

Building and Construction Authority

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

Enterprise Singapore

Growing Enterprises SG

BCA-ESG CHALLENGE CALL

-LAUNCH WEBINAR-

Thank you for joining us, we will begin the webinar shortly

Building and Construction Authority

BCA-ESG CHALLENGE CALL
LAUNCH WEBINAR

12 August 2020, 3PM-5PM

Noel Chin, Building and Construction Authority (BCA)

Gina Wang, Enterprise Singapore (ESG)

Agenda

1. **Background:** Objective of the BCA-ESG joint challenge call
2. **Challenge projects:**
   A. **Alkaff Kampung Melayu Mosque**
   B. **St. James Power Station**
   C. **JTC Summit**
3. **Process & timeline**
4. **Proposal application**
5. **Frequently asked questions**
6. **Questions and answers** (from the audience)

BACKGROUND

OBJECTIVE OF THE BCA-ESG JOINT CHALLENGE CALL

Super Low Energy (SLE) Programme

BACKGROUND

BCA launched the SLE Programme to encourage cost-effective and energy-efficient building designs

Towards 60-80% energy efficiency improvement over 2005 levels by 2030

International Green Building Conference , Sept 2018

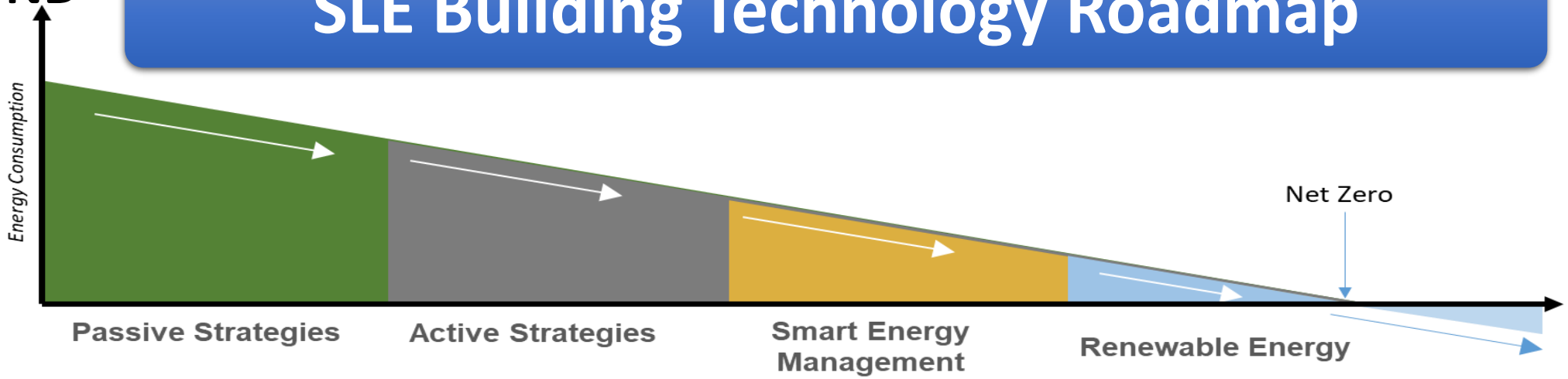
SLE Technology Roadmap
- Leveraging on Research & Innovation
- Green Building Innovation Cluster (GBIC)

Green Mark for SLE
- SLE Challenge
- Recognition for SLE projects to facilitate mass deployment

Raising Industry Capability & Awareness
- SLEB Smart Hub
- Case studies & technical workshops & courses

BACKGROUND

SLE Building Technology Roadmap



Sunlight Shading
- Solar analysis
- Shading devices
- Interblock shading

Natural Ventilation
- Site planning & orientation
- Building massing
- Cross ventilation
- Induced ventilation
- Thermal comfort modelling

Facade & Daylighting
- High performance glass & wall
- Cool materials/greenery
- Air-infiltration control
- Air-con space reduction
- Daylight redirection

Air-conditioning
- High COP chiller with low lift & friction
- Non-compressor cooling
- Decoupled latent & sensible cooling with desiccant/membrane
- High temperature cooling using radiant / convective / hybrid effect

Mechanical Ventilation
- Displacement ventilation
- Personalised ventilation
- High Volume Low Speed fan
- Brushless DC motor

Lighting Technologies
- High efficiency LED
- Dimmable lighting
- Digitally addressable lighting

Building Automation
- Fault detection and diagnostics (FDD)
- Energy Management System
- Occupancy sensoring & demand control
- Weather sensing & system resetting

Smart Control
- Model predictive control
- Machine learning
- IOT integration with BMS
- Personalised control of lighting/ACMV

Plug Load Management
- Smart plug
- Load monitoring and tracking
- Sleep mode optimisation

Roof & Site Optimisation
- Maximising roof and façade spaces
- Site planning for solar utilization

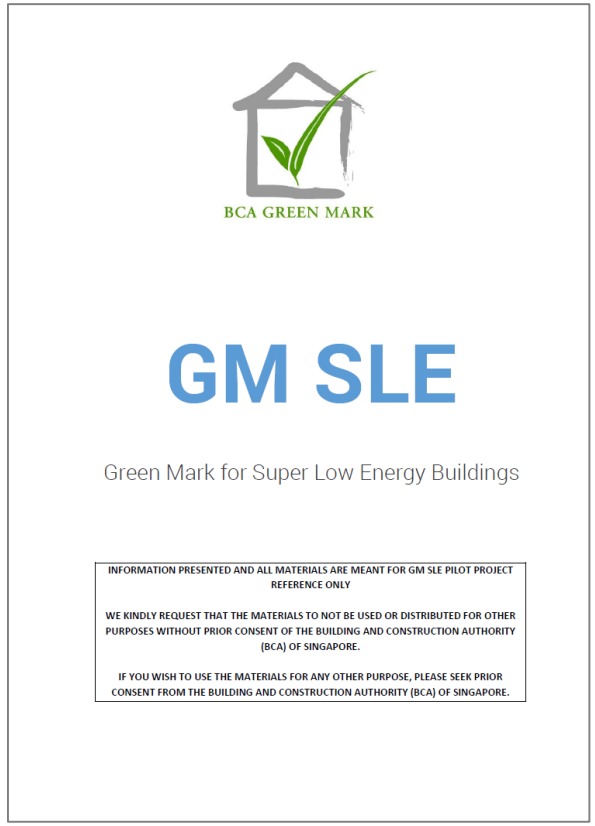
PV Technologies
- Highly efficient module
- Anti-shading design
- Anti-degradation system
- High performance BIPV
- PV integration with greenery
- PV energy management

> 60 Key Technologies in 4 Broad Strategies

Building and Construction Authority

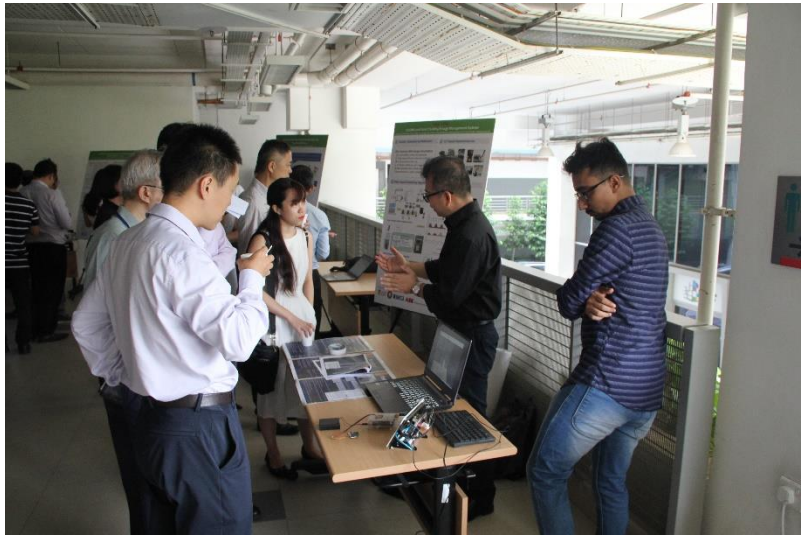
BACKGROUND

GM for Super Low Energy (SLE) Buildings



BACKGROUND

Previous GBIC-Demo Joint Challenge Calls:



BACKGROUND

Previous GBIC-Demo Joint Challenge Calls:

1st - BCA-Keppel Land Joint Challenge Call for Keppel Bay Tower

Launched 5 June 2017, 53 proposals received; 14 technologies shortlisted; 5 technologies selected. Funding was awarded on 11 July 2018 under GBIC-Demo. Estimated savings of about 22% of the total energy consumption in the current Green Mark Platinum building, and expected to achieve an annualised energy consumption of 72.5 kWh/m2/year in the demonstration zones.

2nd - BCA-DBS Joint Challenge Call for POSB@Newton

Launched 2 Sep 2019, 21 proposals received

Process of finalising the list of technologies for GBIC-Demo submission.

DBS is targeting to achieve EUI of <90kWh/sqm/yr and Net Zero Energy with renewables.

OBJECTIVES

SLE CHALLENGE

The challenge is called to encourage Building Owners/Developers to take up the SLE challenge. Through this challenge call, we hope to source for more innovative energy efficient technologies to help building owners to achieve greater energy savings.

SUPPORT SINGAPORE TECHNOLOGIES

In collaboration with ESG, and in line with our national Construction ITM, we will prioritise support for Singapore-sourced technologies and proposals with the most Singapore small/medium enterprise participation.

We aim for this call to be an opportunity for industry to demonstrate innovative technologies for Singapore, and to form partnerships with Singapore companies.

The end goal is to support the development of Singapore's green building industry, enhance local value capture of innovation, and enable export of Singapore solutions overseas. This will be especially important as Singapore works toward a COVID-19 economic recovery.

OBJECTIVES

Beyond SLE – 44% energy savings under GBIC Programme

Building projects striving for GBIC energy challenge of 44% energy savings (over the 2015 GM baseline) will be eligible for funding support through the BCA GBIC-Demo scheme to help offset the risk of demonstrating innovative technologies.

Non-energy technologies:

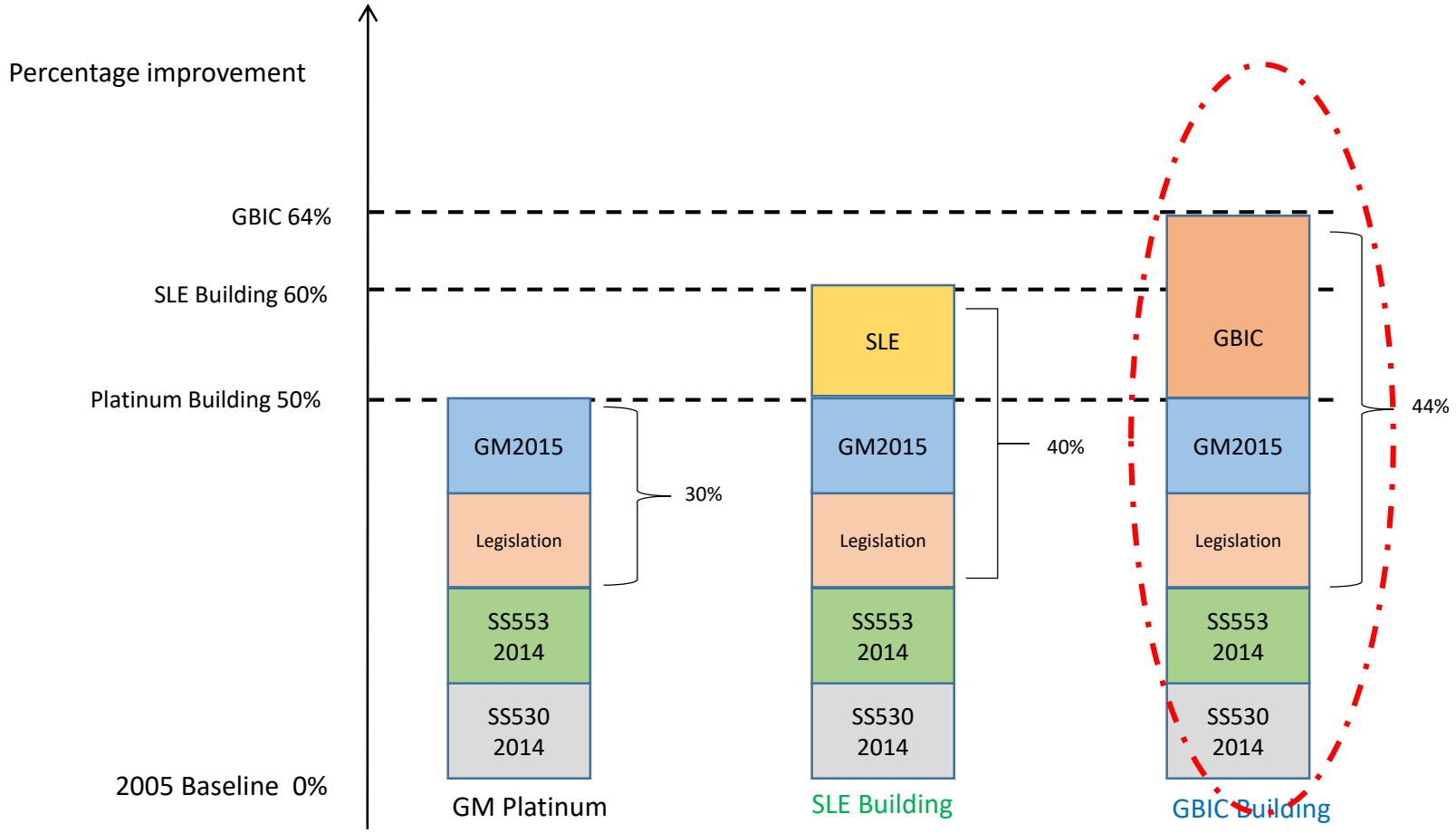
This challenge call would also include technologies developed locally that would help building owners/developers to achieve Greenmark certification. These include:

- Water efficient technologies for cooling tower operations
- Indoor Air Quality technologies that can improve temperature, relative humidity, and reduce CO2, PM, VOC and bacteria count.

ESG's Enterprise Development Grant (EDG) will support the pilot and test-bedding activities of innovative local SME solutions demonstrated in the projects (funding up to 70% of eligible costs).

OBJECTIVES

COMPARISON OF GM PLATINUM, SLE AND GBIC BUILDINGS



**Challenges in meeting the GBIC-Demo pre-requisites of 44% energy savings with innovative technologies*

GBIC Demonstration

Supports large-scale demonstration of promising energy-efficient technologies integrated to achieve greater energy savings for the building.

Encourage building owners and developers to demonstrate innovative energy efficient technologies developed from R&D and/or proven technologies not widely adopted.

Co-funding (up to 70% or $3m whichever is lower) and covers the following:

1. Performance
- Technology - Achieve 20% energy savings over best in class and:
- Building Energy Utilisation Intensity (EUI) to top 10% of EUI or

>20% improvement in energy savings compared to best-in-class energy performing building

2. Report
Final report with at least 12 months of validated performance data. Project no longer than 5 years to complete

- ❑ New or existing buildings
- ❑ Lead applicant = building owner or developer
- ❑ Partner with industry (technology supplier/system integrator) and 3rd party verification (ESD, ESCO or researcher)

ESG seeks to enable enterprises to innovate, build capabilities and internationalise while realising the Green Building Masterplan

Enterprise Singapore

80% Green Buildings by 2030

Research & development

Capability building

Industry adoption

Industry Opportunities

1. Translate latest RD&D into solutions
2. Demonstrate and validate performance in live buildings to raise industry standards
3. Build partnerships to serve future projects (both local and overseas)

To be achieved by

<u>Match and demonstrate innovative SG green building technologies to high impact applications</u>

→ Soliciting, screening and matching innovative solutions to projects

→ Extend support more comprehensively to include non-SLE solution areas such as water efficiency and IAQ *(to local tech providers, through Enterprise Development Grant)*

→ Co-identify pipeline of projects for potential deployment post-demonstration

ESG will extend support to Singapore SMEs to pilot and testbed innovative solutions in indoor air quality and water efficiency in the demo projects – allowing for a broader scope of Green Mark solutions

Enterprise Development Grant – Pilot and testbedding for product development	
Solution type	• Water efficient technologies for cooling tower operations • Indoor Air Quality technologies that can improve temperature, relative humidity, and reduce CO2, PM, VOC and bacteria count.
Applicant eligibility	• Business registered/incorporated in Singapore • >30% ordinary shares held directly or indirectly by Singapore citizens/PR on the ultimate owner/group level • Group annual sales turnover <S$100 million and employment size of <200 workers • Financially able to see project through completion
Assessment criteria	• Technological innovativeness of the solution, • Commercial viability, • Project team technical capability • Presence of knowledge building for the enterprise
Applicable activities / cost items	• Hardware equipment and installation • User testing and technical feasibility reports or certification

CHALLENGE PROJECTS

PROJECT A:

ALKAFF KAMPUNG MELAYU MOSQUE

WAREES INVESTMENTS

Project A: Alkaff Kampung Melayu Mosque – Smart and energy efficient mosque leveraging on artificial intelligence and blockchain

Site area (m^2)	3000.00 m^2
Existing Gross Floor Area (m^2)	3112.20 m^2
Proposed Gross Floor Area (m^2)	3809.48 m^2
Current capacity of congregants	3500 pax
Activities	Daily Prayers (Capacity approx.100 to 200pax) • 0530-0630 • 1230-1400 • 1600-1700 • 1900-2100
	Fridays Prayers (capacity approx. 2k to 3k pax) • 1230-1400
	Classes (capacity approx. 100 pax) • Saturdays morning til evening • Sundays morning
	Peak time (approx. full capacity) • Fridays Prayers • Public holidays :Hari Raya Aidilfitri, Hari Raya Haji, Fridays fall on public holidays
Current EUI (estimated) kWh/m^2/year	50

Project A: Alkaff Kampung Melayu Mosque – Smart and energy efficient mosque leveraging on artificial intelligence and blockchain

Challenge Statement

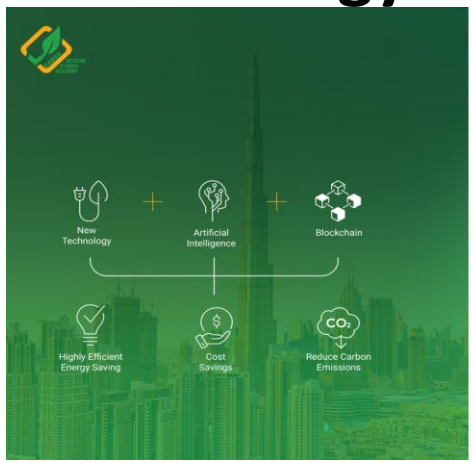
A significant reduction in energy consumption in standard energy management cannot be accomplished in a short time frame with the introduction of renewable sources of energy alone. A synergistic approach and strategy must be undertaken, which also includes increased efficiency of equipment, processes and practices used in the energy management system.

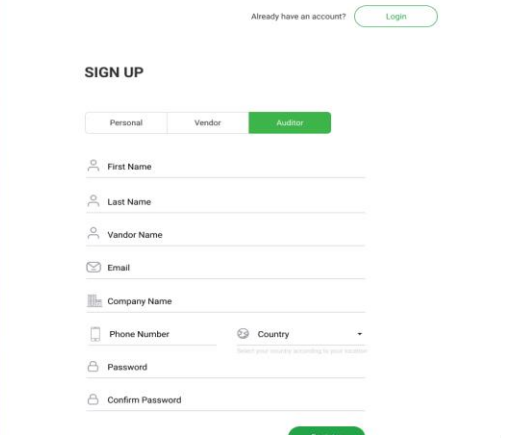
Key to recognizing energy inefficiency is:

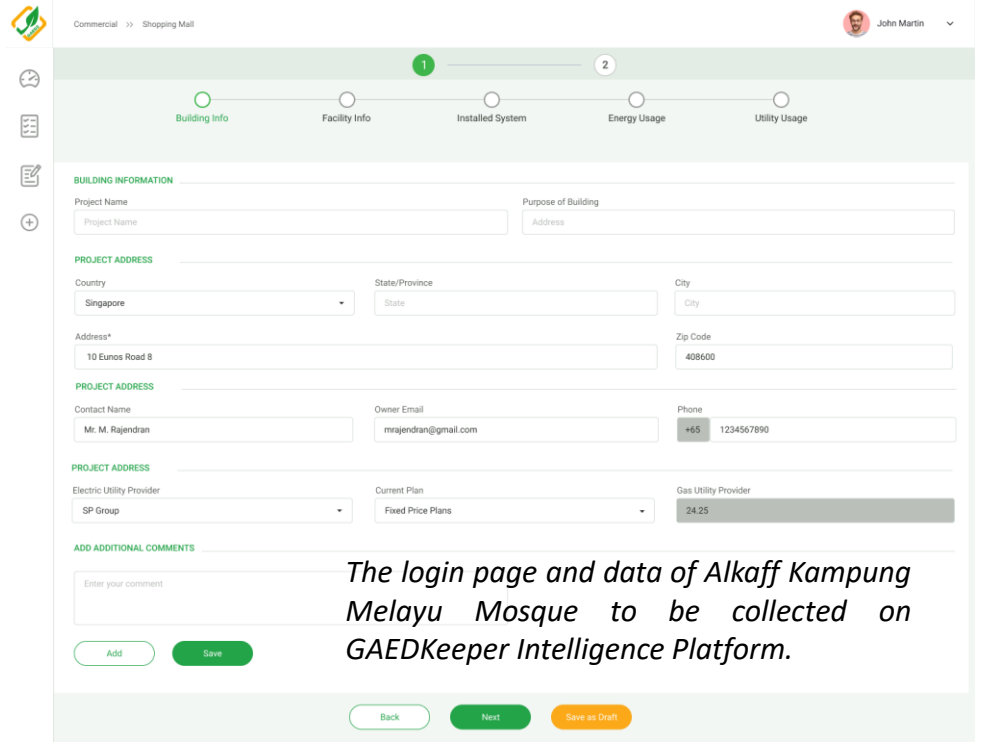
1) Increasing awareness of the urgency to undertake improvements in energy conservation initiatives, continue to increase awareness and education concerning methods of making significant improvements in energy efficiency.
2) Using AI and Blockchain Energy Assessment software to help an energy audit programme that analyses energy use for specific technology and identifies areas where efficiency improvements can be made with projections of amounts of energy saved along with costs of implementing the changes and pay-back projections.
3) Leveraging on an integrated solutions comprised of both ours and international technology/saving devices that contributed to an increase in cost savings and reduction of losses.
4) The long term objective of such a programme is to develop a comprehensive energy audit program that can be applied to all types of building operations in Singapore.

What we hope to achieve?

- Energy efficient mosque running on GAEDKeeper an Artificial Intelligence and Blockchain based energy intelligence platform.
- Running through such platform we can track the performance of the mosque pre and post advisory and implementation of solutions.



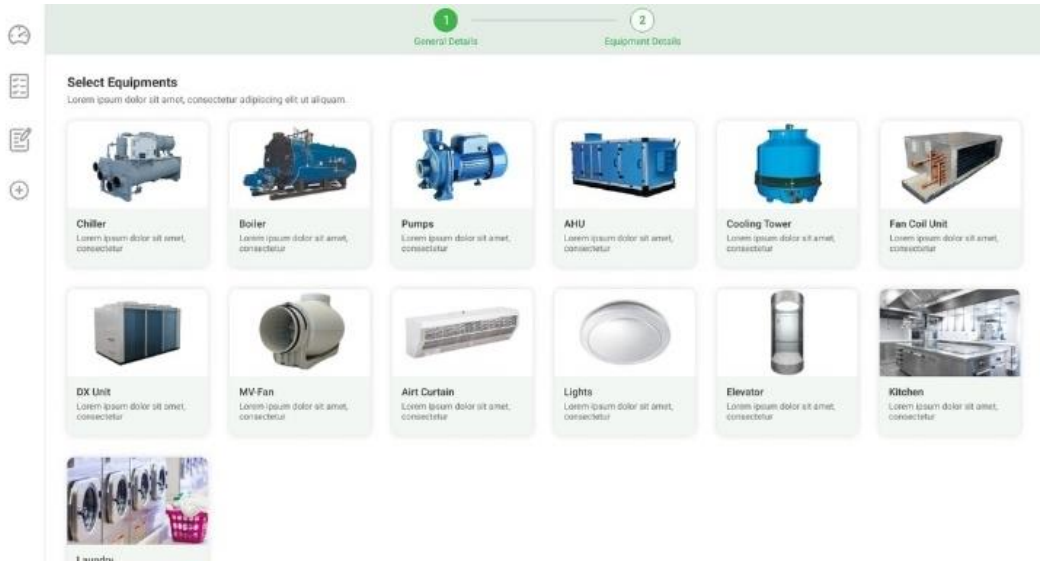


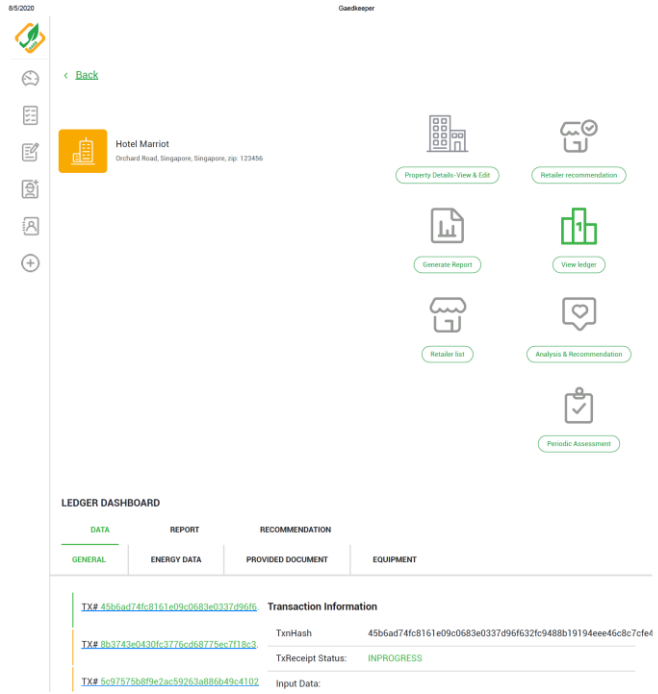


The login page and data of Alkaff Kampung Melayu Mosque to be collected on GAEDKeeper Intelligence Platform.

Project A: Alkaff Kampung Melayu Mosque – Smart and energy efficient mosque leveraging on artificial intelligence and blockchain

Energy consumption and equipment in the mosque will be analyzed with solutions recommended and implemented using our channel partners solutions. Reports will be saved via Blockchain ledger technology.





PROJECT B:
ST. JAMES POWER STATION
MAPLETREE INVESTMENTS

Project B: St James Power Station – Advanced technological solutions for monument building

Items	Remarks
Green Mark Rating	Green Mark Platinum Certified (ENRB 2017)
Proposed EUI (kWh/m2/yr)	128
GFA & NLA (sm)	12,941 & 11,365* (* NLA : estimated)
Number of Occupiers & Expected Usage	Single , Office and R&D
Expected Occupant Load & frequency of usage	Assumption: - 1 pax per 10 sm - 9am to 6pm (typical office most of the time)
Information on A&A	Assumption: - Office and R&D set-up with Kitchen

Project B: St James Power Station – Advanced technological solutions for monument building

S/N	SJPS GM Platinum Key Design Features	Design Performance Reference
1	Energy Utilization index (EUI)	EUI at 128 kWh/m²/ yr
2	Chiller System efficiency	Design for 0.619 kW/RT
3	AHU Design	Electronically Commutated DC Motors (ECDC)
4	Use of LED lighting	Common area lighting budget 3.8 W/m²
5	Thermal Performance of Building Envelope	Envelope thermal transfer value 41.5 W/m²

Project B: St James Power Station – Advanced technological solutions for monument building

Challenge Statement:

- Seeking proposals /solutions to achieve EUI (kWh/sm /yr) 79 or below from 128.
- Proposals shall be related to
  a) Building considering the limitation of the monument building for ETTV

PROJECT C:
JTC SUMMIT
JTC CORPORATION

Project C: JTC Summit – Super low energy office building (in the demo zones)

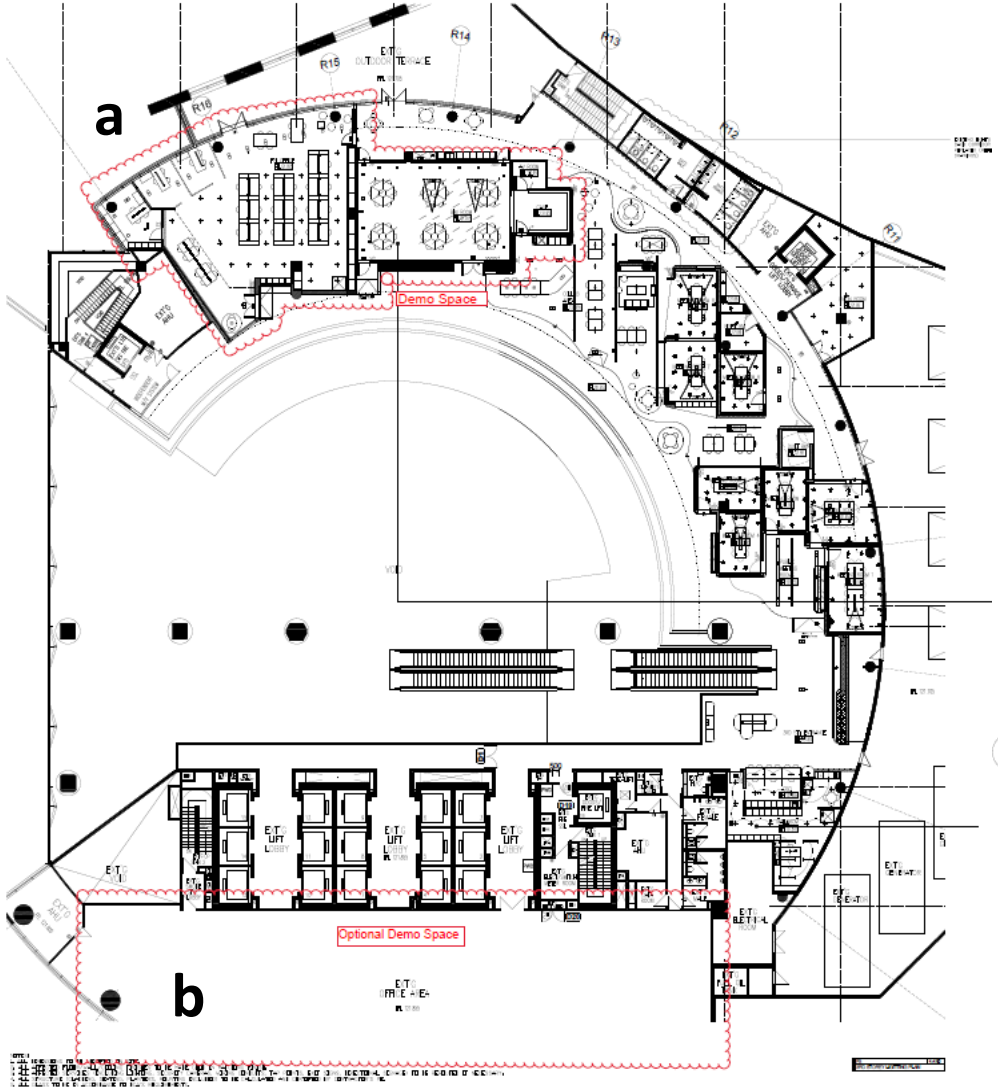
JTC Summit is a 32 storeys office building. Proposed demo spaces (listed below) are typical office use configurations and present good potential to transfer to majority of similar spaces across JTC summit.

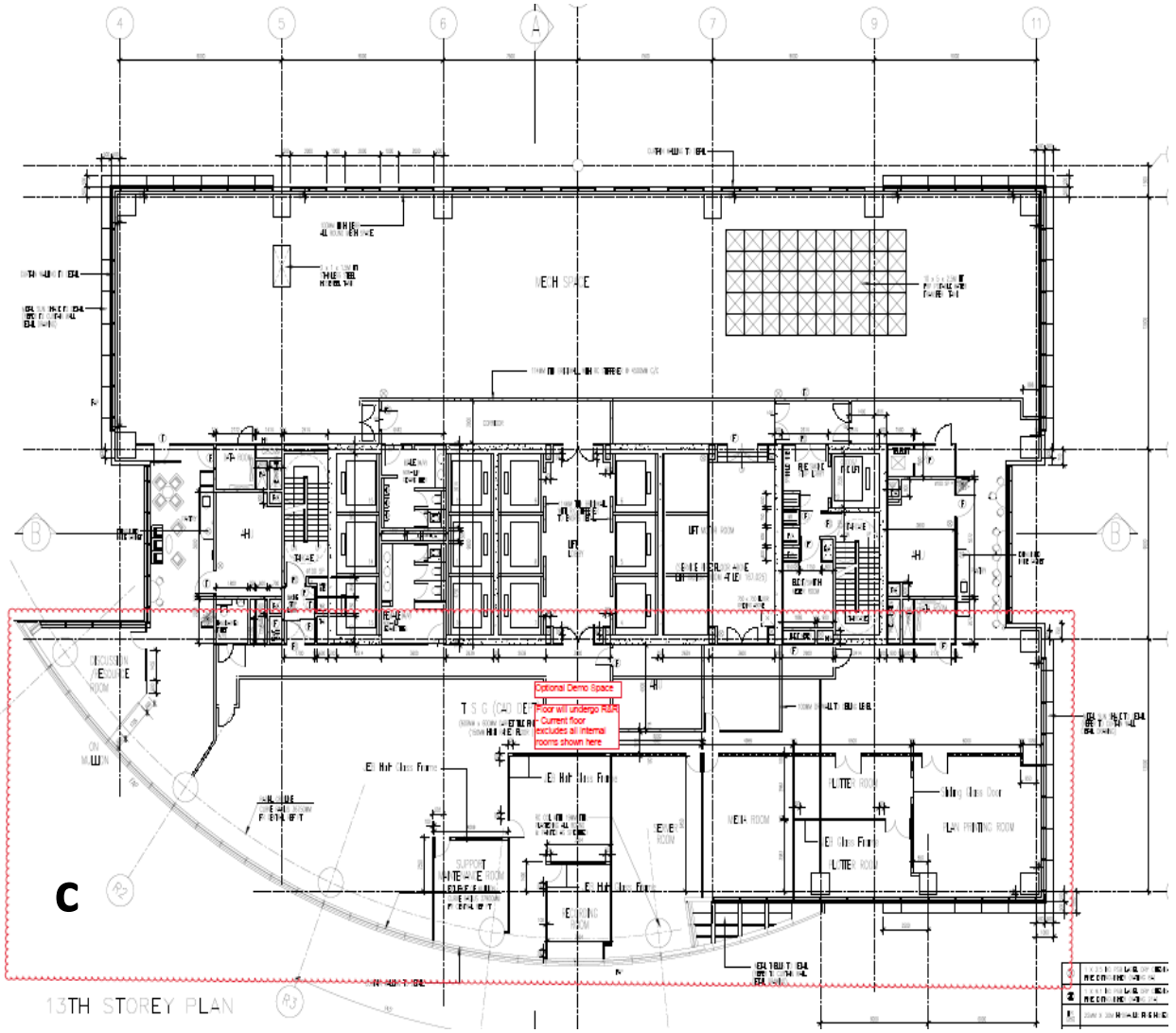
a. Level 3 Existing Office Space – Demo Space
b. Level 3 New R&R office space – Optional Demo Space
c. Level 13 New R&R office space – Optional Demo Space

Objectives:

- to demonstrate potential of achieving SLEB (GBIC energy challenge)
- to demonstrate cost effectiveness for proposed solutions/technologies
- to demonstrate ease of integration to existing building systems
- scalability and applicability to other office spaces
- to test optimal office configuration for low energy use profile, user comfort/productivity

Project C: JTC Summit – Super low energy office building (in the demo zones)





PROCESS AND TIMELINE

Process

BCA and ESG to launch the 3rd Joint Challenge Call:

1. **Engage** building owners/developers who are keen to participate in the challenge call – building owners/developers to identify a project (either new or existing) = cap at 3 projects.

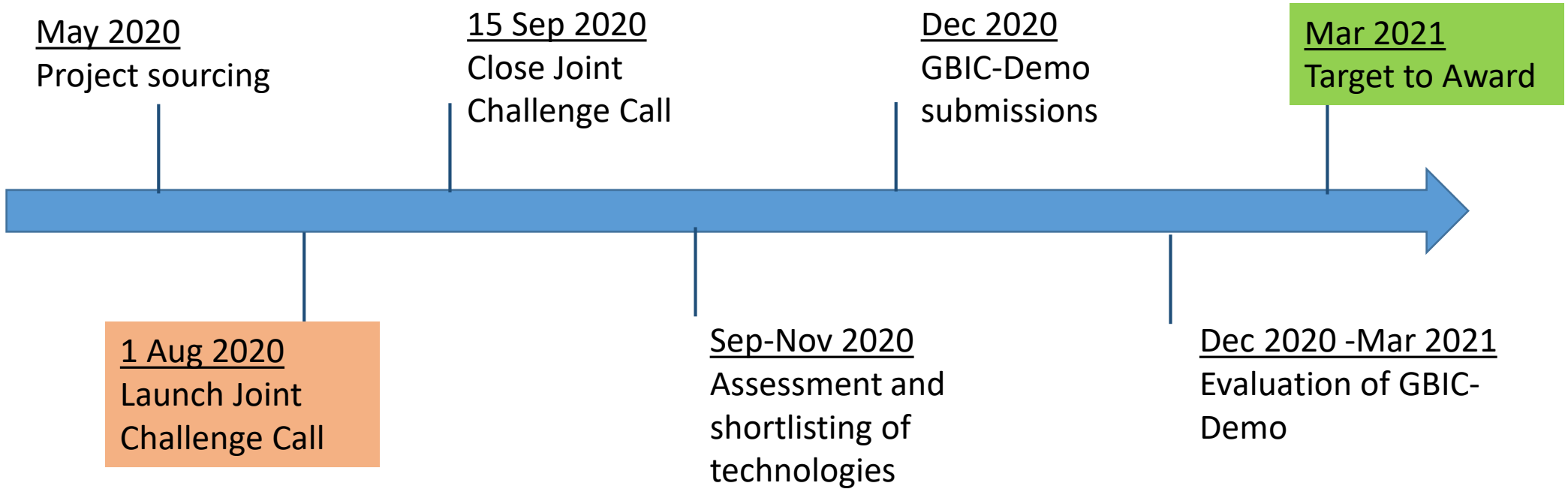
2. **Announce** the 3rd Joint Challenge Call for technology proposals for a period of 1.5 month (1 Aug – 15 Sep 2020) through CORENET, BCA website, Smart Hub and ESG's channels and partners.

3. **Evaluate** proposals BCA, ESG and building owners, and schedule for interviews with technology providers.

4. **Assess** technology feasibility and shortlist jointly by BCA, EnterpriseSG and Project owners.

5. Project owners will separately submit for GBIC-Demo funding or technology providers to submit ESG EDG funding.

Timeline


May 2020
Project sourcing
15 Sep 2020
Close Joint Challenge Call
Dec 2020
GBIC-Demo submissions
Mar 2021
Target to Award
1 Aug 2020
Launch Joint Challenge Call
Sep-Nov 2020
Assessment and shortlisting of technologies
Dec 2020 -Mar 2021
Evaluation of GBIC-Demo

PROPOSAL APPLICATION

PART A – Details of Technology Proposed

Information pertaining to the technology proposed.
What is unique about this technology – emphasis is on innovation.
We also like to understand if the technology was developed by Institutes of Higher Learning or Research Institutes with funding support from other government agencies.

Technology proposed should:

- Achieve better performance compared to the current best-in-class technology,
- First of its kind to be demonstrated in Singapore
- Take into account the tropical climatic conditions of Singapore

PART B – Application of Technology

We would like to know what is the scale of application for this technology in terms of building types

PART C – Economic Considerations

We would like to understand economic value of the technology, its benefits in terms of cost, space or labour savings for the client to incentivize rapid deployment across the industry.

PART D – Commercial Viability and Business Scalability

We would like to understand the commercial value of your solution and business model, in terms of your plan and ability to market and deploy the solution both locally and overseas, maintain competitiveness intent and potential to continue to work with other Singapore companies.

PART E – Applicant's Details

All applications must be accompanied with the applicant's ACRA Bizfile, management accounts, and other required documents to be considered.

Please provide the details of the contact person as we will be scheduling interviews and/or seek clarification

FAQS

Frequently Asked Questions

1. Can I propose my technology solution for all 3 building projects?
Yes. Please indicate this clearly in the application form.

2. Can I submit a joint proposal with other technology providers?
We understand that some of you might wish to submit a joint proposal as a packaged solution. We would like to request that the lead applicant (eg. Lead consultant) to compile the inputs from the various technology providers as we would still need to assess the individual technologies. The submission should also mention what is the potential energy savings with all the proposed technologies integrated.

3. Can I submit more than 1 joint proposals for my technology?
Yes, you are permitted to do so.

Frequently Asked Questions

4. Can we request for a site visit to the building projects?
Due to the current Phase 2 safe distancing measures, we are unable to conduct a mass site visit. The building owners have assisted by providing as much information as possible for this challenge call (https://www.sleb.sg). You may get in touch with the building owners if you require more detailed information.

5. If my technology has been implemented in Singapore before, would it still qualify to be shortlisted?
We would need to assess based on the number of projects the technology was implemented, the building type and whether there has been any verification of the performance before we can make a decision. On a similar note, if the technology was funded in previous projects, it may not be eligible unless there was some improvement to the previous technology (eg. Improve performance).

6. What are the economic considerations to qualify for this challenge call?
Proposals should demonstrate plans to scale deployment beyond this challenge call. One way to demonstrate this is to identify the building portfolio from the building owners for which your solution will be relevant.

Frequently Asked Questions

7. I have an overseas technology which I would like to propose for the projects, would be considered?
Unique technologies with no local alternatives could be considered. However, it is expected for implementation to involve Singapore enterprise collaborators, and for there to be longer-term plans to develop, commercialize the solution in Singapore with Singapore enterprises.

8. I am a technology supplier and would like to work with a local SME implementation partners, would you be able to help connect me with them?
You may write to BCA_Challenge_Call@bca.gov.sg for assistance on this.

9. Would proposals led by larger enterprises (LLEs) and multinational corporations (MNCs) be eligible for support?
LLEs and MNCs should propose solutions with Singapore small/medium enterprise collaborators. Proposals with the most Singapore SME content will be strongly considered.

Frequently Asked Questions

10. May I contact the building owner directly for clarifications?
Yes. You are encouraged to direct building-specific enquiries to project owners, keeping BCA_Challenge_call@bca.gov.sg in copy (refer to Annex B for the contact details).

11. If my submission is late, can the closing date be extended?
The Challenge Call is open for applications from 1 August 2020 to 15 September 2020. For your application to be considered, please submit it before the closing date of 15 September. Any missing details can be supplemented with further clarifications.

12. What happens if my technology is shortlisted?
The building owner would proceed to submit a GBIC-Demo funding scheme to support the implementation of the technologies. Alternatively, the technology may be funded under the ESG EDG. This will be communicated to you following the shortlisting by the building owner.

Q&A

Before we end this webinar, any questions from the audience?



Building and Construction Authority

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

Enterprise Singapore

Growing Enterprises SG

BCA-ESG CHALLENGE CALL

-END OF LAUNCH WEBINAR-

Thank you for joining us, do visit https://www.sleb.sg and we look forward to receiving your applications at BCA_Challenge_Call@bca.gov.sg.