

Our Ref: GBIC-R&D RFP 02

Date: 24 May 2018

Built Environment Research and
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Green Building Technology (GBTEC)
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Circular to Professional Institutes / Associations

Dear Sir/Madam

Innovation Challenge Call for Advancing Net Zero through Smart Building Technologies

Background

1. To support the national target of reducing greenhouse gas (GHG) emissions intensities, BCA has set aspiration of achieving positive energy, zero energy and super low energy buildings in the tropics. A dedicated Super Low Energy Technology Roadmap has been introduced to guide the implementation of research and innovation.
2. To accelerate the development and deployment of innovative solutions for zero energy buildings, BCA is launching an **Innovation Challenge Call for Advancing Net Zero through Smart Building Technologies**. This challenge call, to be funded by Green Buildings Innovation Cluster (GBIC) programme, aims to develop and test-bed innovative smart building solutions to advance the agenda for Super Low Energy buildings through innovation.

Objective

3. This Challenge Call will provide opportunities for the industry to collaborate with researchers, technology providers and building owners to **co-innovate Smart Building Technologies toward advancing Net Zero in the Tropics**.


Scope of Challenge Call

4. Proposal shall involve development of smart technologies that are connected to building systems and are able to achieve significant energy savings. This includes smart sensor and control technologies, advanced data analytics, and artificial intelligence for building systems, etc.
5. The developed prototypes should be demonstrated in an operational environment (in an actual building) as part of the deliverables.
6. Proposals with strong commitment from building owners/developers to demonstrate their technologies in real buildings after R&D will be considered favourably. (Please see enclosed for details of Challenge Call)

Application

7. Interested applicants are required to submit White Paper proposal with the supporting documents and submit via email to [BCA Challenge Call@bca.gov.sg](mailto:BCA_Challenge_Call@bca.gov.sg) by 25 June 2018 at 1700 hours (Singapore time).
8. Full details of the challenge call, including the application form can be found at BCA's GBIC website at <https://www.bca.gov.sg/ResearchInnovation/gbic.html>
9. A sharing workshop for Innovation Challenge Call will be conducted at 9am to 12:30pm on 1 June 2018 at the **Auditorium T1-1, Academic Tower, Level 1, BCA Academy, 200 Braddell Road, Singapore 579700.**
10. To register your interest to attend the workshop, please email to the GBIC Secretariat at [BCA Challenge Call@bca.gov.sg](mailto:BCA_Challenge_Call@bca.gov.sg).

Yours faithfully,



TAN TIAN CHONG
DEPUTY MANAGING DIRECTOR
BUILT ENVIRONMENT RESEARCH AND INNOVATION INSTITUTE (BERII)
BUILDING AND CONSTRUCTION AUTHORITY

GREEN BUILDINGS INNOVATION CLUSTER (GBIC)
REQUEST FOR PROPOSALS (RFP)

Research Challenge Areas	Innovation Challenge Call for Advancing Net Zero through Smart Building Technologies
RFP Number	GBIC-R&D RFP 02
Category	GBIC Innovation Challenge Call
Open Date for White Paper	15 May 2018
Close Date for White Paper	25 June 2018 Proposals must be submitted via email to BCA_Challenge_Call@bca.gov.sg by 25 June 2018 at 1700 hours (Singapore time).
Contact (for proposal submission)	Green Buildings Innovation Cluster (GBIC) Secretariat c/o: Building and Construction Authority Green Building Technology (GBTEC) Programme Office 200 Braddell Road ZEB Level 3 Singapore 579700
Enquiries	Please send your enquiries to: BCA_Challenge_Call@bca.gov.sg

Background

1. Buildings account for approximately 40% of energy consumption globally, and contribute up to a quarter of greenhouse gas (GHG) emissions in Singapore. In response to climate change, Net Zero Energy Buildings (NZEBs) represent a transformative shift in the building sector, with an astonishing momentum gained over the past years. According to Navigant Research, the global NZEB market is projected to grow from less than USD 100 billion in 2016 to USD 1.4 trillion by 2035. The trend, notably, is led by rapid advancements of technologies and governments' sustainability agenda.
2. In 2016, BCA shared the aspiration of advancing net zero in the tropics, i.e. achieving positive energy, zero energy and super low energy buildings in our tropical and urban context. Subsequently, a technology development roadmap has been introduced to identify key technological areas and to guide research and innovation.
3. One of the most fast-growing and dynamic technologies towards net zero is the smart building technologies. Through tapping on Internet of Things (IoT), advanced sensors, data analytics, the smart technologies have shown a potential of saving an estimated 8-18% of total building energy consumption and providing a host of non- energy benefits¹. It is also considered particularly suitable for the research community and industry to drive co-innovation in this area.
4. BCA has been supporting R&D of smart and green building technologies under the Green Buildings Innovation Cluster (GBIC) programme since 2015. Substantial progress has been made in areas such as data-driven optimisation, model predictive control of multiple systems, etc. To continue driving the R&D towards innovative solutions with tangible outcomes, it is essential to strengthen academic-industry research collaboration to transform new knowledge into societal benefits through translational research and technology development efforts.

¹ Smart Buildings: A Deeper Dive into Market Segments, American Council for an Energy-Efficient Economy (ACEEE), 2017

Objective of Challenge Call

5. In this context, BCA is launching an Innovation Challenge Call to provide opportunities for the industry to collaborate with researchers, technology providers and building owners **to co-innovate Smart Building Technologies towards Advancing Net Zero in the Tropics.**

Scopes of Challenge Call

6. Proposal shall involve development of smart technologies that are connected to building systems and are able to achieve significant energy savings. This includes smart sensor and control technologies, advanced data analytics, and artificial intelligence for building systems, etc. (Please refer to Annex C for details of the Challenge Statement).

7. The technologies proposed should achieve a Technology Readiness Level (TRL) of 6 or above. (Please refer to Annex D for TRL classification). The developed prototypes should be demonstrated in an operational environment (in an actual building) as part of the deliverables.

8. Proposals with strong commitment from building owners/developers to demonstrating their technologies in real buildings after R&D will be considered favourably. Proposals should also show clear evidence of technical and commercial viability of the solutions to scale up for wider adoption in the market. This should be indicated clearly in the submitted proposals.

9. Project duration should be not more than 2 years for technology development and validation.

Eligibility

10. This call is open to all public and private entities. Proposals with strong industry involvement and commitment (e.g. as host institution) will be assessed more favourably. Institutes of Higher Learning (IHLs), Research Institutes, research start-ups, and not-for-profit organisations, are strongly encouraged to collaborate with the private sector companies to jointly submit proposals, together with support and commitment from public or private sector building owners/developers.

Evaluation Criteria

11. The following criteria will be used for the evaluation of proposals:

- a. High-technical-merit research and innovation that is novel, internationally competitive, directly addresses identified industry-challenge(s), and can lead to breakthrough results;

- b. Economic benefits to Singapore in terms of potential scale up for mass adoption, capabilities and manpower development.
- c. Excellent execution by an experienced project team with a good track record and whose members have the relevant and complementary expertise. Close collaboration and partnership with industry and a clear business model for the proposed innovation will be the vital consideration for award.

Funding Support

12. Private sector companies will qualify for up to 70% of funding support of the approved direct qualifying costs² of a project. IHLs, research institutes, public sector agencies and not-for-profit organisations will qualify for up to 100% funding support of approved direct qualifying costs of a project. Only IHLs and not-for-profit entities would be allowed support for indirect costs. These include up to 20% of qualifying costs for overhead costs.

13. Proposals should not be funded or be currently considered for funding by other agencies.

14. Funding awarded cannot be used to support overseas R&D activities. All funding awarded must be used to carry out the research and innovation activities in Singapore unless approved in the grant.

15. We expect each project to range in total size up to S\$800,000, although we may consider projects outside this range.

16. Projects would be considered for further funding support for large scale demonstration in a real building environment if they show potential at the end of the technology innovation.

Application and Evaluation Process

17. The call for proposals has two stages: (i) White Paper stage; and (ii) Full Proposal stage.

White Paper Stage

18. Interested applicants are required to submit White Paper proposal (see Annex A) with the supporting documents and submit via email to BCA_Challenge_Call@bca.gov.sg by 25 June 2018 at 1700 hours (Singapore time).

19. The White Paper should be kept to a maximum of 5 pages, describing the innovation proposal being proposed. Only **CVs** (2 page per team members such as PI, Co-PI, industry partners, building owner, etc. in the format specified in the Form) and references (up to 2 pages per White Paper) may be attached as supporting documents that will not be subject to the 5 pages limit. Please refer to **Annex B** for CV format.

20. Shortlisted applicants may be invited to present their proposals to the Project Evaluation Panel (PEP).

² Direct and indirect qualifying cost items shall base on National Research (NR) Fund Guide.

Full Proposal Stage

21. Lead applicants of the shortlisted White Papers will be invited to submit Full Proposals via NRF's Integrated Grant Management System (IGMS). This will be followed by the final selection of proposals for award.

Indicative Timeline

Activities	Timeline
Announcement of Innovation Challenge Call and Circular	15 May 2018
Workshop-cum-launch	1 June 2018
Closing of Innovation Challenge Call	25 June 2018
Evaluation & shortlisting of White Papers	15 July 2018
Submission of Full Proposals	31 August 2018
Evaluation of Full Proposals	September 2018
Award of Innovation Challenge Call	November 2018

Contact Details

22. For further enquiries on this challenge call, please contact us at BCA_Challenge_Call@bca.gov.sg.

Rights of Awarding

23. BCA reserves the right to select proposals to be awarded. For the avoidance of doubt, BCA reserves the right not to award to any proposal.

Annex C: Challenge Call Statement

Challenge Statement for Smarter Building Solutions	
Current Situation	<p>In line with the national sustainability target and Smart Nation initiative, developing innovative solutions to make our buildings smarter and greener has been imperative for our industry and research community. In this context, GBIC launched its first R&D Grant Call on smart building technologies and awarded eight projects in 2016.</p> <p>While the existing R&D efforts have addressed some of the technology challenges in this area, there are rooms for further improvement and continued efforts to drive R&D towards market-ready solutions:</p> <ul style="list-style-type: none"> • Most of the existing R&D efforts are yielding prototypes that are yet to be validated under operational environments. • Few industry collaborators are playing an active role in driving R&D towards commercialisation and market adoption. • Energy saving benefits of many existing R&D projects are unclear or difficult to be quantified. • Latest developments of emerging technologies are not adequately addressed or used to benchmark against the proposed technologies. • Less emphasis has been given to integration of proposed technologies into base building systems to realise benefits. • There is a lack of deep understanding of building clients/occupants' need for a smart, comfortable and productive built environment. • There is a lack of incorporation of industry standards, practices, and comprehensive strategies to overcome technical and non-technical barriers to market adoption.
Challenge Statement	<p>The challenge is to develop innovative and viable smart building technologies / solutions that are ready for scale up for market adoption.</p> <p>The energy saving potentials need to be clearly validated and demonstrated.</p> <p>Besides pushing the boundaries of novelty and building R&D capabilities, the proposed solutions must clearly define and address practical needs of the industry.</p>

	<p>The technologies proposed should be industry relevant and state-of-the-art. This is important as smart building technologies are fast-growing and rapidly evolving.</p>
<p>Possible solutions (not limited to)</p>	<p>Possible technology proposals could include:</p> <ul style="list-style-type: none"> • Integrated information and communication technology (ICT)/Internet of things (IoT) solutions to improve building energy management; • Accurate, low cost, multi-functional smart sensor network systems for indoor environment monitoring and control; • Advanced data analytics and artificial intelligence techniques for optimising building operations; • Open and universal data management platforms/applications that allow communication and integration of multiple building systems; • Smart solutions that can capture individual users' preference, deliver solutions, and influence occupants behaviours; • Adaptive and smart controls for innovative cooling, lighting and process load control systems.
<p>Desired outcomes</p>	<ul style="list-style-type: none"> • The proposed technologies should be able to deliver energy savings of at least 20% over current best-in-class technologies. • The outcomes must be demonstrated in actual buildings at the end of the innovation process.

DISTRIBUTION (via e-mail only):

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