

Economical and energy efficient solution to control Automated Storage Retrieval System (ASRS) temperature and humidity levels

Challenge Owner	YCH Group
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

YCH operates a large 50 m tall Automated Storage Retrieval System (ASRS) facility sitting on approximately 111,500 sqft land area, which stores both fast-moving or long-term storage goods. The facility runs on natural ventilation and there are currently no humidity and temperature regulators at the facility. However, there are sensors for both parameters installed. Temperature in the ASRS can go up to 35°C on a hot day and relative humidity can reach 90% on rainy days. Prolonged exposure to moisture and warmth may cause degradation of carton boxes and require more pest control activities. Additionally, the control of temperature and moisture will enable a greater variety of goods to be stored in the ASRS, which utilises space more efficiently than most conventional warehouse.

Hence, an innovative solution is sought to keep the temperature of the ASRS at 25°C and the relative humidity below 70%, while keeping energy consumption to a minimum. This solution need not apply to the entire ASRS and can be applied at a pallet level or zonal level instead, to allow temperature and moisture-sensitive goods to be stored in the ASRS.

The solution should preferably not require modifications to the ASRS racks, and also minimise loading to the racks and structure. Due to the high precision moving parts within the ASRS, the solution should not introduce high vibration nor obstruct the paths of moving cranes and pallets. The solution should be energy and cost efficient. Air conditioning the entire facility drives up installation and operation costs, as well as introduces high carbon footprint and high structural loading on the facility. Standalone coolers and huge fans are not preferred as well.

Due to the complex operations of the ASRS, applicants are required to attend the technical briefing cum site visit to gain a better understanding of the challenge statement. Applicants that do not participate in the site visit are not eligible to submit a proposal for this Challenge Statement.

DESIRED OUTCOMES

The desired outcome is a solution that can regulate the temperature and humidity of a section of the ASRS without impacting the operation of the ASRS, does not require intensive infrastructure modification, and is energy and cost efficient. Ideally, the solution can cater to goods of different sizes and different storage periods.

TECHNICAL SPECIFICATIONS AND REQUIREMENTS

- Temperature should be maintained at 25°C and relative humidity below 70%. Ideal temperature is 25°C(+/-2 °C) and humidity is 65-70%.
- There should be minimal modification to the racking, and impact to the operation of the ASRS.
- ASRS machine sensitivity must be maintained (example: vibration to the ASRS sensor may result in misalignment).
- Compliance to structural standards according to prevailing regulations, and with both fire and building code regulations (as the ASRS is a rack-supported facility).
- Compliance with BCA Green Mark Platinum criteria.
- Solution will eventually require acceptance/approval by the ASRS supplier.
- Proposals are encouraged to 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:

- Not be readily or commercially available in the market.
- Wherever applicable, aim to:
 - Enhance safety of operations; and/or
 - Reduce reliance of manpower; and/or
 - Improve quality, consistency and service delivery; and/or
 - Achieve cost-effectiveness; and/or
 - Improve efficiency/productivity.

BUSINESS OPPORTUNITY

YCH may be the first customer of this ASRS temperature and humidity control solution. There is potential for scale up through deployment in other YCH regional warehouses or future facilities.

DEVELOPMENT TIMELINE

Prototype development should take around 6 – 9 months, followed by 3 months of monitoring and stabilising period. Based on the solution proposed, applicant should indicate a reasonable scale of prototype to be test-bedded (e.g. pallet or zonal level).

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

ELIGIBILITY CRITERIA

Interested applicants are required to attend a site visit cum briefing session at the Supply Chain City (SCC) on a strictly confidential basis to view the ASRS. Visitors are required to sign the YCH non-disclosure agreement (NDA) form that will be provided to applicants shortlisted for the visit. Only those that attended the session will be eligible to submit a proposal for this Challenge Statement.

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.

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

ADDITIONAL RESOURCES

YCH can provide temperature and humidity readings using existing sensors installed in the ASRS. Guided access to the ASRS and on-site test-bedding of solution are allowed. YCH will provide office space at the Supply Chain City to the selected applicant(s) for the duration of the project. Depending on the solution proposed, YCH may provide co-funding support for POC as well.

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 ASRS
 - Minimal/no nuisance and disruption to existing operation
 - Minimal alterations to existing infrastructure
- Economic feasibility of solution [30%]:
 - Commercialisation strategy
 - Estimated commercial price
 - Estimated operating, life cycle costs and return on investment upon deployment
- 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 cum site visit will be held to provide potential proposers with more information. The details for the briefing are as follows:

Date :	03 Dec 2019
Time:	2.30pm – 5.30pm
Location:	Office Lobby, Supply Chain City, 8 Bulim Ave, Singapore 648166

Please register your interest [here](#) by 22 Nov 2019. Only shortlisted applicants that receive email confirmation from YCH can join the session.

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:

- Wenda.yeo@ych.com – 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*