



# Challenge Statement: Data-Led Mixed Use Waste Handling

*Challenge Theme - Zero Waste Industries*

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# Our History



## Our Housing Roots

Singapore's Housing Development Board



## Leading Township Development Consultancy

Corporatisation of Surbana International Consultants



## Our Industrial Roots

Singapore's Jurong Town Corporation



## Leading Industrial Planning Consultancy

Corporatisation of Jurong International Holdings

# Background

## SG Green Plan & UN's SDG Road Map



### SG GP 2026 Target:

Reduce the amount of waste to landfill per capita per day by **20%**



### SG GP 2030 Target:

Reduce the amount of waste to landfill per capita per day by **30%**



### UN's Sustainable Development Goals 2030

Goal 12  
Responsible Consumption & Production

Goal 13  
Take urgent action to combat climate change and its impact



# Singapore's Zero Waste Masterplan

## Present Scenario and Target

### Targets Towards Zero Waste

Singapore's Zero Waste Masterplan sets the target to increase national recycling rate to 70%, domestic recycling rate to 30% and **non-domestic recycling rate to 81%**.

### Action

- Managing waste streams of food waste, E-waste and packaging waste.
- Closing waste loops to achieve circular economy.



## Reduce amount of waste

Sent to Semakau each day from

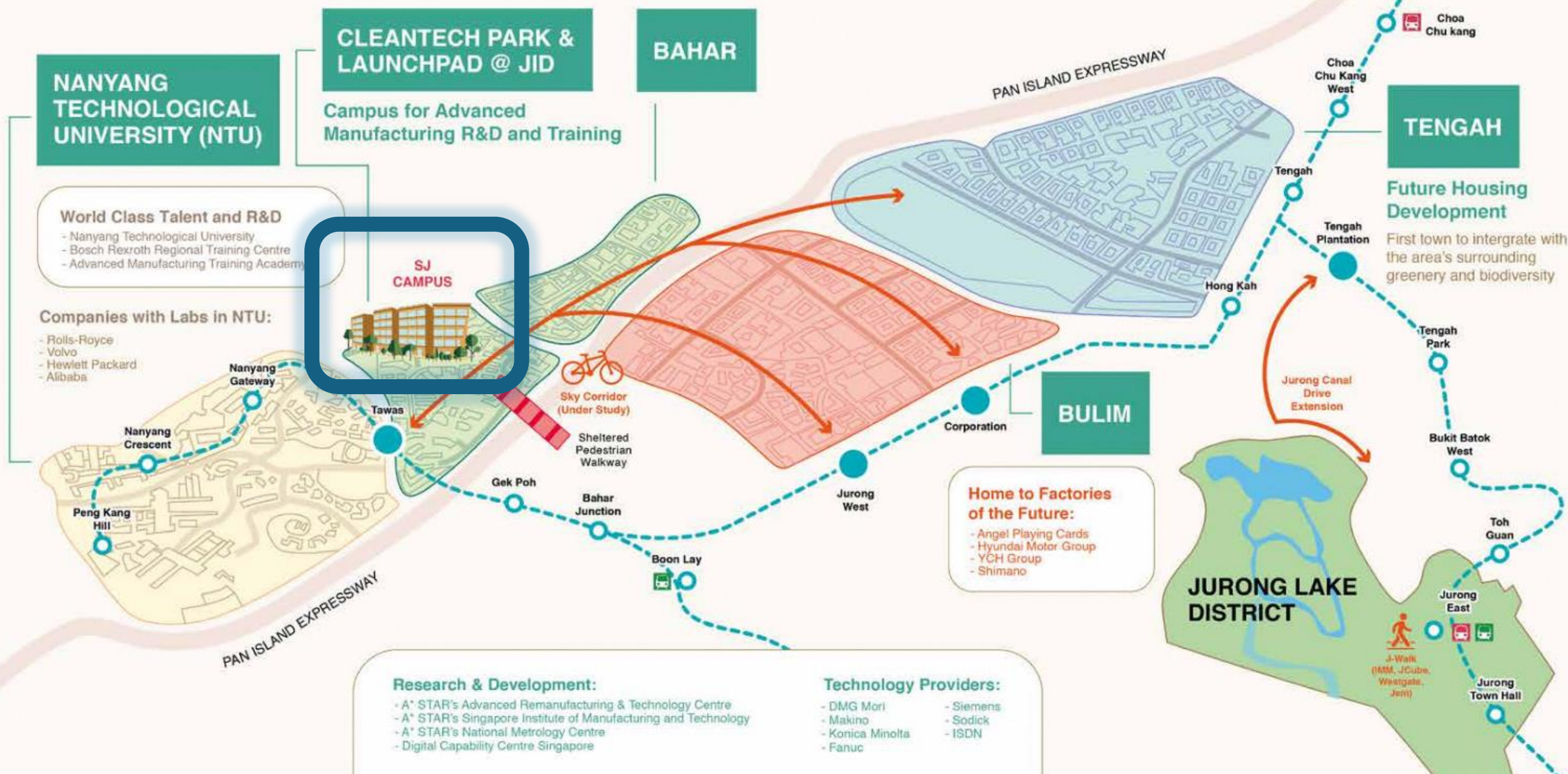
0.36kg/capita  
In 2018



0.25kg/capita  
By 2030



# Background: SJ Campus Location



**CLEANTECH PARK & LAUNCHPAD @ JID**  
Campus for Advanced Manufacturing R&D and Training

**BAHAR**

**NANYANG TECHNOLOGICAL UNIVERSITY (NTU)**

**World Class Talent and R&D**  
- Nanyang Technological University  
- Bosch Rexroth Regional Training Centre  
- Advanced Manufacturing Training Academy

**Companies with Labs in NTU:**  
- Rolls-Royce  
- Volvo  
- Hewlett Packard  
- Alibaba



**BULIM**

**Home to Factories of the Future:**  
- Angel Playing Cards  
- Hyundai Motor Group  
- YCH Group  
- Shimano

**TENGAH**

**Future Housing Development**  
First town to integrate with the area's surrounding greenery and biodiversity



**Research & Development:**  
- A\* STAR's Advanced Remanufacturing & Technology Centre  
- A\* STAR's Singapore Institute of Manufacturing and Technology  
- A\* STAR's National Metrology Centre  
- Digital Capability Centre Singapore

**Technology Providers:**  
- DMG Mori  
- Makino  
- Konica Minolta  
- Fanuc  
- Siemens  
- Sodick  
- ISDN

# DECAL Innovation Call

## Challenges

- Surbana Jurong Campus is setting itself the challenge to achieve a diversion from landfill rate of over 90 % or greater.
- Although Surbana Jurong Group is the anchor tenant there are third party tenants including F&B suppliers that must should be collaboratively and enthusiastically involved in the programme

## Desired Outcome

- Diversion from landfill rate of 90% or greater for all waste associated with Surbana Jurong offices and on-premise third party-F&B suppliers.
- Data-led platform for accounting for waste in a smart, digital manner for feedback; process optimisation and performance of value chain.
- Manage all food/organic waste from food & beverages at SJ Campus



# Waste Journey

## Waste Generation

Packed Food

Takeaway Drink



# 1

Disposing Leftovers

Takeaway Food



# 2

Wash Recyclables



# 3

Separate General Waste  
And Recyclables



# Waste Journey

## Waste Collection



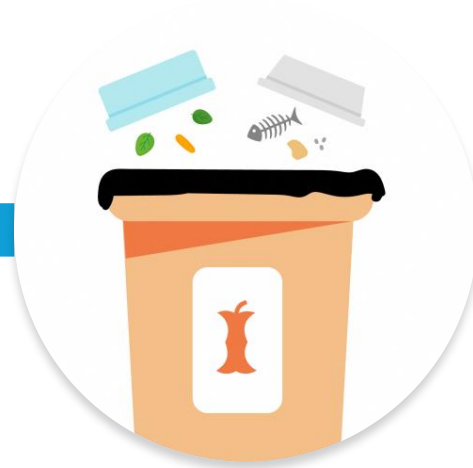


# Waste Journey

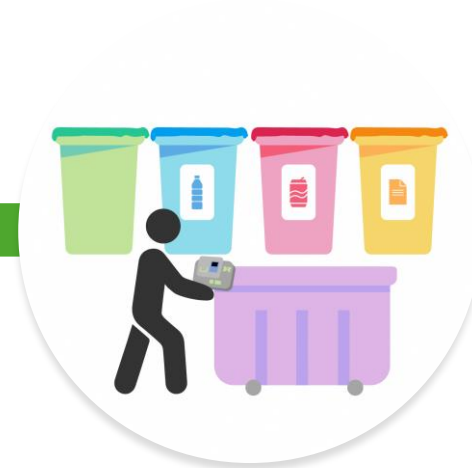
## Canteen Waste



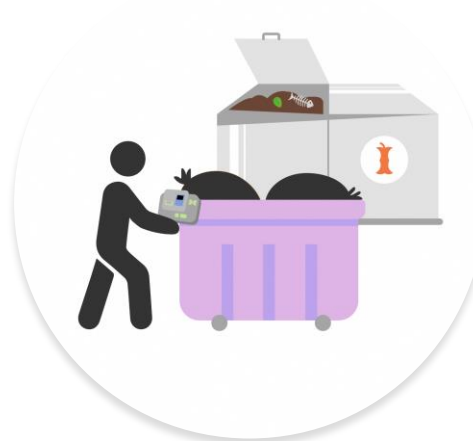
Canteen Food



1 Disposing Leftovers



2 Waste Collection By Cleaner



4 Bring Food Waste TO Digester



3 Scan Qr & Weigh Food Waste

# Requirements



## 01

A smart/intelligent data-led solution such as IoT devices allowing granular data capture by waste stream, weight and location for baselining, trending and hotspotting on SJ premises. The solution needs to be easily taught to and operated by front line cleaning/waste handling staff.



## 02

A solution or data service which allows the operator to optimise the waste servicing of the premises and showing the performance trends over the study period.



## 03

Hygienic infrastructure which allows the operator to safely handle food and beverage waste (organic waste from both plant and animal products) with solid and/or liquid effluent which can be certified as safe for agricultural use.



## 04

Promoting or fostering a connection of SJ Campus into a wider circular economy (eco-system) where such composted/digested waste is of value to community or commercial partners; to serve as a model at scale.

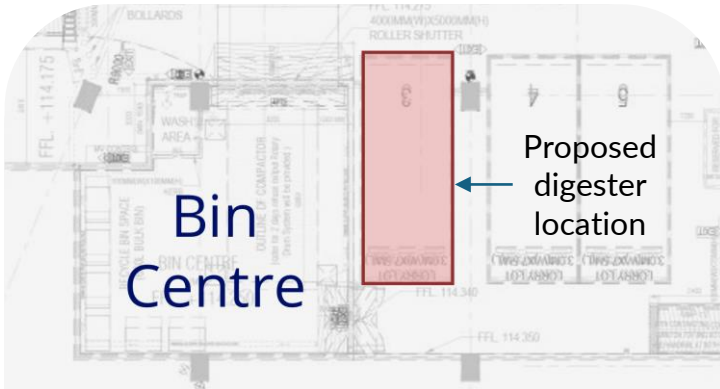


## 05

To create value that downstream waste/recycling haulage companies licensed by NEA can plug-in such that waste and recycling from SJ Campus can be “passported” or tracked all the way to the material recovery facility and/or landfill destination for true “diversion from landfill” rates.

For the avoidance of doubt, this call for an integrated solution across the value chain involving building users, building managers, first-line domestic staff, waste haulers and material recovery operators.

# Possible Solutions



## Bio-digester

- To be located at B1, outside bin centre. digester will occupy one loading/ unloading bay lot
- digester to cater for the whole campus
- Organic waste will be broken down by the digester into liquid effluent that can be discharged into the sewers
- M&E works required for digester to operate



## Dedicated Organic Waste Bins

- Food waste bins to be located at team lounge and pantries
- Need to be cleared frequently to prevent pests
- Food waste to be collected by cleaning vendor and discard into the digester



## Campaign & User Engagement

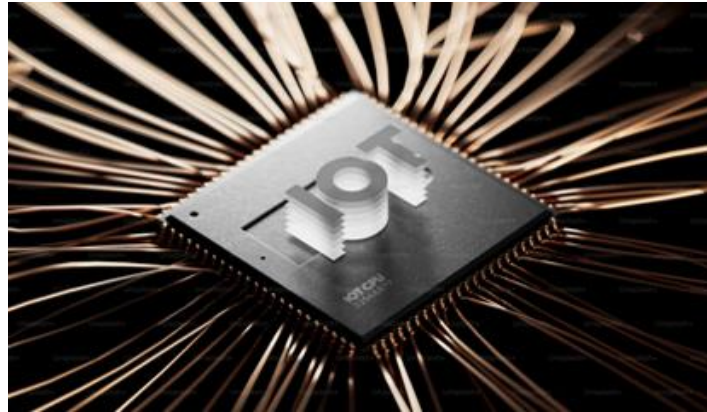
- Actively engage SJ employees on importance of proper waste management
- Campaigns to promote sustainability and raise awareness
- Promotes behavioral change

# Possible Solutions



## Biological Composting

Safe and hygienic microbial and/or other biological composting (e.g. *Hermetia illucens* black soldier fly) as a service (design, build, operate and maintain) for closed-loop management of food waste.



## IoT

Internet of things (“IoT”) for granular data capture and acquisition on premises and fleet vehicle assets.



## Data Science

Data science for baselining and process optimisation and performance assessment of the value chain.