

Closing the Waste Loop in Singapore

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NEA's Vision and Mission are vital to Singapore



Our Vision

A Clean Environment, towards
a Liveable and Sustainable
Singapore

Our Mission

To ensure a Clean and
Sustainable Singapore,
together with our partners and
community

We strive towards achieving these desired outcomes through our work



Clean Air
Clean Land
Clean Water



High Standards of
Public Health



Sustainable and
Resource Efficient



Timely & Accurate
Weather Services

Our work covers many diverse areas

Improve and sustain a clean environment



Pollution Control
(Air Quality, Water Quality, Chemical Safety, Noise Control)



Radiation Protection and Nuclear Science

Promote resource efficiency & conservation



Energy Efficiency & Conservation



Waste Resource Management

Provide timely & reliable weather information



Weather Services & Climate Science

Maintain high standards of public health



Public Cleanliness



Vector Control



Smoking Prohibition

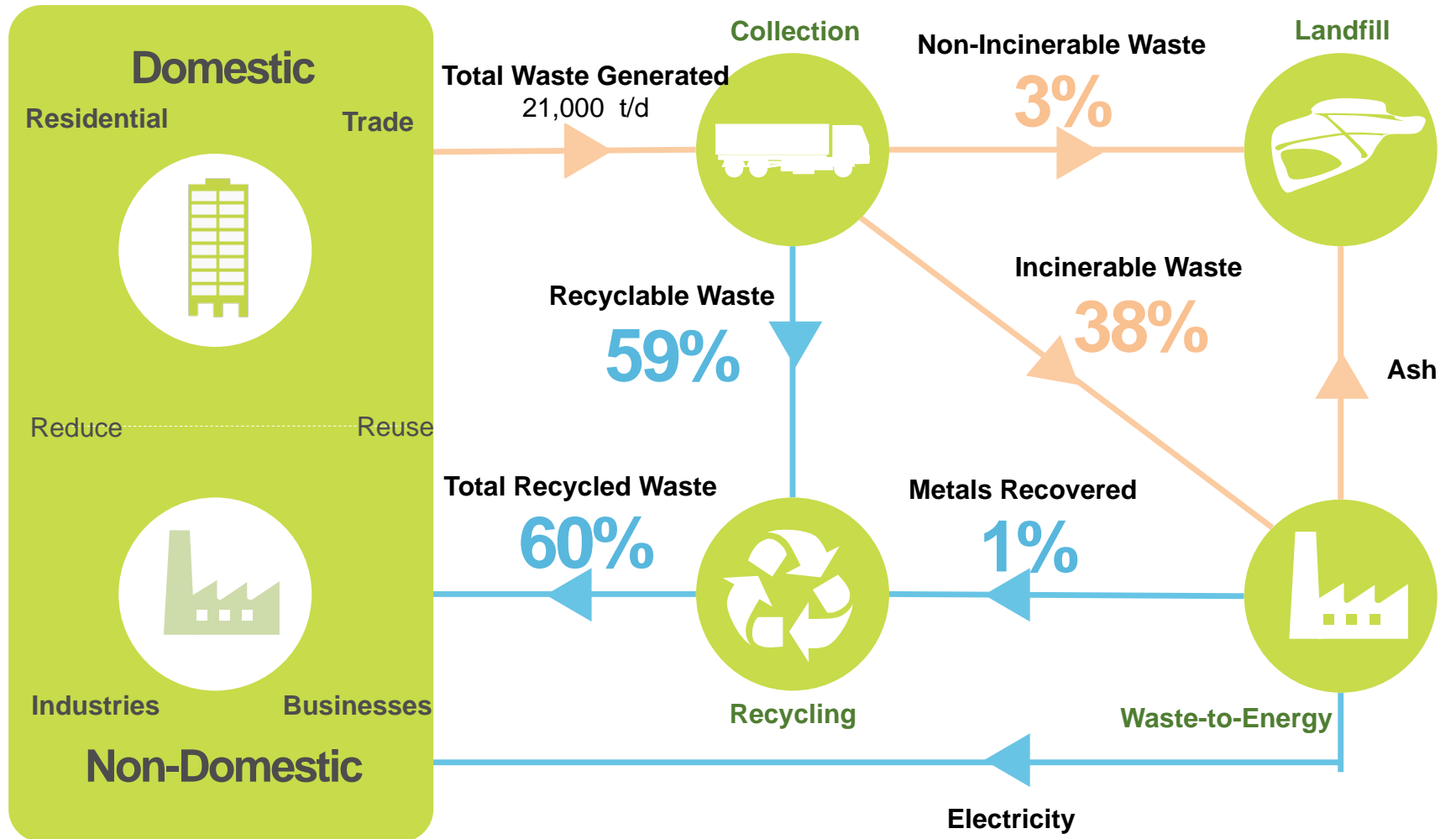


Care for the Dead



Hawker Centres

Singapore's Solid Waste Management System



2018 figures

At the current rate of waste disposal, we will need:

One Waste-to-Energy Plant

Every **7-10 years**



One Landfill Every **30-35 Years**



Co-digestion of Food Waste with Used Water Sludge



Lab-Scale Study

- Conducted from May 2015 – Feb 2016 by NEWRI
- Demonstrated technical feasibility of co-digestion at lab scale
- Informed the design of the pilot-scale facility

Pilot-Scale Facility

- 40 tonnes/day treatment capacity
- Located at Ulu Pandan Water Reclamation Plant
- Began operations in Dec 2016

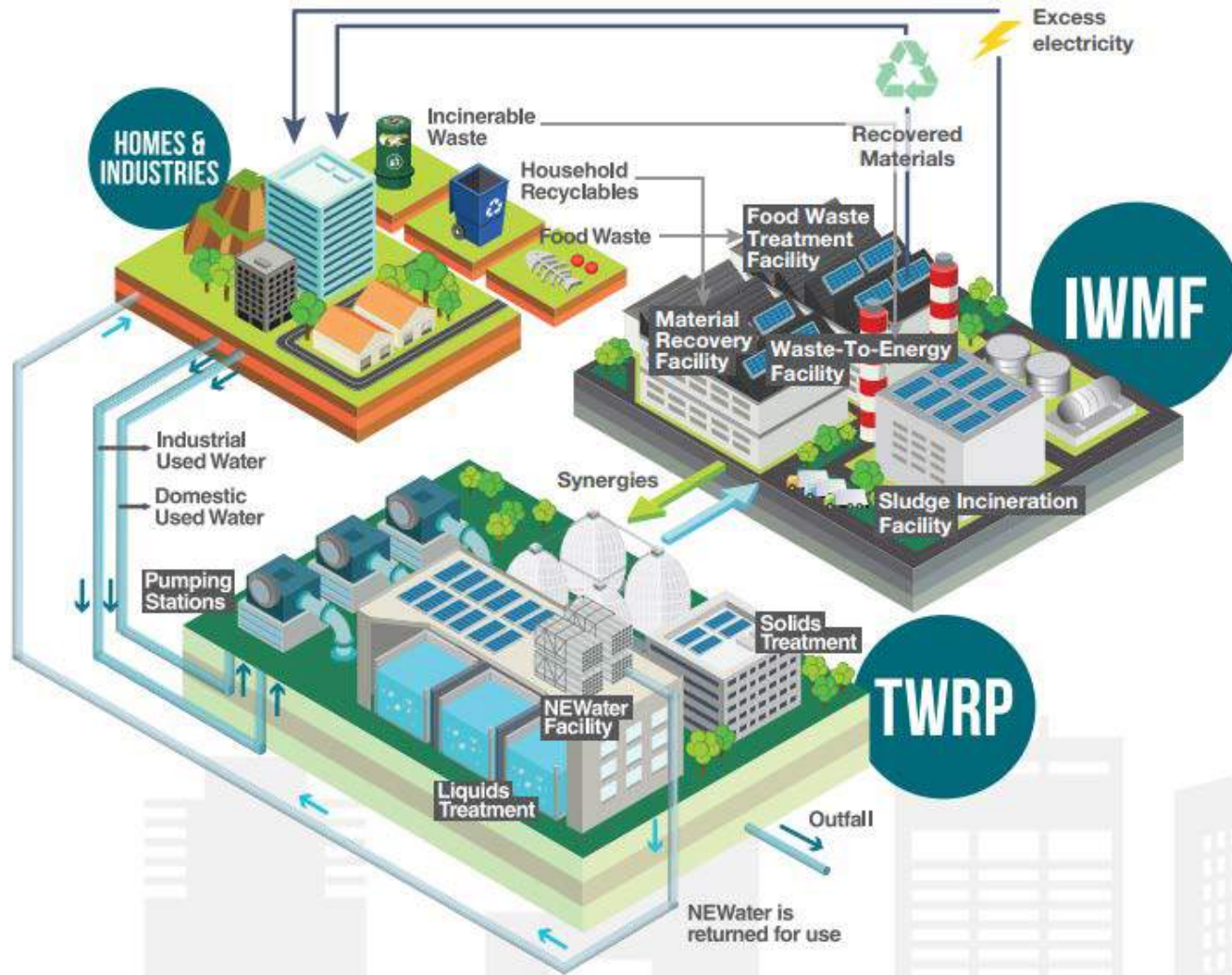
Further Developments

- Potential scale-up in the upcoming Integrated Waste Management Facility (IWMMF) at Tuas Nexus

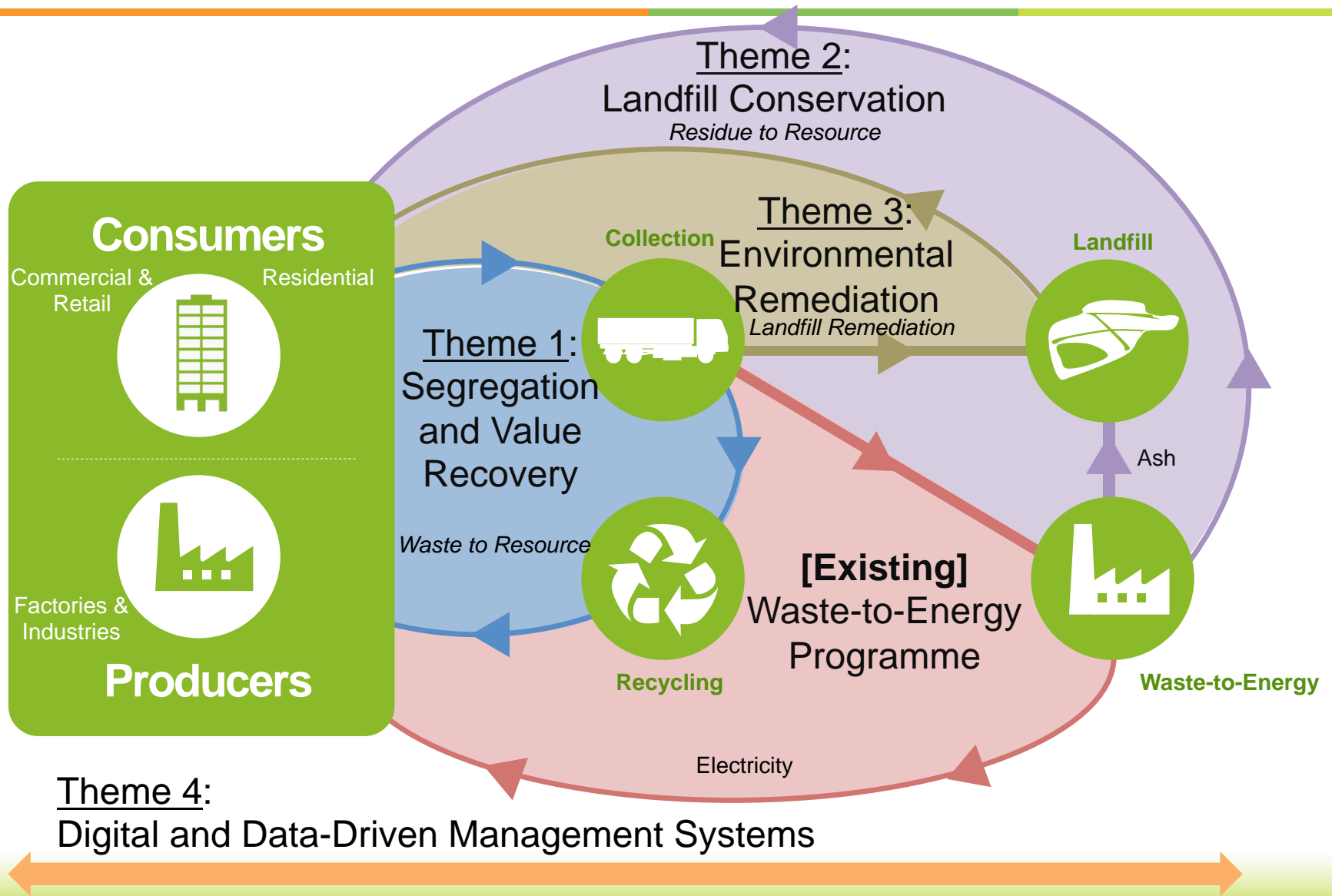


Tuas Nexus

Co-location with Tuas Water Reclamation Plant (TWRP)

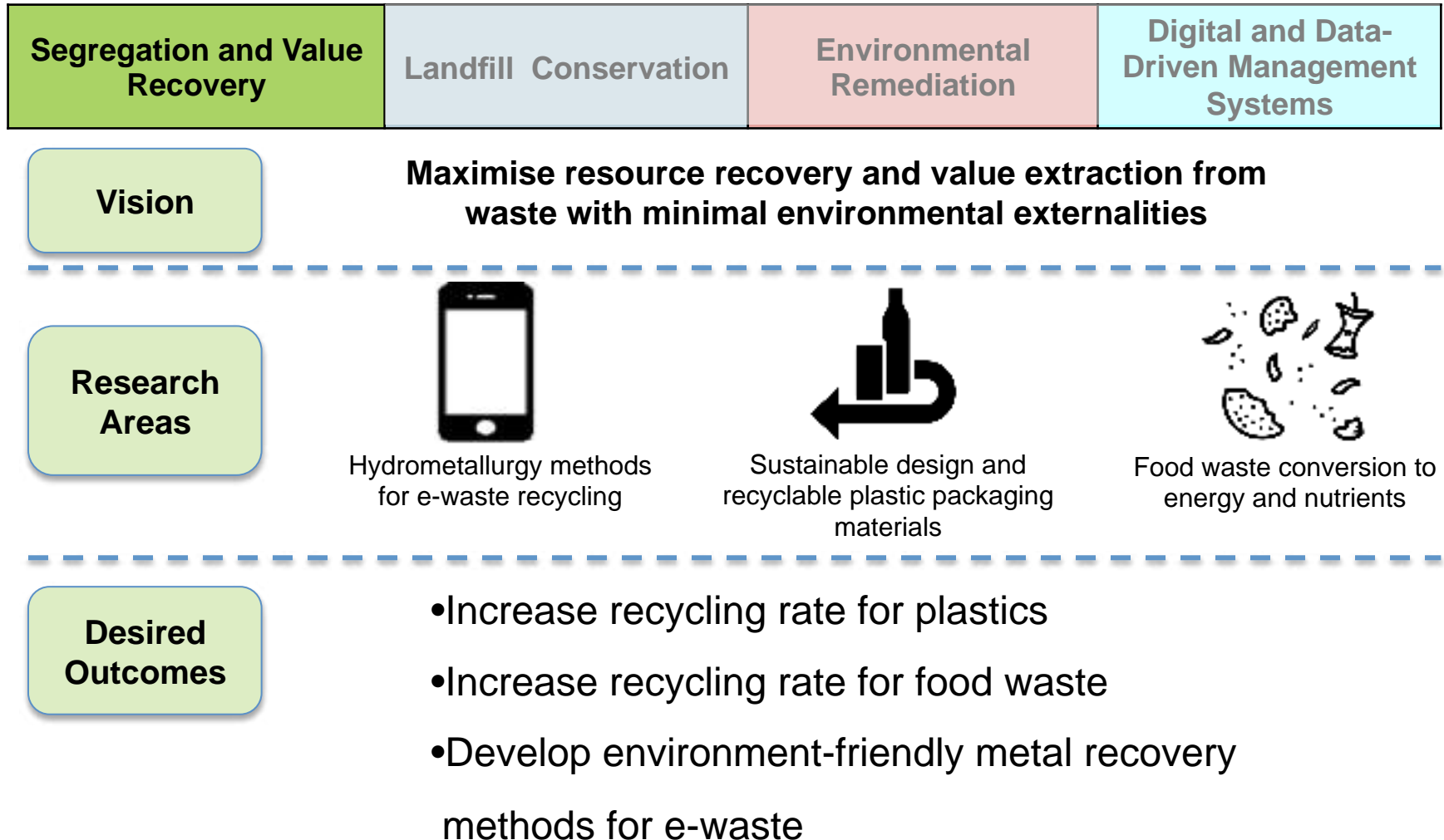


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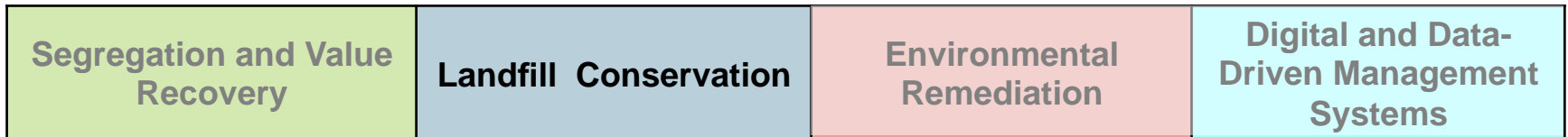
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Theme 1: Segregation & Value Recovery



Closing the Waste Loop

Theme 2: Landfill Conservation



Vision

Utilisation of incineration bottom ash and residues as resources to prolong lifespan of Semakau Landfill

Research Areas



Cost-effective and energy-efficient treatment processes



Treatment for recycling of industrial residues



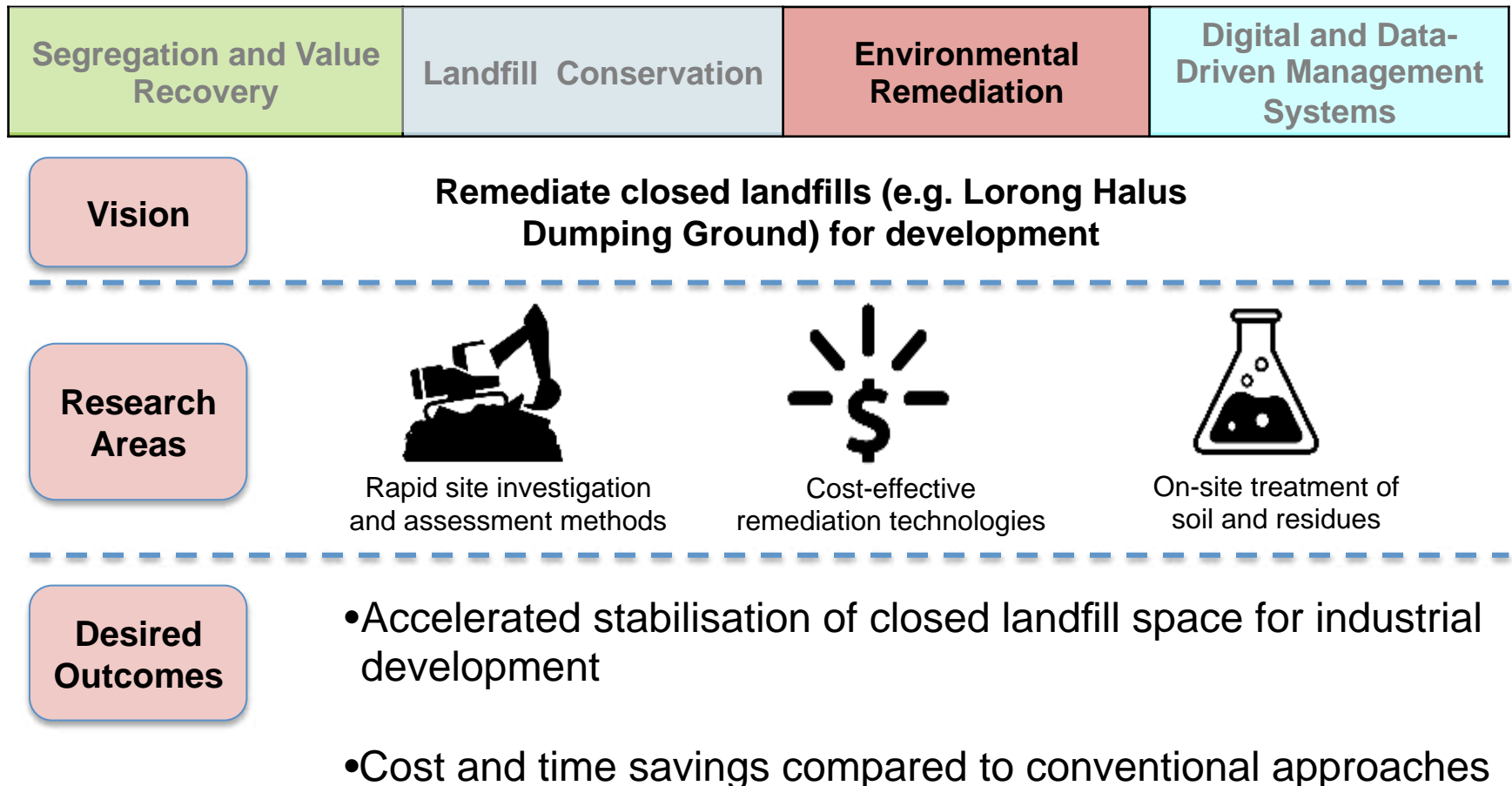
Novel applications of incineration ash and non-incinerable waste

Desired Outcomes

- Divert incineration bottom ash from Semakau Landfill by 2030
- Achieve volume reduction of incineration fly ash for disposal
- Higher resource recovery rate and minimised disposal of industrial residues to landfills

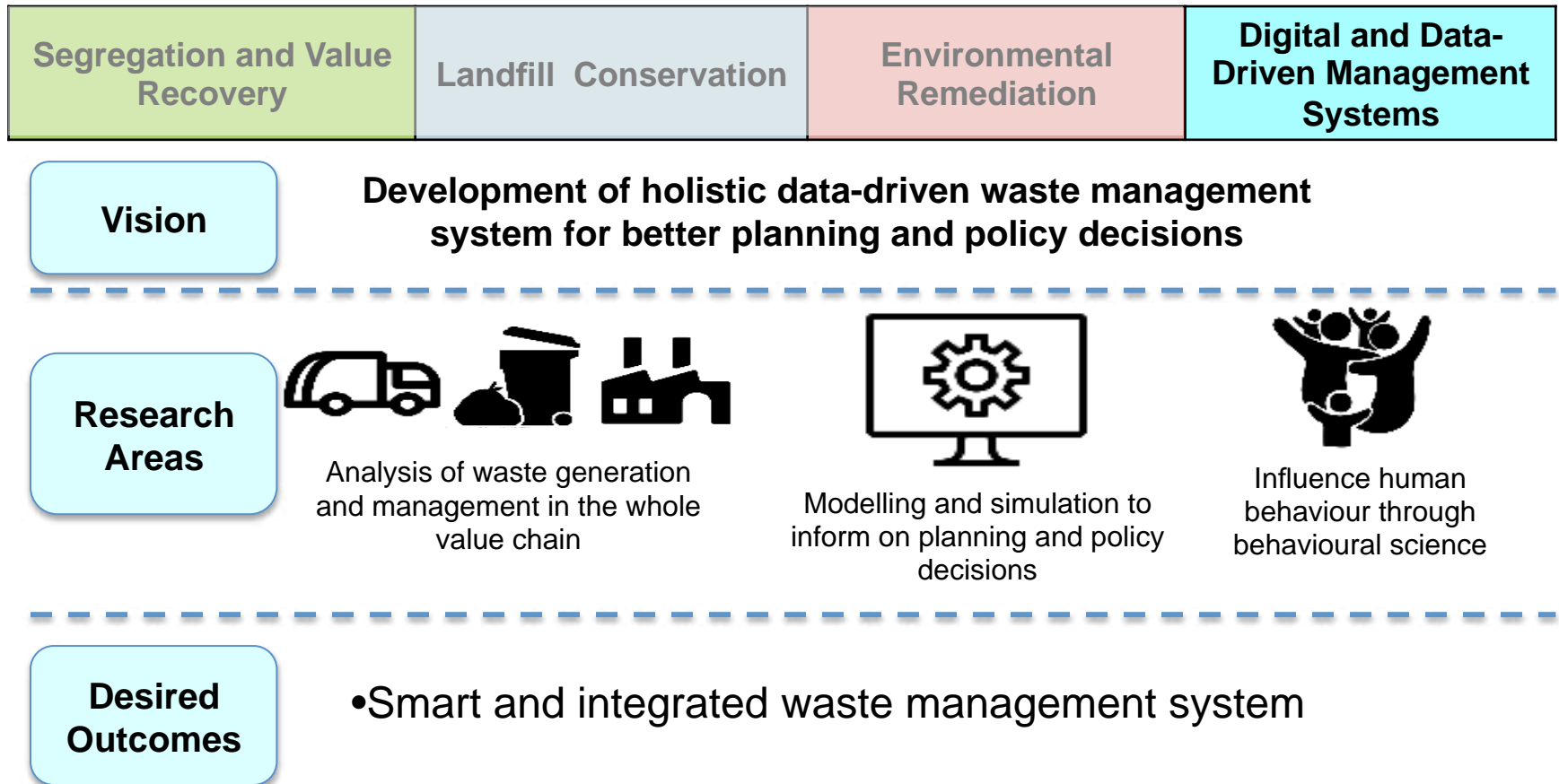
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Theme 3: Environmental Remediation

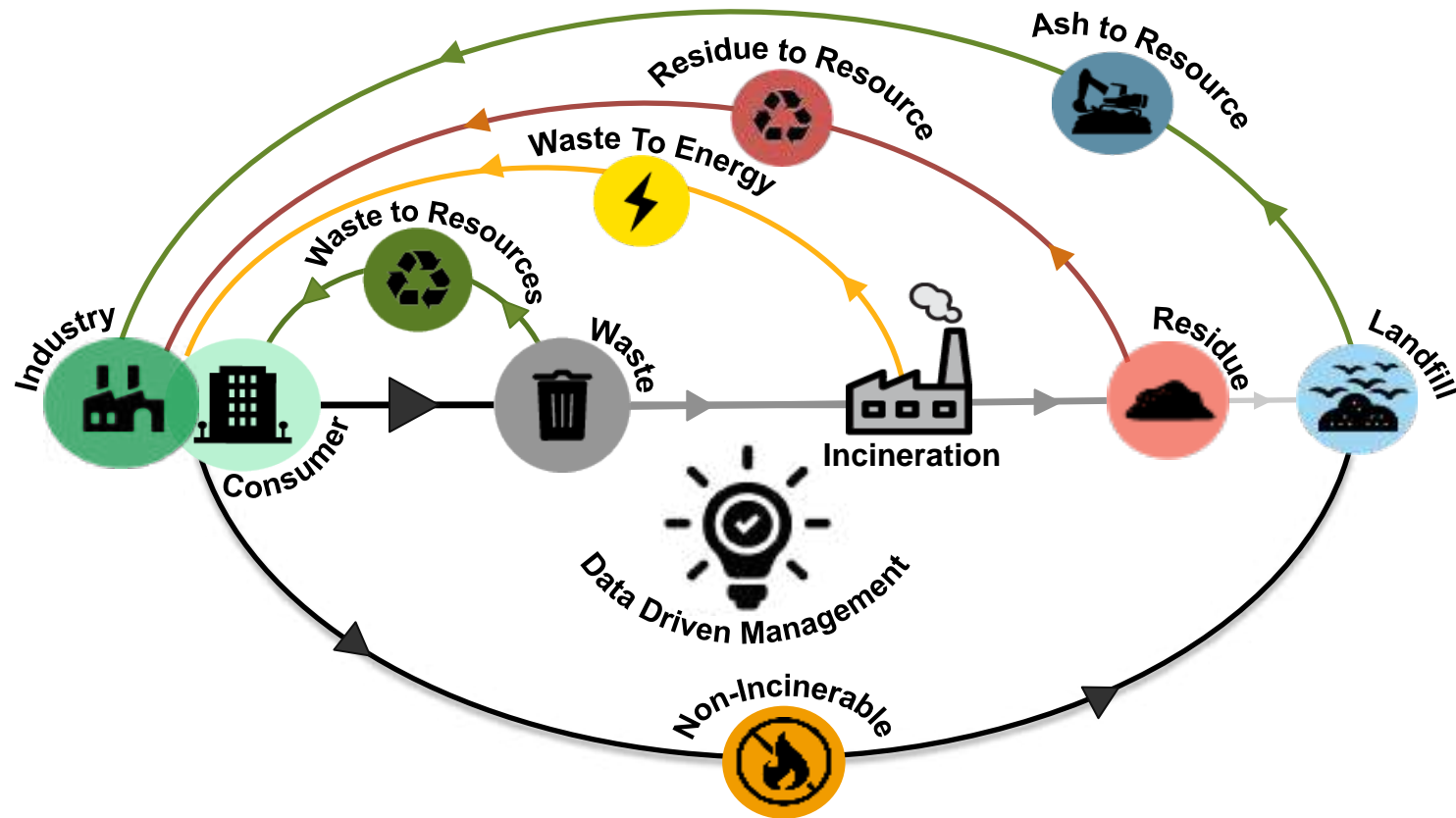


Closing the Waste Loop

Theme 4: Digital & Data-Driven Management



Rounding things up...



Our Environment

Safeguard • Nurture • Cherish

Waste-to-Energy Research Facility

- \$40 million facility co-funded by NEA and NTU
- Fully constructed by end-2018

Features

- High temperature slagging gasification
- Plug-and-play features

Possible demonstration and test-bedding projects

- Gasification of waste and biomass
- Syngas cleaning and upgrading for use in gas engines or turbines for higher energy recovery
- Utilisation of slag in engineering applications
- Novel flue gas treatment for lower emissions
- Low-grade heat recovery and oxygen enrichment

