Safe and environmental-friendly on-site industrial and commercial solid waste (ICW) treatment solution

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

Today, waste is generally transported to incineration plants and processed to reduce solid waste volume by about 90%. The ash output is subsequently disposed to Pulau Semakau as a landfill, which will run out of space by 2035 at the current waste disposal rate. The transportation of waste also generates carbon footprint and contributes to climate change.

JTC is seeking safe and environmental-friendly on-site industrial and commercial solid waste (ICW) treatment solutions with solid output no more than 5% of the original input by weight. The by-product solid output should meet regulatory standards for use in the building and infrastructure domains. In addition, there could be opportunities to recover energy for generation of utilities e.g. electricity, hot water, etc. at the building. The waste streams to treat are mainly mixed waste generated from the manufacturing processes, packaging, cafeteria, etc. Preferably, the solution can demonstrate the ease to scale up daily treatment of ICW generated beyond building-level.

The solution should bring down the overall operations and maintenance costs of waste management. Savings from refuse disposal (at benchmark rate of $77/ton), operating costs (e.g. rental of compactors, transportation of waste) and utilities generated on-site could be used to offset the costs of deploying and operating the solution.

DESIRED OUTCOMES

The desired outcome is an on-site zero-waste solution that treats ICW to no more than 5% of its input weight using safe, energy efficient and environmental-friendly methods. The by-product solid output should find uses that meet regulatory standards in the building and infrastructure domains. Applicants are also invited to submit proposals that focus on utility generation in the process of waste treatment, provided the waste reduction rate is no less than 90%.

TECHNICAL SPECIFICATIONS AND REQUIREMENTS

- As this is an on-site waste treatment solution, it should meet regulatory standards with minimal odours and noise for occupants' comfort.
- Solution should not require additional Gross Floor Area (GFA) for implementation.

- Solution should work within current electrical loading i.e. 32 Amps 3-Phase, for industrial estates.
- Solution is preferably at prototype/minimum viable product (MVP) phase with demonstrated technology for waste treatment and show preliminary commercially viable uses for the by-products (eg. filler materials in the building and infrastructure domains).
- Solution for utility generation (e.g. recovered energy) should be used on site, and demonstrate a pathway for commercial viability.
- Prototype of the solution should have a capacity to treat no less than 2 tonnes of waste within 24 hours; and has potential to scale up daily treatment of waste generated beyond building-level. The eventual scaled solution should strive to overcome NEA's nuisance buffer stipulated for waste treatment facilities.
- Solution must comply with all relevant safety regulations raised by Ministry of Manpower (MOM) and Singapore Civil Defence Force (SCDF).
- Solution proposed should be above TRL 6.
- Proposals should include information on any proof-of-concept (POC)/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

Singapore intends to reduce the amount of waste sent to Semakau landfill every day by 30% by 2030. A zero-waste solution enabling on-site waste treatment accompanied with utility generation, if proven financially viable and allowed by relevant regulatory agencies, could potentially be scaled across various industrial estates in Singapore. The waste treatment solution could even be exported overseas. Granting licence for the technical know-how of value-adding to the by-product solid output in the building and infrastructure domains, is another desired avenue. 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 20 months.

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. Selection of projects and test-bed sites will depend on the availability of the particular wastestream to be reduced in JTC's industrial estates.

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 *(Monday)*
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*