

NERC Catalyst Grant: Resource Recovery from Waste

The University of Leeds has been successful in obtaining a NERC *Resource Recovery from Waste* Catalyst Grant for a project that will explore the development of a framework to assess resource utilisation options based on multiple criteria. The aim is to ensure that the benefits for the environment and human health are fully integrated in to a 'whole systems approach' in the recovery of resources from waste. The project, known by the acronym CVORR, is described briefly below.

Complex Value Optimisation for Resource Recovery (CVORR)

"Waste as a resource" has become a central societal theme. To truly minimise the disposal of unwanted material, it is necessary to consider industrial processes as manufacturing products and co-products with varying, complex value – economic, environmental and social – rather than simply products plus wastes. Processes can then be designed to maximise resource recovery at all stages of the life cycle of a product while minimising impact on the environment and human health.

Project Aim: The aim is to develop a novel valuation framework which will draw on LCA, material flow analysis ('stocks and flows'), social cost-benefit analysis and multi-criteria decision analysis in order to synthesise a new concept of complex process/product value. Based on economic, environmental and social criteria, this will explicitly incorporate the potential to **optimise value from cradle to cradle** and thus assess the true value of e.g. designing for dismantling, upstream de-pollution, optimising closed-loop recycling, up- vs. down-cycling, and the robustness of technical recoverability. This framework will encourage departure from established notions of waste, and **progress towards a resource efficient, sustainable society with circular materials flow**. It will analyse the implications of time and geographic variables such as resource scarcity, composition and consumption, economic costs, and impacts of pollution on environment and human health. By normalising and weighting the criteria and allowing flexible adjustment of inputs, the framework will both offer an overall value of a process for given conditions, and enable transparent, simultaneous analysis of the value of each criteria, demonstrating compromises which are required in order to approach optimum value for a given scenario and perspective.

Collaborations and Partnerships: A very broad range of expertise is required to develop the value analysis framework. The primary objective at this Catalyst Grant stage is to form a partnership of experts from different fields (e.g. waste management, civil engineering, environmental engineering, economics, mathematics, industrial ecology, social science, materials science, product design, geography, water management, process engineering, environmental sciences, public health) to discuss the various approaches that can be adopted to understand processes and their impacts, and scope out framework development through data sharing, pilot assessment, and research partner consultation. Working with collaborators, a consortium will be formed to develop a Research Grant application.

Workshops: A one-day workshop and two-day sandpit have been organised in Leeds:

- Tuesday 23 July: case study scoping and development
- Tuesday 17 – Wednesday 18 September: prototype framework discussion and research project development

If you would like to join the workshop/sandpit, please contact Rebecca Slack (r.slack@leeds.ac.uk; 0113 343 3373) for more information.

