Automatic Waste Sorting System for Brisbane City's WALI initiative

Group Q

EGB101 - Engineering Design and Professional Practice

Presentation Overview

1. **Project Context** – Krystian Rozanski
2. **Location** – Lucas Ackland
3. **Users** – Alex Wen
4. **Design Features –** Daniel Suter
5. **Community Impacts** - Alex Piamonte
6. **Conclusion** – Matthew Amos

Krystian Rozanski

Project Context

Brisbane City Council's Sustainable Initiative

Addressing the united nations' sustainable development goals 7, 11, 12, 13

Issuing the development of a WALI project.

WALI → Waste Awareness and Lifecycle Innovation

Images by (United Nations, 2024)

The Importance of Recycling in WALI

The lifecycle of a product without recycling:

Raw materials → Processing → Manufacturing → Distribution → Use → Disposal

Linear economy ⇨ **mass waste generation**

Linear economy ⇨ **decrease in the of abundance natural resources**

The Importance of Recycling in WALI

The lifecycle of a product with recycling:

A circular economy:

- Decreases pollution
- Increases the abundance of natural resources
- **Contributes towards sustainability**

Image by (Trinity College of Dublin, n.d.)

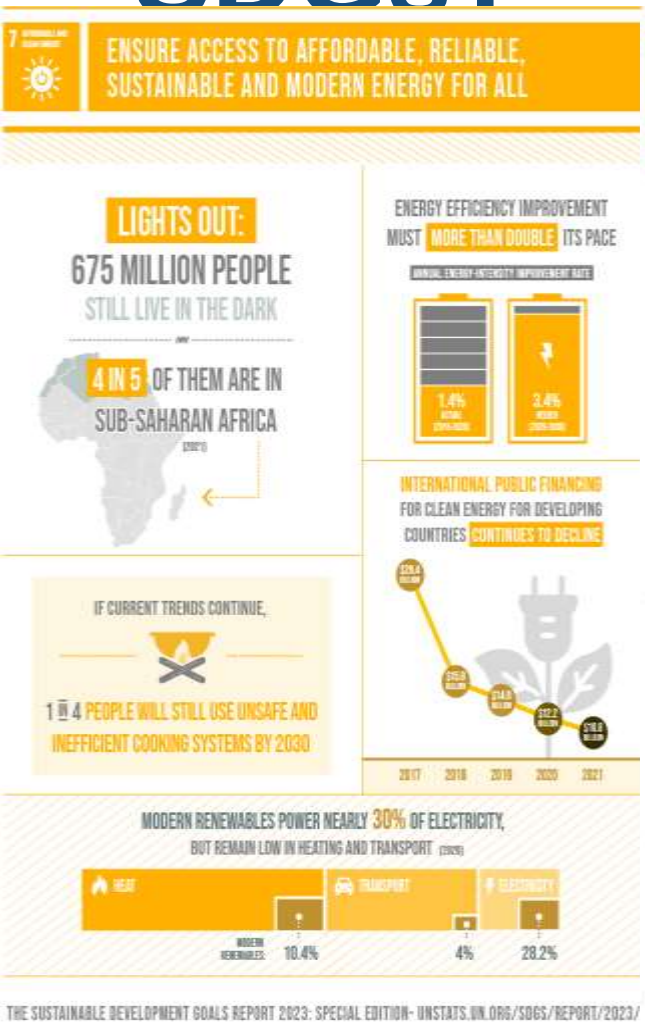
The Solution

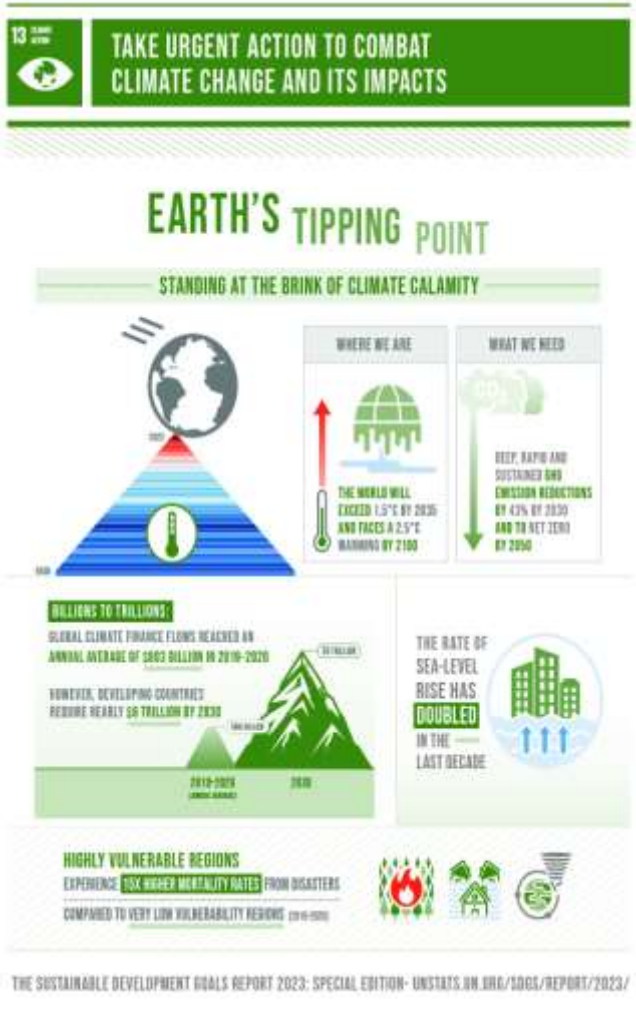
Automated Waste Sorting System

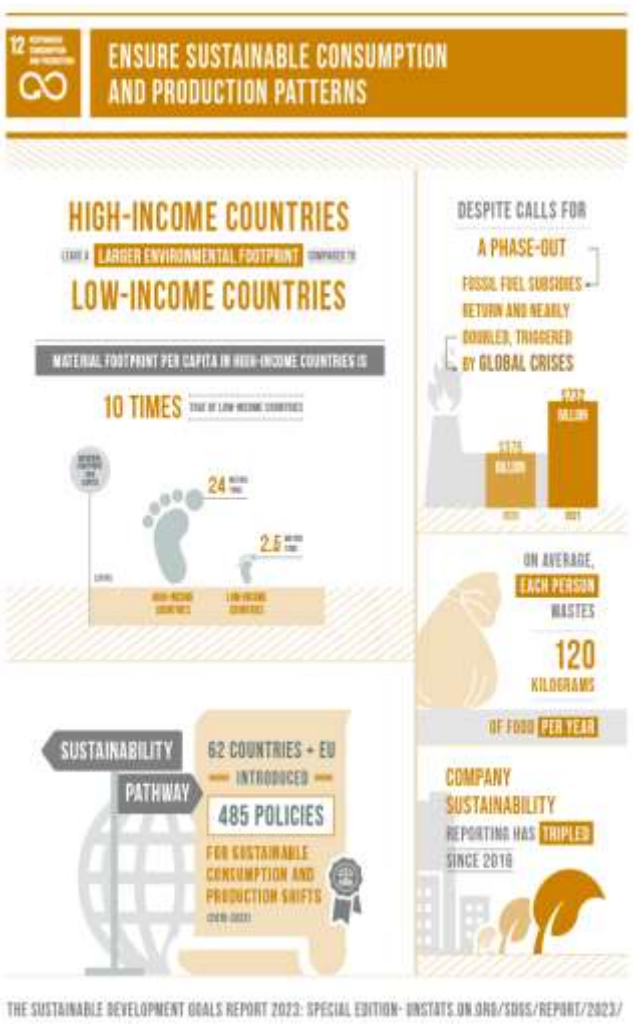
This system will:

- Separate metal, cardboard, and paper
- **Increasing** efficiency of recycling and therefore the **efficiency of sustainability**

How does the solution align to the SDGs?



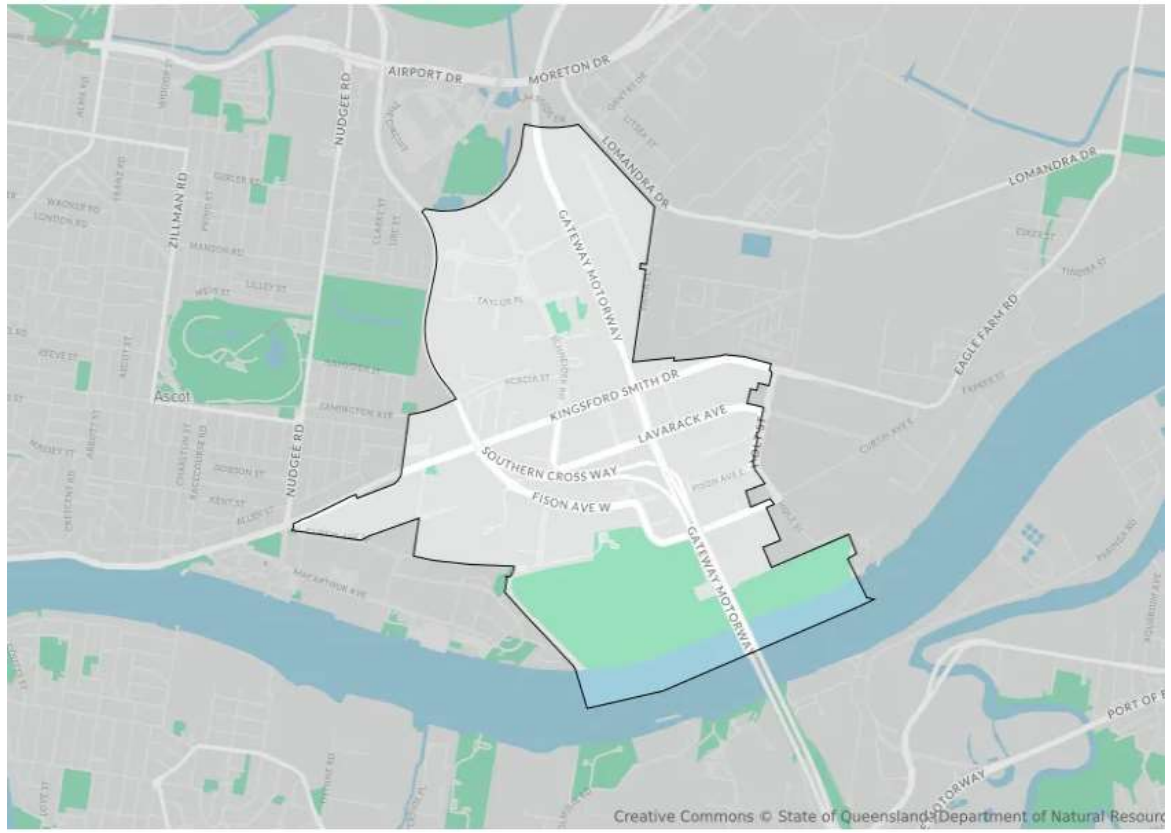




Images by (United Nations, 2024)

Location- Eagle Farm

- Industrial-commercial suburb ideal for waste management trials
- High volume of packaging waste from warehouses and freights
- Close to Brisbane Airport and major road networks
- Strong logistics infrastructure for transport and recycling



Infrastructure Compatibility

- Eagle Farm has extensive industrial infrastructure, facilitating scalable waste management solutions.
- Centralised waste collection systems are already common.
- Prototype can be integrated into existing loading docks or shared waste areas

Lucas Ackland
and Alex Wen

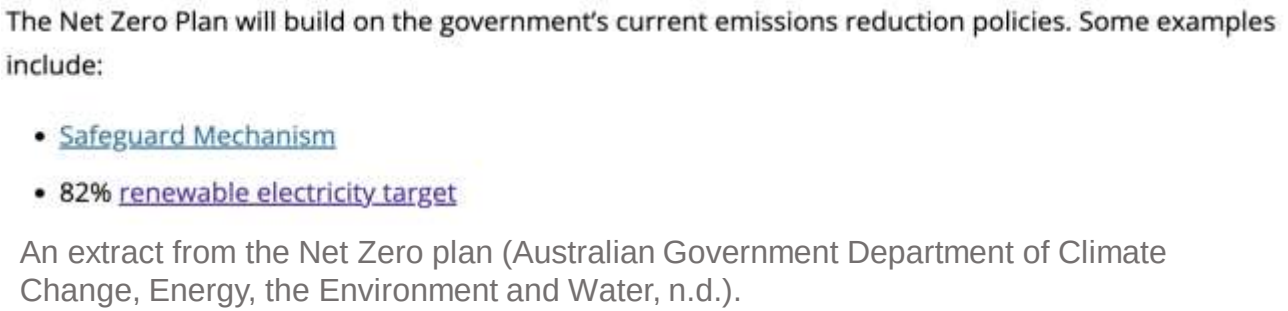
Location and Users

- Eagle Farm have a population of approximately 2,000 people
- Job roles such as pick packers, warehouse labourers, and machine operators are commonly found in the area, therefore, factory industrial waste are more common to be found.

Daniel Suter

Design Features

- W.A.L.I Key Features:
  - Fast Sorting time
  - Simple, energy efficient methods of sorting waste
  - Multiple waste types for sorting
  - Powered by clean energy
- User Guarantees from W.A.L.I:
  - Low-energy demands
  - Low amounts of noise pollution
  - Segregates multiple waste types – including plastics
  - Low-carbon emissions lifecycle
  - Cheaper to create and use than dumping waste



The Net Zero Plan will build on the government's current emissions reduction policies. Some examples include:

- Safeguard Mechanism
- 82% renewable electricity target

An extract from the Net Zero plan (Australian Government Department of Climate Change, Energy, the Environment and Water, n.d.).

Waste management, recycling and material recovery activities are a significant part of Australia's economy. We need to reduce the amount of waste we generate and accelerate the recovery rate of our resources.

An extract from the 2018 National waste policy (Australian Government, 2018)

Alex Piamonte

Community Impacts

Positive Impacts:

- Reduces pollution and landfill waste by sorting and recycling materials efficiently.
- Improve public health by reducing waste-like hazards such as illness and disease.
- Promotes engagement in sustainable practices within the community, and the participation of environmental awareness.
- Creates job opportunities in the following sectors: education, sorting, and recycling.

Negative Impacts:

- Setup costs and infrastructure development may be high initially.
- Behavioral resistance from residents may occur due to unfamiliarity with waste separation (confusion).
- Increase noise or traffic from sorting facilities, affecting residents nearby.
- Persistent education and community compliance required.

Conclusion

- The project explores the need for improved sustainable processes, through proper waste management and recycling techniques.
- Designed to be useful in major infrastructural area like Eagle Farm to manage leftover waste to be properly disposed of or recycled.
- The solution takes into account the Engineers Australia competencies, the need to recycle more materials, Australia Net Zero plan, while accounting for its users by limiting energy consumption, noise and pollution in its design development.
- The design positively impacts the community allowing job opportunities while improving pollution, public health, and encouraging the use of sustainable processes

References

Project Context

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Location and Users

Design Features

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Community Impacts