to consider setting targets in two-year or five-year cycles for better tracking and measurement of performance and effectiveness of the initiatives.***

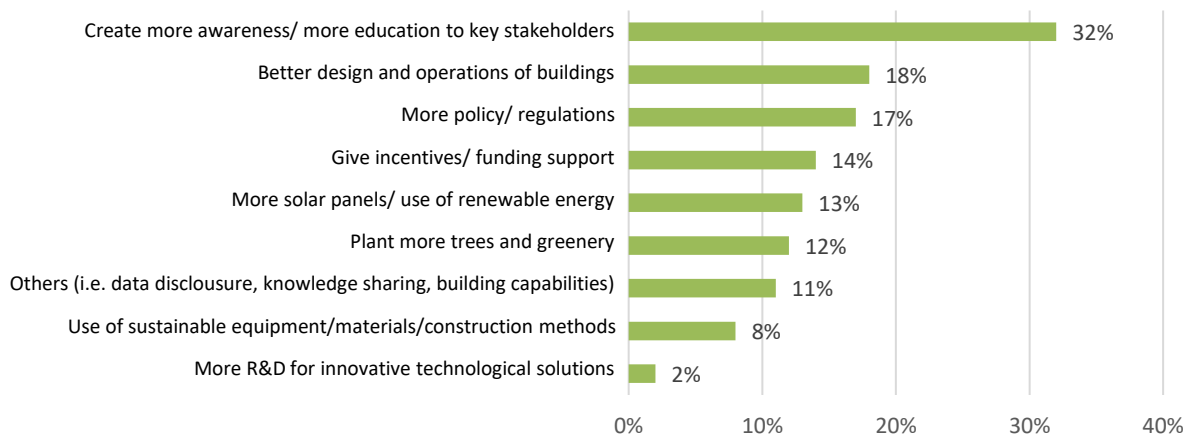
15 From the public poll on suitable tagline for SGBMP, the option with the highest vote was ***'Build our green future together'***.



Picture: Results for Public Poll on SGBMP Tagline

Suggestions on what more can be done for the green buildings sector to address climate change

16 From the public perception survey, respondents gave various suggestions⁵ on how and what more could be done for the green buildings sector to address climate change. A summary of their suggestions is shown below.



⁵ More detailed feedback and suggestions from each category can be found in Annex C.

Next Steps

17 Overall, the feedback and insights showed strong public agreement and awareness on the need to do more to green our buildings for climate action with a sense of urgency to take climate action through green buildings in the next 5-10 years. This calls for more ambitious goals to be set. Also, suggestions received on how we can do more for the green buildings sector to address climate change will be evaluated and carefully considered in the development of initiatives and programmes under the SGBMP.

18 The survey findings had revealed a gap between awareness and agreement on individual responsibility to act. There were also greater calls for more public education and awareness on the benefits of green buildings to encourage behavioural change. Therefore, we will continue our engagement initiatives with key stakeholder groups, including youth and homeowners, on green buildings to close this gap. This includes a digital public campaign on the benefits of green buildings, and an online training programme for individuals (and their organisations) who are interested in starting behavioural change campaigns to encourage environmentally sustainable behaviours in their premises.

19 The Committee would like to thank all respondents for their contributions over the past few months of engagement for the SGBMP. The Committee will consider the views and suggestions when finalising the recommendations for the masterplan. We have also received many suggestions beyond the scope of the SGBMP and may be unable to address all of them. Nevertheless, we will analyse the feedback and adopt suitable suggestions in our ongoing review of green building efforts as we *'Build our green future together'*.

For more information on the Singapore Green Building Masterplan, please visit

<https://go.gov.sg/sqbmp>.

Annex

Annex A – SGBMP Engagement cum Visioning Exercise

Focus Group Discussion Questions:

- Topic 1: Need for higher aspiration for green buildings.

‘Against the backdrop of global rising aspiration and higher climate change commitments, what is the next respectable ambition to be set for the Built Environment?’

- Topic 2: Everyone has a part to play.

‘How do we get there? Can we achieve comfort without air-conditioning (i.e. naturally ventilated SLE buildings)? What are the trade-offs if any? What can you do in your role as an occupant?’

Audience Survey Questions:

1. What are the top 3 benefits for you as an occupant of green building?
 - Lower carbon emissions
 - Lower utility bills (electricity and water)
 - Natural ventilation
 - Comfortable indoor temperature
 - Better health and well-being (e.g. better indoor air quality, greenery)
 - Environmentally friendly
2. Use 3 words to describe the future of green buildings in 2030

Annex B – Digital Engagement

Digital Engagement Questions – General Public

1. Use 3 words to describe the future of green buildings in 2030. [Word Cloud]
2. What is the next respectable ambition to be set for the Built Environment? [Flowing Grid]

Digital Engagement Question – Industry

1. Following the COVID-19 pandemic, what long-term shifts should we make for the workplace, learning space, and home environment?
[Flowing Grid]

E.g. office space remote workforce, real estate footprint, IT infrastructure, technology advancements, home as integrated work play learn environments and vice versa.

2. What are the aspects of green buildings that can be done better in mitigating against pandemic such as COVID-19 or similar pandemics in the future? Please provide an example.
[Flowing Grid]
3. How would our responses to COVID-19 and anti-viral measures in buildings impact the energy consumption in buildings (i.e. opportunities/downsides toward climate change commitments)?
[Flowing Grid]
4. How much do you agree with the following statements?
 - Post-COVID19 response should be an investment in the long-term transformation of the built environment.
 - Economic revival should be done in climate-friendly ways.
 - Green buildings support economic recovery and climate change commitments.
 - Supply chain sustainability and partnership are important for the integration of climate change efforts.

[Scale – Strongly Disagree to Strongly Agree]

Annex C – Detailed Feedback and Suggestions from the Public Perception Survey

Category	Consolidated Feedback and Suggestions
Education/ Raise awareness	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>Need for greater communication to all stakeholders (young to old) to get the buy-in and bring relevant stakeholders on board:</i> <ul style="list-style-type: none"> • A targeted suite of initiatives to address concerns and demands of the various parties of the value chain (e.g. developers, consultants, shareholders, consumers, occupants) • Key stakeholders to communicate the constraints they faced and work together on solutions to overcome them <p>Feedback</p> <ul style="list-style-type: none"> • Building professionals have a desire to design, construct and operate green buildings but shared that there was limited demand and interest from end-users and consumers who are less willing to pay for green buildings <ul style="list-style-type: none"> - <i>Public outreach messages on green buildings need to be relatable and challenge common misconceptions associated with green buildings:</i> <ul style="list-style-type: none"> • Raise awareness on benefits of green buildings to increase public demand for green buildings • Look beyond infrastructure and focus on consumption patterns, and encourage end-users to make lifestyle or behavioural changes • Emphasise a life-cycle viewpoint for buildings due to their long lifespan and make business decisions with long-term savings in mind in addition to the immediate payback period. <p>Feedback</p> <ul style="list-style-type: none"> • Environmental groups struggle in communicating the significance of impact to and by individual on environmental topics where they can often be indirect and seemingly distant • Businesses and individuals who are struggling financially are less inclined to consider life-cycle costs and benefits but will be more sensitive to upfront costs and guided by this when making purchasing decisions. <p>Feedback</p> <ul style="list-style-type: none"> - <i>Green building messages to better engage youths:</i> <ul style="list-style-type: none"> • Youths may feel anxious about the future when climate action goals and tasks ahead seem daunting and pressing timeline. Hence, there is also an increasing desire by youths to see actions of a larger scale.

	<ul style="list-style-type: none"> Green building as career is appealing to youths. With increasing awareness in climate action, youths want to avoid sectors that are environmentally destructive and wish to know more about emerging areas such as green building related jobs as career options. <p>Suggestions</p> <ul style="list-style-type: none"> Link environmental sustainability to social issues which can resonate with youths Promote green building messages with youth green groups
Building design and operations	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>Next lap of building design to focus on passive and holistic designs that consider facilities management and occupants' well-being:</i> <ul style="list-style-type: none"> Design considerations to be intentional in reducing energy consumption (i.e. use of natural ventilation, better cross ventilation, modular space design for easy reconfiguration/repurposing for different functions) and optimise space allocated for renewable energy deployment Building design should reduce resource usage by considering life-cycle principles (i.e. use of environmentally friendly/recycled building materials for construction and interior design and rainwater harvesting) - <i>Commitment from building owners to review building management policies and operations for better resource utilisation and reduce wastage:</i> <ul style="list-style-type: none"> Use of digital visitor registration and ban bottled water Practise smart facilities management and use technologies (i.e. smart controls and scheduling) for better on-demand energy management and reduce wastage - <i>Increase greenery, improve indoor environment quality for better health and well-being of occupants, and engage tenants and end-users on sustainable behaviours.</i>

Policy and regulations	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>Greater focus on the following areas in upcoming policies:</i> <ul style="list-style-type: none"> • Encourage more green buildings with a stronger focus on existing buildings as well as building types such as residential buildings as they occupy a large footprint • Encourage retrofitting, repurposing and refurbishing of existing buildings instead of building new ones • Encourage the public sector to take the lead in greening public buildings (i.e. public residential, schools, community spaces) • Encourage businesses and individuals to act, and co-ordinate efforts amongst government agencies to maximise the impact of outreach and initiatives (e.g. urban planning for integration of solutions) - <i>Set more ambitious targets and consider both operational and embodied⁶ carbon emissions in policies for holistic climate change mitigation:</i> <ul style="list-style-type: none"> • For new buildings to have net zero emissions and existing buildings to achieve net zero • Need to view the entire value chain from material sourcing to end-of-life and consider both operational and embodied carbon emissions in policy decisions • Greater recognition for initiatives that reduce carbon emissions beyond energy efficiency under the BCA Green Mark scheme - <i>Introduce new mandatory requirements to collectively upgrade all buildings towards better performance:</i> <ul style="list-style-type: none"> • Raise minimum environmental standards for all buildings • Make it mandatory for all new buildings to be built to meet ambitious green standards • Introduce green requirements on buildings in land sales to developers • Introduce disincentives on existing buildings for not meeting minimum environmental standards • Implement restrictions on emissions per building based on gross floor area (GFA) and building type or introduce a cap allowable Energy Utilization Index (EUI) for different building types
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⁶ Embodied carbon refers to the carbon emissions associated with materials and construction processes throughout the whole lifecycle of a building. (WorldGBC, 2019)

Incentives/ Financial support	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>More financial incentives and support to strengthen the business case for green buildings:</i> <ul style="list-style-type: none"> • Bank and capital providers could recognise and reward green buildings with lower interest rates (e.g. green financing loans) • Greater support and ease of securing green loans for smaller companies, encouraging them to green their buildings • Other initiatives include tax incentives, bonus GFA incentives, more funding and grant support, subsidies, and other co-funding mechanisms - <i>A suite of financial incentives and support that are accessible for different stakeholder groups at different stages of the value chain</i> from planning, construction, management, buying/leasing to materials
Renewable Energy (i.e solar energy)	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>Install more solar panels on rooftops</i> of buildings, homes, and other public common spaces where feasible - <i>Explore and encourage the adoption of other renewable energy technologies for buildings</i> such as Building-integrated Photovoltaics (BIPV) panels, hydrogen or fuel cell technologies to generate power for building energy systems - Establish safety guidelines and allow people to set up their own solar panels in their own buildings or homes
Greenery	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>More greenery within and on façades of building</i> <ul style="list-style-type: none"> • Encourage more vertical greenery and rooftop gardens to reduce cooling demand of buildings and help to reduce urban heat island effect • Provide space to allow occupants to create urban farms i.e. rooftop gardening, hydroponics • Introduce indoor greenery requirements for buildings and encourage occupants/homeowners to grow plants and enjoy better indoor air quality

Sustainable construction methods (i.e. equipment, materials)	<p>Suggestions</p> <ul style="list-style-type: none"> - On construction methods, <ul style="list-style-type: none"> • Stronger adherence to circular economy⁷ principles and ensure construction waste and processes do not pollute or harm biodiversity and ecosystems, i.e., waste is properly managed or disposed and channeled for reuse or recycling • Use productive and efficient construction methods (i.e. prefabrication and use of precast concrete) with good planning and coordination of work processes to reduce abortive work and wastage - On equipment selection and operation, <ul style="list-style-type: none"> • Use high energy-efficient chillers and cooling systems, LED lighting with motion sensors, and energy-saving appliances that are readily available in the market - On the selection of materials for construction and renovations, <ul style="list-style-type: none"> • Raise awareness and encourage consumer choice on more environmentally friendly, low-carbon materials (i.e. reclaimed wood, bamboo, recycled glass and steel, biomaterials) • Recover/harvest from existing sources and reuse construction waste and choose low impact and reusable (modular) materials where possible
Research and Innovation	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>Stronger government support and more investments in the research of green building technologies</i> - Green building solutions (international or local) should be scalable, accessible and customised to suit Singapore's environment - Innovators need to venture into wider areas across the construction value chain from construction methods, building operations and alternative materials

⁷ A circular economy is a restorative and regenerative economic system in which resources are retained and reused. [Drinkwater, n.d.]

Others (i.e. data disclosure, knowledge sharing, building capabilities)	<p>Suggestions</p> <ul style="list-style-type: none"> - <i>An easily accessible and official platform that consolidates green buildings information for all stakeholders</i> <ul style="list-style-type: none"> • Important to collect and share research data to establish new best-in-class standards and guidelines • Publish building energy performance data and have a directory of green buildings • Develop online tools and platforms with simple, user-friendly interface for easier sharing of best practices and expert knowledge on green buildings - <i>More sustainability-related awards (i.e. green building leadership) and greater recognition on progressive firms;</i> highlighting good examples to inspire others - <i>Increase the number of green jobs and develop more expertise in environmental sustainability</i> (i.e. upgrading skills, nurturing young talents, supporting the growth of green companies)
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References

Drinkwater, J. (n.d.). When is a building ‘circular’? Retrieved February 02, 2021, from <https://www.worldgbc.org/news-media/when-building-circular>

World Green Building Council. (2019). Bringing embodied carbon upfront: Coordinated action for the building and construction sector to tackle embodied carbon.

