



Summary Document:

Evaluation and Communication of the Organic Waste Management Strategy of the University of Galway

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Abstract

Many higher education institutions are taking an active role in organic waste management, and the University of Galway is no exception, seeking to minimise their waste's harmful impacts through a circular approach. This project aimed to evaluate the effectiveness of the university's current organic waste management strategy, provide recommendations, and design a communication plan.

The evaluation was done through a Life Cycle Assessment, measuring the global warming potential of three treatment options and one do-nothing scenario. The analysis found that the global warming potential for Scenario 1 (current strategy, composting off campus) was 47.07 [kgCO_{2eq}], for scenario 2 (composting on campus) was 252.89 [kgCO_{2eq}], and for scenario 3 (anaerobic digestion on campus) was -0.26 [kgCO_{2eq}], while for the do-nothing scenario (waste to landfill) was 1,314.27 [kgCO_{2eq}], showing that scenario 3 is the one that contributes less to climate change.

The communication plan consisted of the development of a 4-minute film that explains the current strategy, with further versions to be developed in the future, together with three infographics that showcased the university's approach as well as the results of this work, with variations depending on the target audience and where they will be published.

The most relevant recommendation for the university is the installation of anaerobic digestion bioreactors on campus, but a cost-benefit analysis is necessary. If not viable, the current strategy can still be improved through the optimization of the transport route, in accord with partner company Barna Recycling. The communication strategy could be improved through audience surveys and continuous monitoring of the impacts once the media is made public.

To conclude, this project showed that circular organic waste management strategies are better than linear ones when it comes to their climate change impact, with anaerobic digestion as the best option. The biggest limitations were low data availability and time constraints. Finally, it is thought further research could help refine results to make more informed decisions.

LCA results

These graphics show the results of the Life Cycle Assessment (LCA) carried out using the software openLCA. They both show the Global Warming Potential (GWP) of each scenario in $\text{kgCO}_{2\text{eq}}$, meaning the carbon dioxide emissions, to show how much each contributes to climate change.

Scenario 1 is the university's current strategy of composting off campus; scenario 2 is an alternative where composting would occur on campus grounds; scenario 3 is another alternative where instead of composting, anaerobic digestion would be used to treat the organic waste, also on campus grounds; and the do-nothing scenario is the last alternative, where waste would be sent to landfill without any treatment.

Figure 1 shows the results for all scenarios compared in the analysis. The inclusion of the do-nothing scenario is meant to highlight how positive all other treatment options are. On the other hand, Figure 2 only shows the results for the university's current strategy and the do-nothing scenario. With this comparison, the results show how positive the environmental impact of the university's organic waste management approach is.

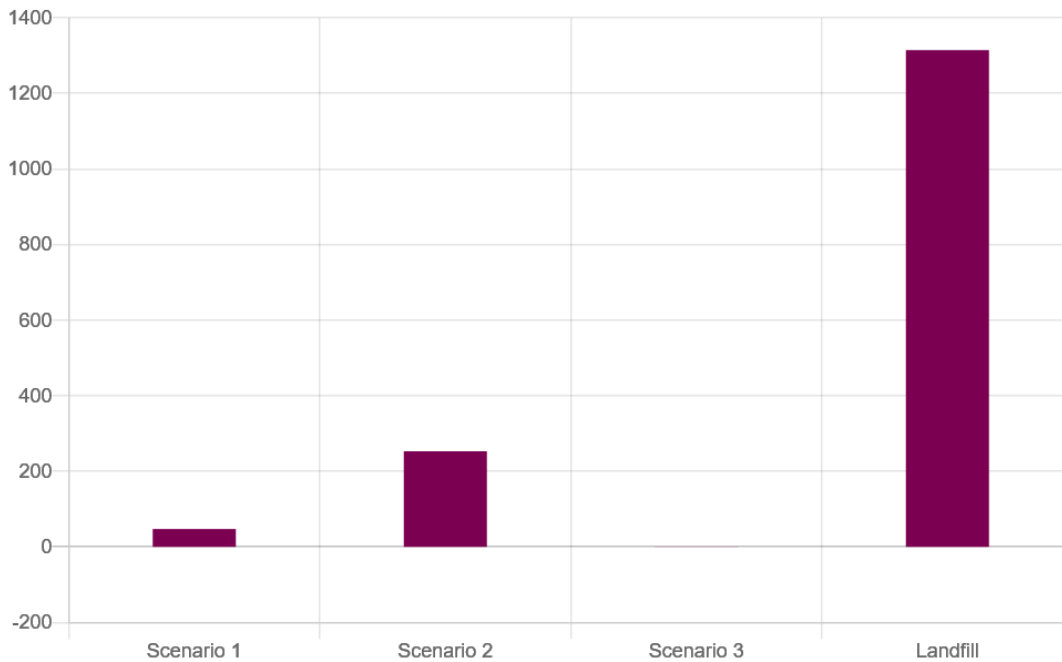


Figure 1: GWP of scenarios in $\text{kgCO}_{2\text{eq}}$.

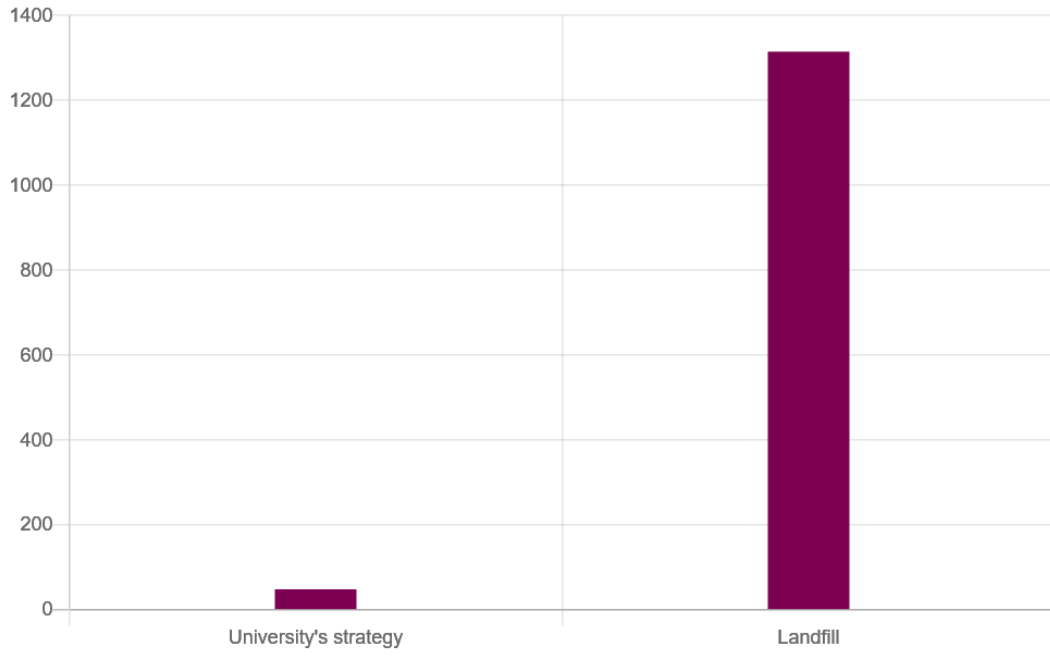


Figure 2: GWP of university's strategy and do-nothing scenario in kgCO₂eq.

Recommendations

- Installation of anaerobic digestion bioreactors on campus grounds to treat the waste on site. Not only is there a reduction in emissions from the lack of transportation needed, but there could also be energy savings from the potential use of the biogas produced as an energy source, while the digestate could be used as a fertilizer just as the compost is now.
- Feasibility analysis of this installation must be carried out first, from both a technical and economical perspective. Students and researchers could be included in this stage to facilitate the development of the project, also allowing the university to offer leadership and R&D opportunities to researchers and students.
- If the installation of the biodigesters is not viable, the current strategy can still be improved upon, mainly through the optimization of the transport route. This would have to be done in accord with Barna Recycling, ensuring it fits into their transport logistics.
- Another recommendation that comes from researching what other institutions around the world do is to add OW bins on more locations around campus as well as advertise the existing ones.
- Further initiatives carried out by other HEIs that could also be implemented on NUIG would be to implement food sharing schemes on an institutional level, and aim procurement operations towards a more sustainable approach, such as a focus on fair trade or local products.
- About the communication strategy, this could be improved through the inclusion of advice from marketing and communication experts from the conceptual stages onwards.
- Another course of action would be to carry out surveys to see what the public wishes to learn from this strategy, what they already know about OW management, what they wish to obtain from this campaign, as well as the best way to reach them. In this way, the strategy could be targeted accordingly to the survey results. This could also be an opportunity to obtain new ideas from the public on how to communicate the information.
- Once the videos and infographics are published, the impacts should be monitored and quantified, to use this and any feedback received for continuous improvement of the strategy.