

Enabling prescriptive/predictive maintenance as well as continuous optimisation of air-conditioning system

Challenge Owner	JTC Corporation
Opening date for proposal submission	12 November 2019
Closing date for proposal submission	14 February 2020, 12 pm (UTC+8)
	Proposals and all accompanying attachments must be submitted through the Sustainability Open Innovation Challenge portal.

BACKGROUND

Accounting for upstream power generation, buildings contributed to 28% of global energy-related CO₂ emissions (Global Status Report 2017). Global use of electricity in buildings also grew on average by 2.5% per year since 2010. It is thus vital to find solutions to reduce the energy consumption of our buildings. Among the electrical and mechanical systems in a building, JTC is looking for innovations that can reduce energy consumption by ensuring optimal running of the air-conditioning (AC) system within a satisfactory user thermal comfort level.

JTC is seeking innovative solutions to enable prescriptive/predictive maintenance, as well as continuous optimisation of air-conditioning systems, to ensure efficient energy usage while maintaining critical operations. The solution should be able to analyse system operations and provide maintenance/fixes with low false positive rates to maintain equipment and energy/cost efficiency.

DESIRED OUTCOMES

The desired outcome is a solution that can monitor and optimise air-conditioning system performance to reduce energy consumption.

TECHNICAL SPECIFICATIONS AND REQUIREMENTS

- Solution should:
 - Gather holistic and relevant building data to enable accurate real-time condition monitoring (e.g. embedded algorithms to advise the next course of action/recovery to reduce building disruption and man effort).
 - Detect a variety of anomalies based on data and failure conditions for AC systems.
 - Generate appropriate trigger and responses.
 - Provide continuous optimisation strategies and tools (model based) to the chiller plant as well as air-side equipment (e.g. air handling units, fan coil units, etc.) in order to reduce total electrical consumption and CO₂ emissions.
 - Interface at high level with the chiller system manager using an in-built network manager which will allow multiple open protocol selection
 - Where high level communication is not possible, an add-on chiller interface module, pump interface module, cooling tower interface module, flow

interface module or utility module must be supplied. The Interface modules should be hardwired to the System Manager panel and also include a number of sensors in order to provide the necessary information and control.

- Be capable of running multiple open protocols simultaneously and to translate information between protocols.
- Include user testing for feedback on users' thermal comfort.
- Proposals should include information on any proof-of-concept (POC)/minimum viable product (MVP) that is non-sensitive.
- Applicant should indicate estimated commercial price of solution, cost of operation/maintenance and cost-benefit analysis of the solution in the proposal.

Besides addressing the above requirements, the proposed solution should also fulfil the following criteria:

- Contains novelty in addressing the abovementioned criteria.
- Wherever applicable, aim to:
 - Enhance safety of operations; and/or
 - Reduce reliance of manpower; and/or
 - Achieve cost-effectiveness; and/or
 - Improve efficiency/productivity.

BUSINESS OPPORTUNITY

With the need to reduce energy, operations and maintenance cost of buildings, there will be demand from other building owners, developers and facility management companies. JTC can be the first customer for pilot deployment if the solution is successfully developed.

DEVELOPMENT TIMELINE

The solution should ideally be deployable immediately as a pilot or with minimal additional development within a timeframe of no more than 2 years.

THE RULES AND REGULATIONS ON THE CHALLENGE WEBSITE APPLIES, WITH ADDITIONAL INFORMATION BELOW.

FUNDING SUPPORT

Enterprise Singapore may support shortlisted local SMEs/startups with funding of up to 70% of the qualifying project cost, capped at \$250,000. JTC may provide additional funding to selected applicant(s).

Foreign solution providers are encouraged to work with local SMEs/startups for solution development.

ADDITIONAL RESOURCES

JTC will provide mentorship and test-bedding site for the solution.

IP ARRANGEMENTS

If JTC co-develops the solution with the applicant, JTC would like to co-own the foreground IP in equal undivided shares and obtain royalty-free rights of use.

EVALUATION CRITERIA

Proposals will be evaluated against the following criteria:

- Technical feasibility of solution [30%]:
 - Effectiveness in addressing the challenge statement
 - Operational feasibility for deployment at the facility
 - Minimal/no nuisance and disruption to tenants
 - Minimal alterations to existing infrastructure
- Economic feasibility of solution [30%]:
 - Commercialisation strategy
 - Estimated commercial price
 - Estimated operating, life cycle costs and return on investment
- Capacity and expertise to execute project [25%]:
 - Requisite capabilities and committed resources to undertake solution development
- Clarity of proposal and accompanying information on POC/MVP [15%]

TECHNICAL BRIEFING

A technical briefing will be held to provide interested applicants with more information. The details for the briefing are as follows:

Date :	18 Nov 2019 (<i>Monday</i>)
Time:	9am to 12 pm
Location:	230 Victoria Street, Bugis Junction Office Tower, Level 10, Singapore 188024 - Room: Little Red Dot

Please register your interest [here](#) by 14 Nov 2019, 12pm.

PROPOSAL SUBMISSION

Submit your proposal using the Application Form, together with all supporting documents, in the Sustainability Innovation Call portal.

CONTACT

For further enquiries, please email:

- Starsky_LIM@jtc.gov.sg – for matters pertaining to the challenge statement
- Sustainability_Challenge@enterprisesg.gov.sg –for assistance on:
 - *Using the Sustainability Open Innovation portal for registration, submission of proposal, etc.*
 - *Funding enquiry*