

# BUILDgreen

Building and Construction Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.



ISSUE 10/2016

PM LEE OFFICIALLY OPENS  
THE BCA SKYLAB AND ACADEMIC TOWER



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# CEO'S MESSAGE

We are well into 2016, and it is my pleasure to take stock of all that we have achieved so far in the year as well as offer a glimpse of the exciting plans and developments that we have in store.

Earlier this year, we organised the BCA Awards Night to recognise the best and finest in the built environment sector. A new award category - **BCA Green Mark Platinum<sup>STAR</sup> Champion Award** - was introduced to recognise outstanding developers and building owners with 50 or more building projects achieving the highest BCA Green Mark Platinum rating. For this inaugural year, the Nanyang Technological University was the proud recipient of this much coveted award. With such strong support from the industry to green the built environment over the last decade, **Singapore is ranked second among global cities for green buildings** in a recent White Paper published by management consultancy firm Solidiance.

Another major event on our calendar was the official launch of **BCA SkyLab**, which saw Prime Minister Lee Hsien Loong joining us as the Guest-of-Honour. The BCA SkyLab is the world's first high-rise rotatable laboratory for the tropics, dedicated to the development of energy efficient building technologies. The setting up of the BCA SkyLab demonstrates our firm commitment towards our aspirational goal of Positive Energy Low Rise, Zero Energy Medium Rise and Super Low Energy High Rise buildings in Singapore.

A number of innovative studies and research has been undertaken by BCA so far to help create a difference in the green building industry. The development of a Smart Portal for Continuous Commissioning of Chiller Plant, which seeks to address the problem of high energy consumption by air-conditioning systems, is definitely a key initiative to help building owners sustain high energy performance.

BCA is geared up for the **Singapore Green Building Week (SGBW) 2016** with its anchor event, **International Green Building Conference (IGBC)**, held from 7-9 September at the Marina Bay Sands. The theme for IGBC 2016 is **Build Green: The Next Decade** and this year witnesses an impressive congregation of international and local experts, policy makers, academics, real estate developers, architects, engineers, builders and green building professionals, who will gather for a three-day programme designed to stimulate new ideas, collaboration and learning. More than 20,000 participants from more than 50 countries are expected to be taking part in the various events during SGBW 2016.

A number of key reports and announcements will be made in the course of IGBC 2016. One key announcement is the launch of the **new Green Mark for Residential Building GM RB: 2016**, which will be released for piloting by industry stakeholders. Also on the table and of interest to the industry is the latest instalment of the **BCA Building Energy Benchmarking Report (BCA BEBR) 2016**, public access to data for Anonymised Building Energy Performance, and the award presentation of the inaugural Climate Innovation Challenge, a hackathon that will engage the public in problem solving. Join us and be the first to hear details of our new GM RB: 2016 criteria, sharing of best practices and latest initiatives from around the world which will give insights on new and innovative building solutions.

BCA is not alone in our continual green building journey as we are joined by our strategic partners including the Singapore Green Building Council (SGBC). The Build It Green Day Out or BiG Day Out in short is an example of our joint efforts. BCA and SGBC organised the second BiG Day Out in June with the aim of instilling in children and families an appreciation for green buildings, which attracted about 17,500 visitors from the public. Other co-organised events include Green Living, BEX Asia 2016 and MCE Asia 2016, all of which take place during SGBW 2016.

SGBC has developed the criteria for Singapore Green Building Product (SGBP) labelling scheme to certify sustainable building products to meet the needs of the industry. This scheme is recognised and supported by BCA's Green Mark scheme, which awards additional points for SGBP certified products.

Mr. Tai Lee Siang, Honorary Advisor on the board of the SGBC, has been elected as Chair of the World Green Building Council (WGBC). This is indeed a boost of encouragement for the local green building community as it signifies Singapore's ascension to a world leading position.

We have had a good first half for 2016, having packed in such a meaningful line-up of events and initiatives within just six months. We welcome you to join us on this green building journey if you have not done so!

**Dr. John Keung**  
*Chief Executive Officer*



# PM LEE OFFICIALLY OPENS THE BCA SKYLAB AND ACADEMIC TOWER

Amidst his busy schedule, Prime Minister Lee Hsien Loong was able to grace the opening of the BCA SkyLab at the BCA Academy. BCA was honoured to have hosted PM Lee on a tour around this world's first, groundbreaking facility for the tropics!

## From now on, the sky's the limit

20 July 2016 marked one of the most memorable days in BCA's history - we were honoured to have Prime Minister Lee Hsien Loong officially launch the BCA SkyLab. The BCA SkyLab, which sits atop the Academic Tower at BCA Academy along Braddell Road, is the world's first high-rise rotatable laboratory designed especially for the tropics. It is a state-of-the-art test facility designed to develop energy efficient building technologies and advance research & innovation in the built environment sector.

During the opening ceremony, PM Lee and other guests in attendance were shown around the BCA SkyLab and other facilities in the BCA Academy's Academic Tower. Researchers from BCA and NTU were on hand to demonstrate to our guests the capabilities of the BCA SkyLab via the test trial of an integrated system comprising smart lighting and automated blinds. Depending on the orientation of the building fenestration and amount of daylight available, the blinds automatically adjust their angles to minimise glare from sunlight and at the same time, maximise the penetration of usable daylight into indoor spaces. This reduces the need for electric lighting, hence saving energy by 15%-20% according to preliminary results.

With its capability to test integrated system under real-world conditions, the BCA SkyLab has attracted significant attention from the public and private sectors with several large scale testbedding projects in the pipeline till 2018.

In his speech to some 200 attendees from the industry, academia and public sector, PM Lee congratulated BCA for building the testbed to further drive the research and development of building technologies. He said, "The BCA SkyLab that we are opening today will play an important role in our environmental sustainability drive. It is a first of its kind in the world – a high-rise rotatable lab for the tropics."

### Stirring excitement from industry to academia

*"We were wowed by the exciting green building innovation development opportunities offered by BCA SkyLab."*

Mr Allen Ang, Keppel Land Limited

*"BCA SkyLab is an excellent research and test bedding platform for the research community and building industry. Its flexibility and sophisticated instrumentation enable R&D for a wide range of building technologies. It also allows for test bedding of multiple technologies and interaction among technologies, which will provide new insights when conducting research in building sciences."*

Asst. Prof. Wan Man Pun, School of Mechanical and Aerospace Engineering, NTU

*"The medium-term aspiration is to develop such positive-energy low-rise and medium-rise buildings that are energy self-sufficient, and energy-efficient high-rise buildings"*

Dr John Keung, CEO BCA





### Big breakthroughs, for now and the future

More than just another test bedding facility, the BCA SkyLab is unique in several exciting ways. It is located outdoors and is also rotatable, which allows for the testing of performance of different building technologies in various orientations relative to the sun.



The BCA SkyLab was built in collaboration with the Lawrence Berkeley National Laboratory in California which is renowned for its research and development in building energy efficiency. It offers comprehensive plug-and-play testing capabilities, where a wide range of energy efficient technologies can be quantitatively assessed individually or in combination. These technologies include air conditioning & mechanical ventilation (e.g. chilled beam, underfloor air distribution system), lighting (e.g. dimmable LED, daylighting), facade (e.g. thermo/electro-chromic glass, sun shading, cool paint), plug load and smart control strategies. The laboratory holds two configurable identical test compartments (a test cell and a reference cell) to customise different space layouts in a building and test the technologies based on their deployment in real-life scenarios. The BCA SkyLab is also equipped with high precision instrumentation system and sensors to measure the performance of the technology and the corresponding office environment accurately.

A dedicated visitor's gallery with demonstration space is also set up to share findings with visitors and demonstrate the mock-up technologies that are to be tested. Real time monitoring of the BCA SkyLab cells are shown on the display in this gallery so visitors can view the BCA SkyLab testing without affecting the research and testing activities.

Currently, the first phase of technology testing at the BCA SkyLab is conducted by a joint team from BCA, NTU, and Lawrence Berkeley National Laboratory. This includes automated blinds, LED lighting with DALI (Digital Addressable Lighting Interface), chilled beam, and thermochromic glass. These technologies are being examined for energy efficiency and indoor environmental quality performance. The results will lead to the development of application guidelines and possibly further advancement of such technologies and new patents.

There is also strong interest from researchers, technology suppliers and building owners to test bed other innovative technologies, including a novel oblique fin air conditioning (OFAC) system, predictive methods for tropical daylighting and cool materials for building facade at BCA SkyLab. For example, the OFAC system with pre-cooled air technology is estimated to be about 30% more energy efficient than a conventional split air conditioning unit. If implemented for use in the market, these next-generation technologies could help further reduce building energy consumption significantly.



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# BCA AWARDS 2016

HONOURING OUR BEST, REWARDING OUR FINEST

As we aspire to become a city of green buildings, a good pat on the back can go a long way towards recognising those who have contributed to this goal and motivate the rest to also play a part. That's exactly what the annual BCA Awards hope to achieve each and every year.

More than 2,000 industry practitioners attended the Building and Construction Authority Awards Ceremony on 26 May 2016, which was graced by Guest-of-Honour Minister for National Development, Mr. Lawrence Wong. BCA handed out 304 Green Mark Awards this year, the highest to date. The inaugural BCA Green Mark Platinum<sup>STAR</sup> Champion Award was conferred to the Nanyang Technological University. This latest honour category was introduced to recognise outstanding developers and building owners with 50 or more building projects achieving the highest BCA Green Mark Platinum rating. The other four Green Mark Champion Awards were given out to Genting Singapore PLC, Ministry of Education, Ministry of Health, and National Parks Board.

Through the BCA Green Mark Pearl Award, BCA also recognises building owners, developers and landlords who have taken the initiative and effort to bring their tenants on board the green building journey. Five such awards were given out this year - City Developments Limited clinched three awards, including the Green Mark Pearl Prestige Award for 7 & 9 Tampines Grande, which is jointly owned by Alpha Investment Partners Limited. The two other winners are Keppel Land and Keppel REIT for Ocean Financial Centre, and Lendlease Commercial Investments for Jem® (Office Tower).

BCA also gave out 86 Green Mark Platinum and 52 Green Mark Gold<sup>PLUS</sup> awards. The Green Mark Gold and GM Certified awards were given off-stage.



*NTU's provost, Professor Freddy Boey, receiving the inaugural BCA Green Mark Platinum<sup>STAR</sup> Champion from Guest-of-Honour, Minister Lawrence Wong*

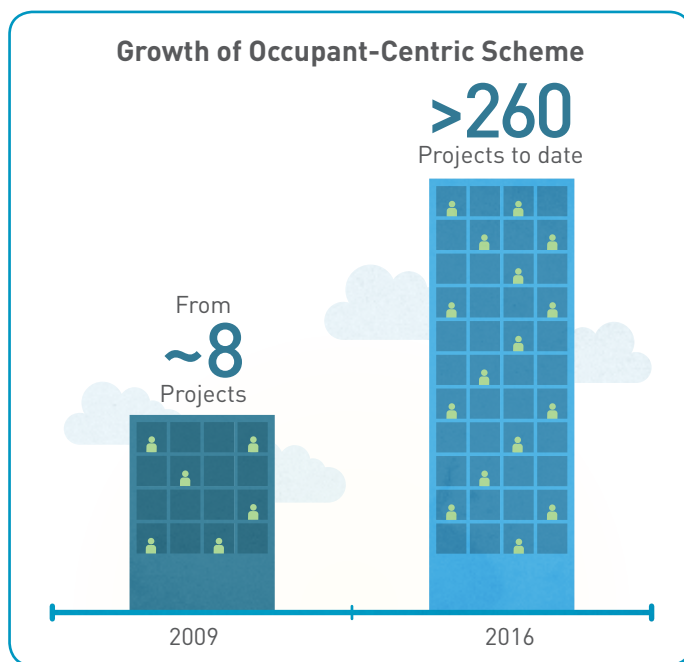
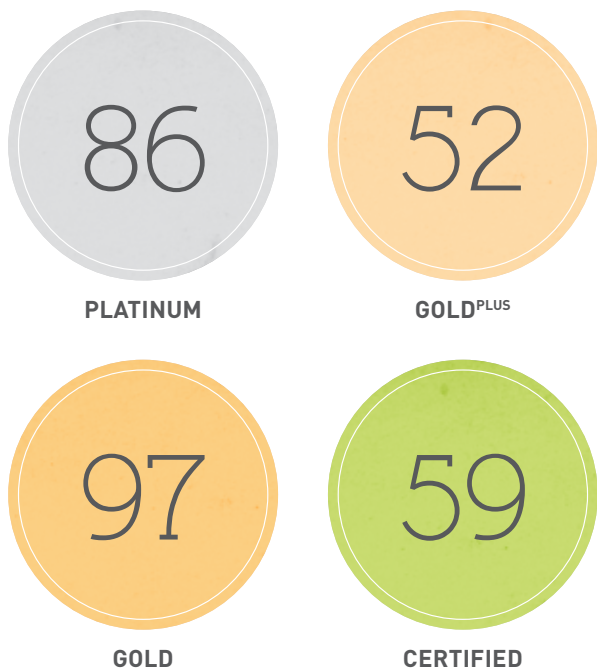


*Mr Daniel T'ng from CDL receiving the BCA Green Mark Pearl Prestige Award from Guest-of-Honour, Minister Lawrence Wong*



It is evident that tenants and business outlets have been caught up in the green building wave as an increasing number of them are getting their business space certified under the BCA's occupant-centric Green Mark schemes. There were 100 tenants and business outlets who received the BCA Green Mark Award this year, almost three times that of last year's number.

As of May 2016, there are more than 2,700 Green Mark-certified building projects in Singapore. With the well recognised BCA Awards providing additional motivation, we hope many more are on the way!



# GREEN MARK FOR RESIDENTIAL BUILDINGS 2016

Green is the way to go and in Singapore, the BCA Green Mark has played a crucial role in guiding and motivating building owners to achieve this goal. However, to stay in step with change, BCA is constantly updating and fine tuning the contents of the various schemes, with inputs from stakeholders.

Since the introduction of BCA Green Mark in 2005, BCA has reached many milestones and greened more than 2,700 buildings in Singapore. Today, there are 17 BCA Green Mark Schemes in place, covering buildings and beyond as well as occupant-centric ones. With that, more than 31% of Singapore's built area is now Green Mark certified. We are well on our way to achieving the goal of greening 80% of all buildings in Singapore by 2030.

To further stretch the outcomes of sustainability, we had reviewed the Green Mark for Non-residential Buildings (GM NRB) 2015 and launched it for piloting last year. With experience gained from GM NRB: 2015 and its pilot study, we are reviewing and will be launching the new Green Mark for Residential Buildings GM RB: 2016 to ensure Green Mark certified residential buildings would put greater emphasis on good passive design, façade performance, and effective natural ventilation to enhance the well-being of end-users and occupants.

The GM RB: 2016 criteria will be structured into five sections, namely:

- i. Climatic Responsive Design
- ii. Building Energy Performance
- iii. Resource Stewardship
- iv. Smart & Healthy Building
- v. Advanced Green Building Efforts

## INDUSTRY CONSULTATION & PILOTING

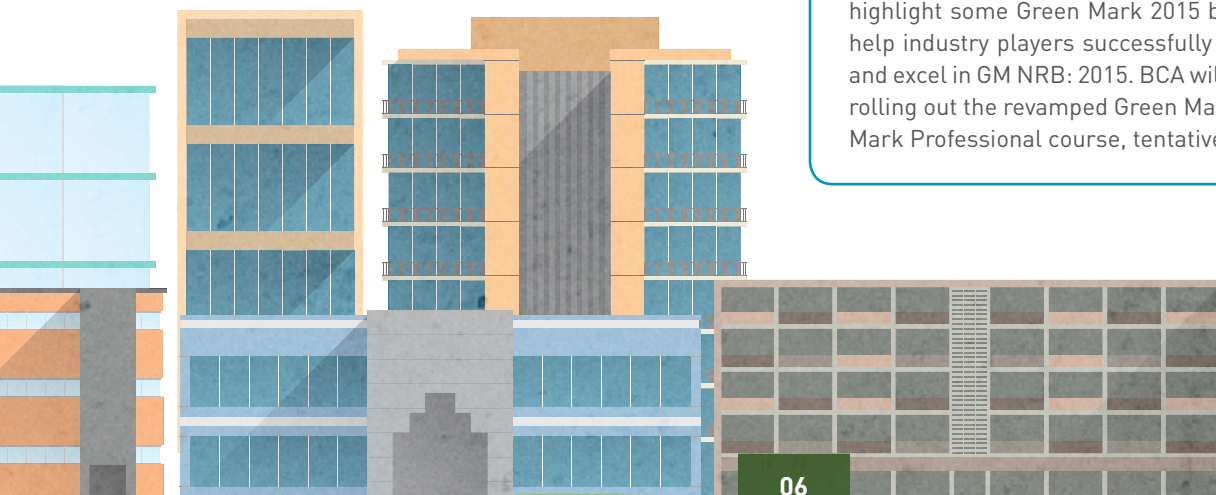
BCA has conducted extensive industry consultation sessions to seek feedback and comments on the draft GM RB: 2016. These sessions were attended by various stakeholders including developers, associations, leading architects & M&E consultants, and the certified Green Mark Professionals (GMPs) & ESD consultants.

Aside from collating feedback, sensitivity analysis of GM projects under earlier versions is being conducted to ensure workability of GM RB: 2016 criteria and credit structure. The GM RB: 2016 Pilot Version will also be launched at International Green Building Conference (IGBC) 2016. A period of 12 months of piloting will be conducted after the launch before full implementation at end-2017. During this transition period, projects can be assessed either under Green Mark Residential Building V4.1, GM RB: 2016, or both. There will not be additional fees charged for projects assessed under the new criteria.

GM RB: 2016 presents a continuity effort from GM NRB: 2015, following the same approach, framework and structure.

## UPDATE ON GM NRB: 2015

As a result of the piloting phase of GM NRB: 2015 and feedback gathered, necessary amendments to the criteria will be made. The finalised version of the criteria is slated to be ready by the second half of 2016. To further communicate GM NRB: 2015 and its objectives, BCA will be developing an informative collateral and brochure on the new criteria. A workshop will also be conducted during International Green Building Conference (IGBC) 2016 to highlight some Green Mark 2015 best practices that can help industry players successfully master the essentials and excel in GM NRB: 2015. BCA will also be subsequently rolling out the revamped Green Mark Manager and Green Mark Professional course, tentatively at end-2016.





GM NRB: 2015 & GM RB: 2016 – AT A GLANCE!

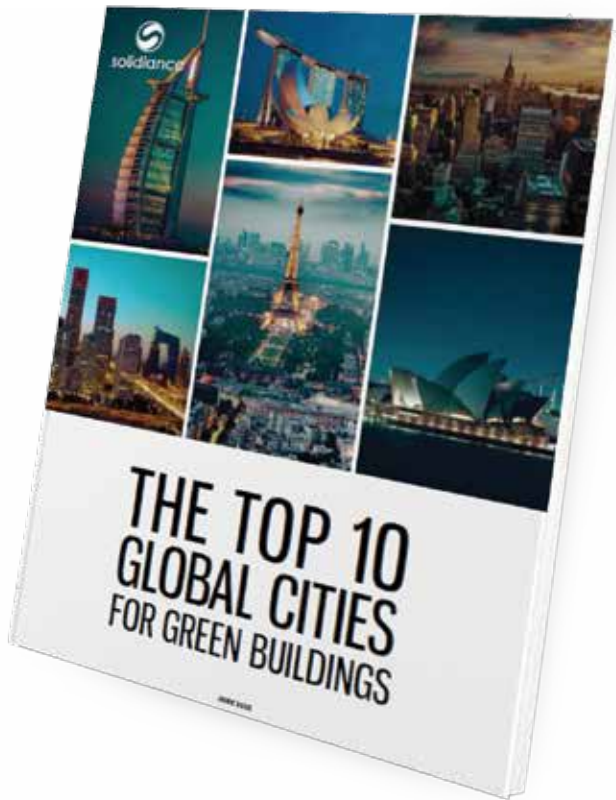
Sections	Indicators	Green Mark NRB: 2015 and Green Mark RB: 2016
 <p><b>Climatic Responsive Design</b></p>	Leadership 	Influencing and driving improvements to the overall environmental credentials of projects, from the initial stages through to building occupation and operation.
	Urban Harmony 	Consideration of the building's human-centricity and whether it is in sync with its surrounding context.
	Tropicality 	Shaping building passive design in consideration of the climatic context.
 <p><b>Building Energy Performance</b></p>	Energy Efficiency 	Optimising the efficiency of high consumption mechanical systems within buildings.
	Energy Effectiveness 	Consideration of the holistic effectiveness of energy performance usage and consumption in a building.
	Renewable Energy 	Driving the creation of opportunities for generation and utilisation of renewable energy.
 <p><b>Resource Stewardship</b></p>	Water 	Encouraging responsible use of water in buildings through water-efficient, monitoring and potable water replacement strategies.
	Materials 	Reducing environmental impact of the building through sustainable construction practices, consideration of embodied energy and life cycle, and use of sustainable fit-out systems.
	Waste 	Minimising need for landfill disposal through responsible management of building construction and operational waste.
 <p><b>Smart &amp; Healthy Building</b></p>	Indoor Air Quality 	Ensuring good air quality within the building's functional spaces.
	Spatial Quality 	Ensuring good physical and social qualities of spaces within the development to enhance the indoor environment.
	Smart Building Operations 	Optimising equipment and related processes for energy reduction and comfort requirements through the use of automation, data and behavioural science.

For more information, please contact the Green Mark Department:  
[BCA\\_enquiry@bca.gov.sg](mailto:BCA_enquiry@bca.gov.sg)

For more information on the criteria:  
[https://www.bca.gov.sg/GreenMark/green\\_mark\\_criteria.html](https://www.bca.gov.sg/GreenMark/green_mark_criteria.html)

# SINGAPORE RANKED 2<sup>ND</sup> AMONG THE TOP 10 GLOBAL CITIES FOR GREEN BUILDINGS

Singapore's firm and consistent effort towards greening buildings has been rewarded in more ways than one. Earning the second top spot among leading global cities for doing so is a firm validation of our efforts and motivation for us to go even further.



Paris, Singapore and London came up as the top three global cities for green buildings, according to a recent White Paper by Solidiance, a management consultancy firm focused on Asia. This white paper ranks the green building performance of 10 global cities: Beijing, Dubai, Hong Kong, London, New York, Paris, Shanghai, Singapore, Sydney, and Tokyo (in random order).

Each city was analysed to assess green building policies and targets, adoption of green building certification and construction projects, and the efficient performance of the city's built environment. The purpose of the paper is to benchmark and publish the green building performance of these global cities, in order to evaluate global progress towards sustainable development, increase knowledge-sharing, share best practices, and better understand what works best for cities on the global green building stage.





According to Solidiance, green buildings are one of the most important elements in the discussion of sustainable development. Accounting for more than 40% of energy use and responsible for an estimated 30% of city-wide emissions, buildings make up the largest energy-consuming sector worldwide.

Findings from the white paper reveal that Paris and Singapore took the top spots by consistently excelling in all four of the main categories and were in fact the only two cities that ranked within top five in every one of the four main categories. These two cities demonstrated strong building efficiency and performance, which showed that both local and international certification standards continue to yield high performance on green buildings. In particular, Singapore stood out as a forerunner by topping the category of green building policies and targets, largely due to its ambitious target of greening 80% of its buildings by 2030 and also its comprehensive legislations for new and existing buildings.

CEO of World Green Building Council, Terri Willis said, "Singapore can certainly be considered a leader in the field of green building. The city target for 80% of buildings to achieve BCA Green Mark standards by 2030 is ambitious but achievable, and the Singapore Green Building Council (SGBC) will play a key role in delivering this."

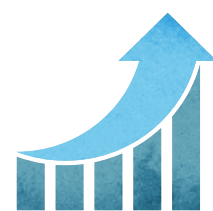
To download the Solidiance White Paper:  
<http://www.solidiance.com/whitepaper/download/the-top-10-global-cities-for-green-buildings.php>

The methodology used in the assessment and development of this white paper was based on four main categories:

**GREEN BUILDING PERFORMANCE INDEX**



**City-wide Green Building Landscape**



**Buildings Efficiency and Performance**

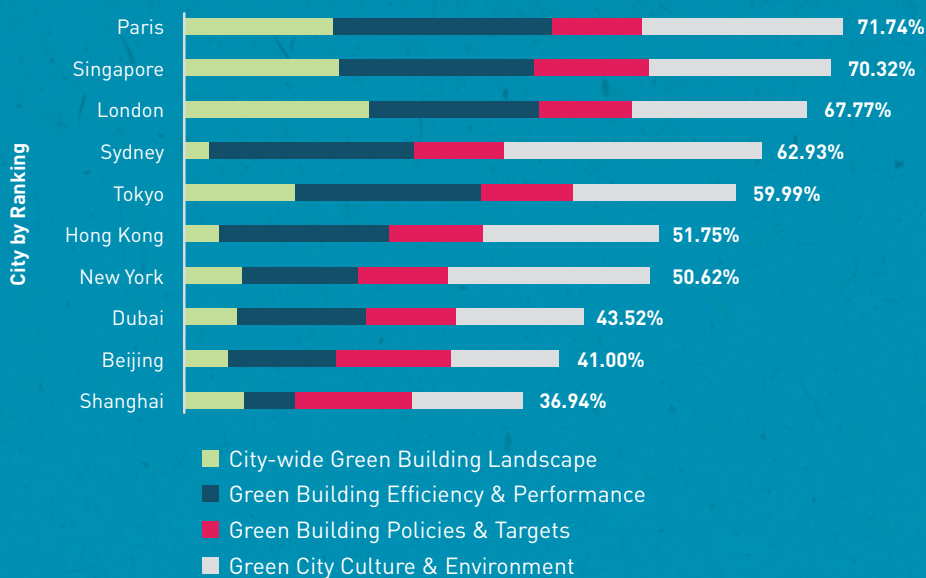


**Green Building Policies and Targets**



**Green City Culture and Environment**

**Global Cities for Green Building Performance Index**



**Top 3 Global Cities**



1. Paris



2. Singapore



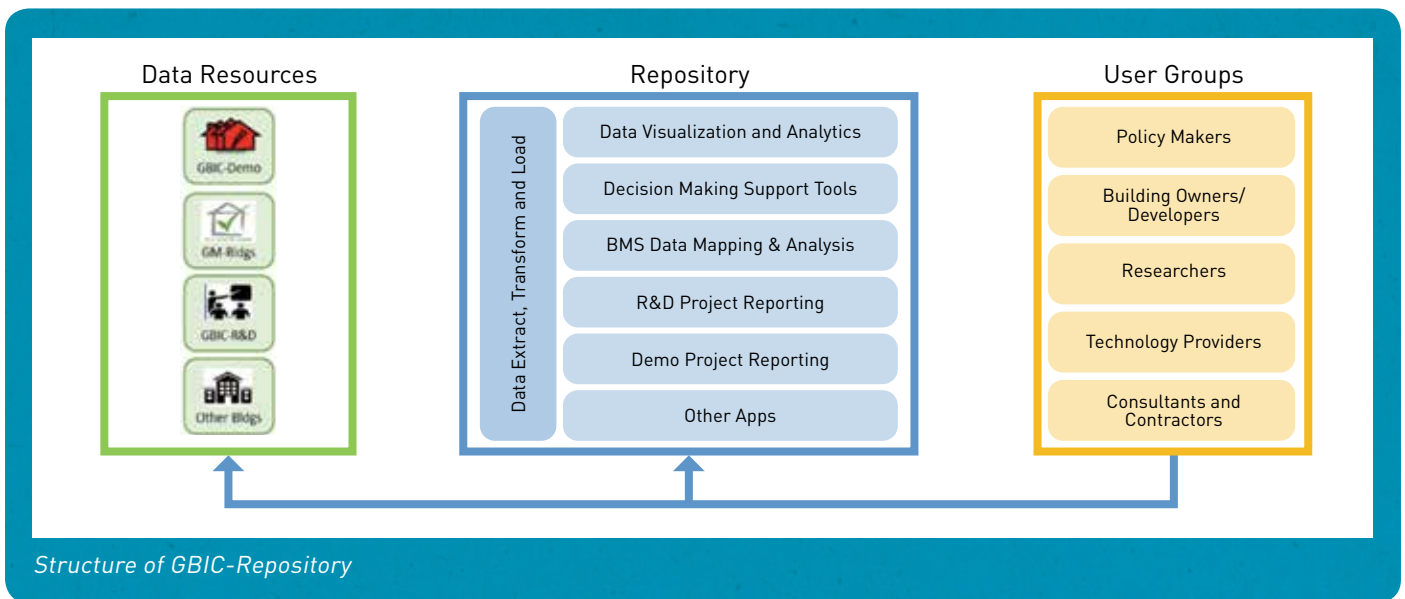
3. London

Source: Solidiance Research and Analysis

# GBIC-REPOSITORY

AN ACCELERATOR FOR ADOPTION OF INNOVATIVE BUILDING ENERGY EFFICIENCY TECHNOLOGIES

As part of the Green Buildings Innovation Cluster (GBIC) programme funded by the National Research Foundation, BCA is rolling out the GBIC National Building Energy Efficiency Repository (GBIC-Repository), a dedicated open database for the built environment sector to accelerate adoption of energy-efficiency technologies.



Envisioned to be a central database employing recent Information and Communication Technology (ICT) for storing and analysis of essential information on building energy-efficiency technologies, the GBIC-Repository comprises multiple modules and layers to allow such information/data to be captured, analysed, reported, and shared with targeted users.

With the green building movement being intensified in Singapore, building owners and developers are increasingly exposed to novel energy-efficiency technologies and products. In many cases, there are difficulties in acquiring comprehensive information and verifying the performance of these technologies. This obstacle could hinder building owners from taking action.

To address this gap, the GBIC-Repository is intended to improve the process for stakeholders to adopt new energy-efficiency technologies. It provides a one-stop portal to access a centralised database and to conduct analysis of building energy-efficiency technologies. This will substantially reduce the time and cost required for evaluation of these technologies. Stakeholders — building owners, technology providers, consultants and contractors, researchers, and policy makers — will be granted access to standardised data and reports, which will facilitate further development and market penetration of building energy-efficiency technologies.

## GBIC-REPOSITORY PROTOTYPE

A prototype of the GBIC-Repository is currently under development, and will be available by February 2017 for user test and feedback. The main features of the Repository prototype include:

- Technology directory - provides insightful information of energy-efficiency technologies.
- Projects map - provides data and information from the R&D, demonstration and test-bedding projects funded by GBIC programme.
- Decision making tools - assist the building owners, developers and consultants to make informed decision for the selection of the new energy-efficiency technologies.
- Building performance database - facilitate users to explore, analyse and report the historical building energy performance data.

By providing open and central platform for data and information sharing and exchange, GBIC-Repository will empower the stakeholders to transform their business models, which will in turn help to accelerate our national building energy-efficiency movement.

For more information, please contact Dr. Jin Guang Yu: [Jin\\_Guang\\_Yu@bca.gov.sg](mailto:Jin_Guang_Yu@bca.gov.sg)



# GOING GREEN IN A "BiG" WAY

The promise of a green building cannot be fulfilled by the building developer alone; it also needs the strong support of building occupants to help drive change. Inculcating the relevant knowledge and habits in end users is therefore key to ensuring that a building remains green.

Recognising that attitudes and habits must be cultivated from young, BCA and SGBC organised the second BiG Day Out at Toa Payoh Hub on Friday, 24 June 2016 with the aim of instilling in our children an appreciation for green buildings.

Based on the storybook published by BCA last year, *The Adventures of Greco and Beco: The Glass House*, BiG Day Out 2016, was presented in the form of Kampong Hijau, the village which the story takes place in. "BiG" is an acronym for "Build it Green". Visitors to the event found themselves transported to a storybook world where there were plenty of games and experiential activities awaiting them.

On display at the venue was the titular Glass House, which offered visitors a 4-D experience living in a non-eco-friendly house, as well as 'My Green Home', which showcases the exact opposite. There was also an array of games set within the village, all of which were specially designed to encourage children to learn about the various features of green buildings while having fun at the same time.

The launch of BiG Day Out 2016 was graced by Senior Minister of State for Home Affairs and National Development, Mr Desmond Lee. He witnessed the signing of two partnership agreements

which signalled the close ties between BCA and the industry. The first partnership agreement was between BCA and Keppel Land, to mark the start of a three-year joint effort to encourage schools and private organisations to work together and take the lead in championing the green building movement. As part of the agreement, a project sponsorship fund will be set up to encourage such entities to team up and organise their own "green" outreach programmes for the public. The second agreement sees BCA, SGBC, Johnson Controls and Republic Polytechnic collaborate on BCA's Greenovate Programme. Under this programme, energy auditors from Johnson Controls serve as mentors to students from Republic Polytechnic and involve them in energy audits of participating secondary schools. With the energy audit reports, students from the participating secondary schools will develop action plans to green their schools. BCA will also conduct training for Operation Managers and, together with SGBC, explore more collaboration opportunities between industry partners and secondary schools.

As one of BCA's main public outreach events for the year, the three-day BiG Day Out received overwhelming response from the public, attracting a total of about 17,500 visitors.



More than 17,500 people visited BiG Day Out over the three days it was held at Toa Payoh Hub Atrium



SMS Desmond Lee witnessed the signing of the partnership agreement by (L-R) Mr Chia Ngiang Hong (SGBC), Dr John Keung (BCA), Mr Michael Anderton (Johnson Controls) and Mr Seto Lok Yin (Republic Polytechnic).

# TOGETHER, GOING FORWARD ON THE “BELOW 2°C PATH”

BCA is representing Singapore in the Global Alliance for Buildings and Construction (Global ABC), which was launched at the inaugural ‘Buildings Day’ at COP21, Paris. Global ABC’s primary goal is to strengthen collaboration and commitment towards energy efficiency around the world.



Mr Ang Kian Seng (2nd from right) speaking on the panel for Government Leadership in Policy and Strategies during Buildings Day

### COP21 Buildings Day

The 21st Conference of the Parties (COP21) was one of the largest international conferences ever held in France. The conference attracted close to 50,000 participants, including 25,000 official delegates from government, inter-governmental organisations, UN agencies, NGOs and civil society. COP21 aimed, for the first time in over 20 years of UN negotiations, to achieve a legally binding and universal agreement on climate, with the goal of keeping global warming below 2°C.

Held as a fringe event during COP21, Buildings Day was conceptualised by the French government in March 2015 on the heels of COP20, Lima. This was the first time a dedicated event for the building and construction sector was held as part of the official programme of COP. Buildings Day aims to raise the profile of the Building Sector at COP.



Representatives from 17 countries endorsed the common statement for the Global Alliance for Buildings and Construction during Buildings Day

The event also provided the opportunity to launch an unprecedented Global Alliance for Buildings and Construction (Global ABC), which aims to:



Help put the buildings and construction sector on the “below 2°C path”,

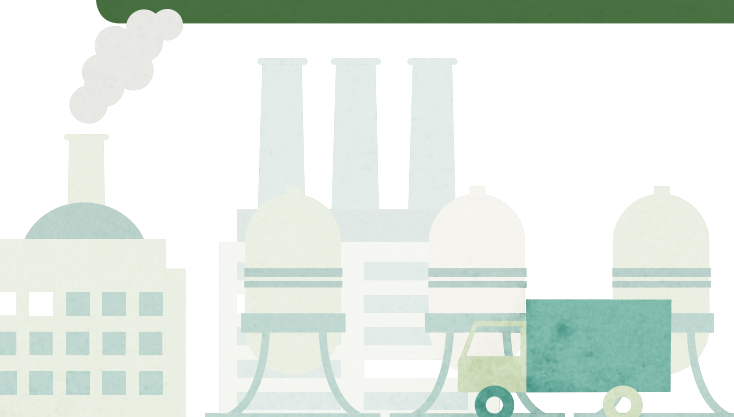


Align existing initiatives, commitments, and programmes to achieve greater scale and increase the pace of efficiency actions.



Catalyse stronger collaboration and target sectorial and cross-sectorial climate action and solutions for all.

As a frontrunner in advocating green buildings, BCA was invited to be an initiating partner in Global ABC. Mr Ang Kian Seng, BCA’s Group Director (Environmental Sustainability), represented BCA at the formal launch of the Alliance and participated in the panel discussion on Government Leadership in Policy and Strategies, during which he shared Singapore’s experience and approach toward green building development.





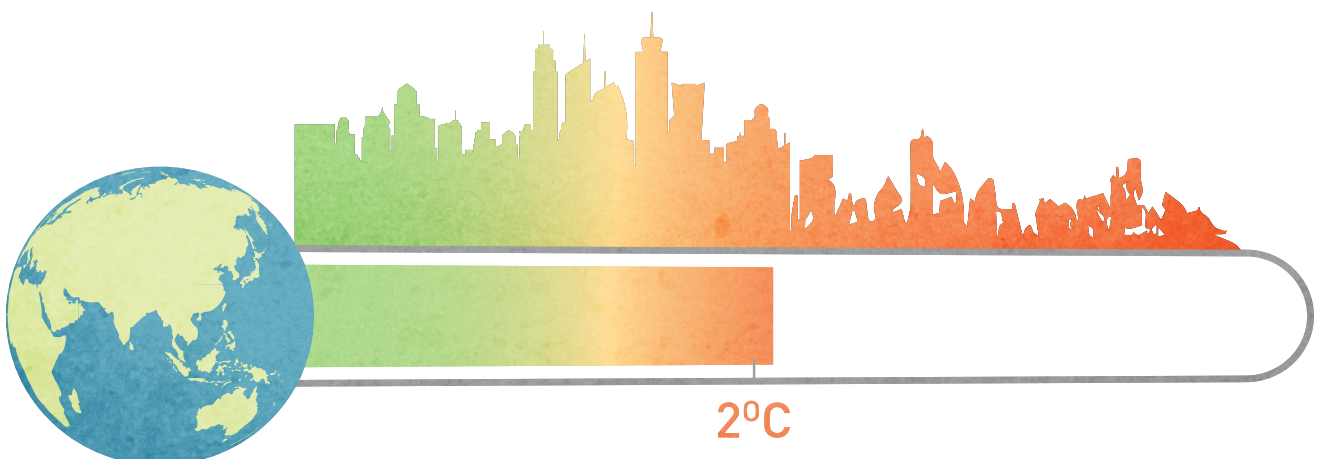


*First General Meeting of the Global Alliance for Buildings and Construction*

### The Inaugural Global ABC General Meeting

Following the official launch of the Global ABC on 3 December at COP21, France and UNEP hosted the first general meeting for the Global ABC on 18 & 19 April 2016. The meeting that was co-chaired by the French Minister of Environment, Energy and the Sea, the Ministry of Environment of Morocco and UNEP, discussed the focus areas, members' potential needs and contribution as well as the operational modalities of Global ABC. BCA was also invited to share Singapore's capability building framework to support Singapore's green building movement at one of the sessions of Global ABC titled "Education and professional training – Awareness and measurement – Introduction to knowledge sharing processes".

The activities of the Alliance have potential synergy with Singapore's collaboration with the UNEP in the BCA Centre for Sustainable Buildings (CSB) and the Nationally Appropriate Mitigation Action (NAMA) Development for the Building Sector in Asia. BCA's annual International Green Building Conference (IGBC), with its wide reach within Asia, can serve to enhance communication and facilitate greater action to reduce the building sector's impact through this global platform. As part of a worldwide alliance among key stakeholders in the building sector, BCA will leverage current initiatives to contribute towards the "below 2°C path" and facilitate the objectives of this Alliance.





# PROGRAMME AT A GLANCE

	Time/Date	Session/Tracks	Room
<b>DAY 1   7 SEP 2016, WEDNESDAY</b>	08.45	IGBC / BEX Asia / MCE Asia Joint Opening Ceremony 2016	L3, Cassia 3201A – 3305
	10.30	Leadership Plenary   Can we do better than 2°C	L3, Cassia 3201A – 3305
	14.00 (Concurrent sessions)	Track 1.1   Envisaging our next decade	L3, Cassia 3201A – 3305
		Track 1.2   Tapping onto Nature’s Renewable Power Bank	L3, Begonia 3001A – 3102
		Track 1.3   Paving the Way for the Next Frontier I	L3, Begonia 3003 – 3104
	12.30	Complimentary Tech Talk @ BEX Asia/MCE Asia 2016 Exhibition Area	L1, Hall B & C
	16.15 (Concurrent sessions)	Track 2.1   Climate Change: Transforming Thoughts to Actions	L3, Cassia 3201A – 3305
		Track 2.2   Data Revolution of Cities and Buildings	L3, Begonia 3001A – 3102
		Track 2.3   Paving the Way for the Next Frontier II	L3, Begonia 3003 – 3104
19.00	IGBC / BEX / MCE Asia 2016 Welcome Reception	L5, Sands A Ballroom	
18.30	Exclusive Networking Session (By invitation only)	L5, Sands A Foyer	
<b>DAY 2   8 SEP 2016, THURSDAY</b>	09.00	Spotlight Plenary   Is the Sky Our Limit?	L3, Cassia 3201A – 3305
	11.00 (Concurrent sessions)	Track 3.1   A Bird’s Eye View of Sustainable Built Environment	L3, Cassia 3201A – 3305
		Track 3.2   Integrated Design for High Performance Buildings	L3, Begonia 3001A – 3102
		Track 3.3   Buildings Harmony	L3, Begonia 3003 – 3104
	12.30	Complimentary Tech Talk @ BEX Asia/MCE Asia 2016 Exhibition Area	L1, Hall B & C
	14.00 (Concurrent sessions)	Track 4.1   Money Sense; Building Sense - Innovative Financing	L3, Cassia 3201A – 3305
Track 4.2   Integrated Design for High Performance Buildings II		L3, Begonia 3001A – 3102	
Track 4.3   Greening Inside-Out		L3, Begonia 3003 – 3104	
16.00	Closing Plenary   Build Green: The Next Decade	L3, Cassia 3201A – 3305	
<b>DAY 3   9 SEP 2016, FRIDAY</b>	08.00	BCA Breakfast Talk for CEOs (By Invitation Only)	L3, Cassia 3201A – 3305
	11.00	Workshop   Green Mark for Residential Buildings GM RB: 2016	L3, Cassia 3201A – 3305
	14.00 (Concurrent sessions)	Technical Workshop 1   Indoor Environment Quality	L3, Cassia 3201A – 3305
		Technical Workshop 2   High Performance Facades	L3, Begonia 3001A – 3102
		Technical Workshop 3   Smart Buildings	L3, Begonia 3003 – 3104
16.00	Workshop   10 Essential Strategies to Mastering Green Mark for Non-Residential Buildings GM NRB: 2015	L3, Cassia 3201A – 3305	



IGBC 2016

Get the latest updates on the programme and much more in the IGBC 2016 APP

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## Conference Sustainability Initiatives

As a leading green building conference, we are committed to reducing our carbon footprint of the event. Here are just a few of our initiative towards a greener and more sustainable environment!



### Green Venue

The conference is held at Marina Bay Sands, an eco-venue which was awarded the Green Mark Platinum Award. It has been designed to promote sustainability, and is active in the 3Rs of Reducing, Reusing and Recycling in their operations.



### Efficient Energy Management

The halls will be set at 50% lighting level during the exhibition build-up days, and 75% lighting level during the exhibition show days. Indoor air-conditioner will be set at 24/25 degree Celcius to reduce energy consumption during the event.



### Easy Accessibility

Situated in central Singapore, the event venue is well connected to various modes of public transportation, including an adjacent train station and various nearby bus stops. Usage of public transport is encouraged.



### Going digital

Download the IGBC 2016 mobile app – which is available for free download from App Store (iOS Platform) and Google play (Android Platform) to get the latest updates of programme, and get connected with other attendees. Digital directional signage is also adopted to reduce wastages from printed materials.



### Eco-Friendly Printing

Only recycled or FSC Certified paper stocks are selected for printing of delegate name badge, conference brochure.



### Corporate Social Responsibility (CSR)

Together with the industry, students and the Guest-of-Honour, Dr Vivian Balakrishnan, MP for Holland-Bukit Timah GRC, 50 trees will be planted at the Zhenghua Nature Park. This event\* seeks to offset the carbon footprint of key events held during the Singapore Green Building Week 2016.

\*proudly sponsored by Ascendas-Singbridge Gives Foundation, RSP Architects Planners & Engineers (Pte) Ltd and Squire Mech Pte Ltd



For more information:

<https://www.bca.gov.sg/events/sgbw/en/event-sustainability-initiatives.html>



**Date: 13 to 15 September 2017**  
**Venue: Sands Expo and Convention Centre, Marina Bay Sands, Singapore**

# FOR THE INDUSTRY, BY THE INDUSTRY

**Tapping on the collective wisdom of the industry, the Singapore Green Building Product labelling scheme relies on its Technical Committees to ensure that only truly sustainable products make the cut.**

As Singapore's only certification scheme dedicated to green building products, the Singapore Green Building Product (SGBP) labelling scheme bears great responsibility. Managed by the Singapore Green Building Council (SGBC), SGBP holistically assesses and qualifies green building products for their environmental performance, helping building practitioners to select suitable building products for their projects. SGBP is also highly recognised by Singapore's national green building rating tool the Building and Construction Authority's Green Mark Scheme, with SGBP products being able to let the projects they are used in score bonus points, thus helping them achieve a higher Green Mark rating. This ultimately results in greener, healthier buildings.

#### **But how do these green building products get certified?**

To ensure that certified products truly function as intended as well as meet the needs and requirements of the industry, it is imperative to consult both members of the industry as well as public agencies. As different materials require different sets of criteria and parameters for a complete and holistic assessment, SGBP counts on the expertise of its Technical Committees, the backbone of the SGBP labelling scheme.

Overseen by the SGBC Board Technical Coordinators, the SGBP Technical Committees are formed based on the needs and requirements of the various building disciplines. The Technical Committees are made up of industry professionals well-versed in

their respective fields, who meet regularly to develop assessment criteria for specific products, review existing criteria to reflect changes in the dynamic business environment, and provide crucial advice on complex certification cases. This essentially allows for the criteria set by SGBP to be self-regulating - project demands and changing public expectations will influence the yardstick to define green building products, ensuring its continued relevance in an ever-changing marketplace.

Since the start of 2016, all SGBP product categories are being realigned to ensure their relevance to the built environment, especially in light of the new Green Mark 2015 which was launched as a pilot programme for non-residential new buildings last September. This realignment will be completed by July 2016, and product manufacturers and suppliers will find it to be more inclusive, encompassing more specific product types than ever before. This translates to a broader range of certified green building products available for the built environment, ensuring that there is a certified product for every conceivable building need.

To help more building manufacturers and suppliers obtain certification for their products, SGBP is now supported by the Capability Development Grant (CDG) administered by national standards and accreditation body SPRING Singapore. As a financial assistance scheme which supports capability upgrading, the CDG defrays up to 70% or a maximum of \$30,000 of certification-related costs for up to two green building products. This funding covers product testing, development and enhancement costs, allowing manufacturers to green their product line to the requirements of SGBP certification without being discouraged by the costs involved. The CDG also covers the cost for ISO 14001:2015 certification, helping enterprises to adopt international environmental management standards and improve their green credentials, essential areas that are steadily gaining prominence in the building and construction sector.

While many have already made the cut, SGBP will continue to widen its pool of green building products with the experience and expertise of its diligent Technical Committees.

For more information on SGBP certified products:  
<http://www.sgbc.sg/sgbc-certifications/sgbp-labelling-scheme>





# PILOTING A NEW PARADIGM FOR CONTINUOUS COMMISSIONING OF CHILLER PLANT

**A new smart portal that can collect data from chiller plants will allow building managers to track, analyse and improve on the one area that truly gobbles up energy in any building.**

Air-conditioning accounts for almost half of a building’s energy use. Determined to rein in such an extravagant consumption, Singapore has one of the most stringent Measurement and Verification (M&V) and chiller plant efficiency regime in the world, to the extent that it has mandated a triennial audit for chiller plant performance. The intent of this legislation is to ensure that building cooling systems are audited to meet minimum energy efficiency and continue to operate efficiently throughout their life cycles. This goal is best served if the process is autonomous and continuous, so as to:

- I. Improve effectiveness and productivity of the regulatory audit process
- II. Empower building managers to maintain plant efficiency through timely updating of information via an online portal that collects data from the chiller system, thereby enabling:
  - Machine learning and base-lining
  - Trend analytics to spot performance or variance of cooling load and sensors’ drift

Monitoring by itself does not save energy - it must trigger an action.

BCA is thus piloting such a portal to give building owners and managers the means to be proactive in operating their chillers as

smart technology is used to autonomously send out performance summary and alerts when performance deviation is detected. They will also have online access to the portal to view their portfolio of buildings and compare trended data.

**How do building owners benefit by studying the data?**

Being better informed empowers them to enhance their contracting efficiency by targetting specific areas for improvement.

The system is deliberately designed to be light-weight, low risk and universal to cater to all chiller plant systems. It is thus not tightly coupled with the building’s BMS (Building Management System), nor does it perform any form of control. What it does is provide three means of uploading chiller plant data from the BMS or control network via a secured mobile data link.

**Can a building owner sign up to participate in the pilot phase of this new portal?**

Yes, he can.

For more information, please contact Mr. Francis Tay: [francis\\_tay@bca.gov.sg](mailto:francis_tay@bca.gov.sg)



*Users of the portal may easily examine multi-day trends of cooling load and plant efficiency*

2030 (TARGET)

80%

JULY 2016

>31%

2010

10%

2005

0.5%



PERCENTAGE OF  
GREEN BUILDINGS IN SINGAPORE