A 'Living Lab' Approach to Managing Food Waste

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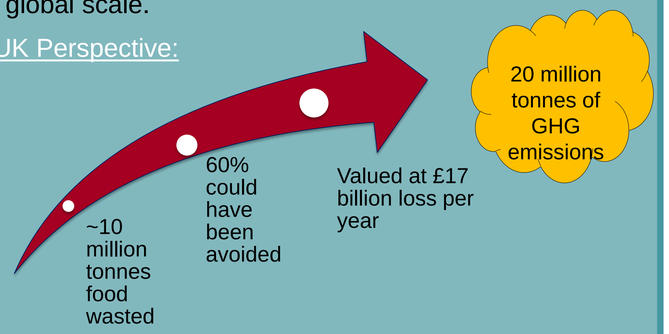
1. Introduction

Food waste is a complex interdisciplinary issue which negatively impacts sustainable development on a global scale.

A UK Perspective:



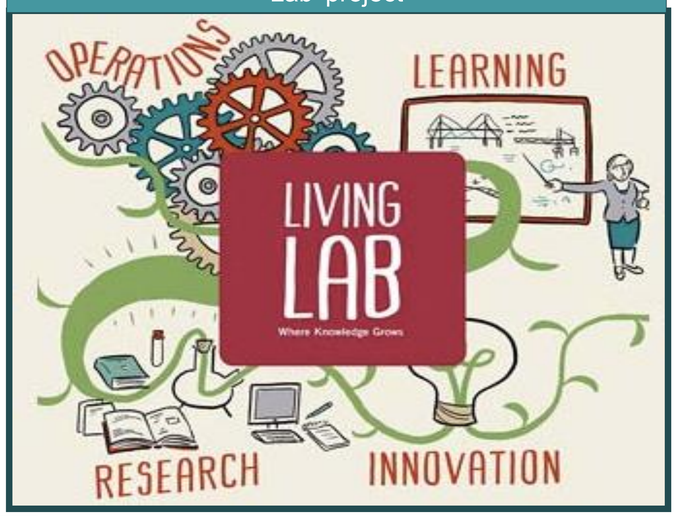
The University of Leeds & Sustainability Services seeks to address this issue by using on-site waste treatment technology, to improve sustainability and enhance research and collaboration opportunities as part of a 'Living Lab' concept.

What is a Living Lab?

"The inter-disciplinary collaboration of researchers, students and university operations to develop innovative solutions to real-world challenges, using the University as a test-bed"

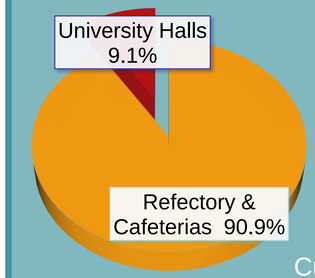
Objective:

To assess the feasibility of managing food waste at the University of Leeds as part of a cross-campus 'Living Lab' project

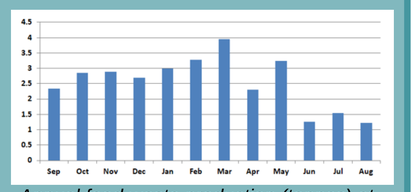


2. Food Waste at The University of Leeds

Sources:



Seasonality:



Annual food waste production (tonnes) at The Refectory (Sept-Aug 2016)

Current Practice:

- Some food waste is segregated at source by Refectory staff and students in some halls of residences.
- Segregated waste is collected by Olleco & taken to an Anaerobic Digester (AD) 20 miles away.
- Bio-gas from AD is used to convert cooking oil to bio-diesel.
- Bio-diesel is used to power Olleco refuse trucks.

3. Technological Approaches

The project looked into the feasibility and relative sustainability of 3 technological approaches to treating food waste on campus and compared this to a business as usual (BAU) approach of continuing contracts with Olleco.

Technology included:

- Anaerobic Digestion (AD)- by-products to be used on site.
- Composting
- Desiccation- a drying pre- treatment

4. Feasibility

BAU performed best as it benefits from economies of scale, but doesn't help with development of the Living Lab. Including desiccation with BAU would save money but needs a greater energy input. A 'green tariff' would improve GHG emissions here. We found composting was not preferable for treating large volumes of waste as there is no opportunity to generate energy.

AD involves high financial input but has the greatest opportunity for reducing GHG emissions, yet there is limited scope for locating a suitable site on campus. AD also offers opportunities for research & participation in the Living Lab & by-products (e.g. digestate) can be utilised by estates while biogas can be used for energy.

Scenarios	Economic Impact	Environmental Impact	Social Opportunities /Engagement
BAU	😐	🙂	😐
BAU with Desiccation	🙂	☹	😐
AD	☹	🙂	🙂
Composting	☹	☹	😐

5. Prevention

The inclusion of food waste prevention and thus reduced food waste generation, offers the greatest potential for reducing GHG emissions and the costs of waste management.

Although initially not included in the project scope, prevention provides a greater opportunity for interdisciplinary participation in the Food Waste Living Lab as well as fulfilling the requirements of the UK Waste Hierarchy.

6. Conclusions

AD on-site would be beneficial **BUT** requires substantial initial investment and thus would be a high risk approach

Recommendations:

- Expand source segregation of food waste across campus.
- Include prevention in the Living Lab to increase sustainability and widen participation.

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