ISDRS 21, Geelong 10-12 July 2015
Industrial ecology and circular economy track

Chaired by: Pauline Deutz (University of Hull, UK) and
Damien Giurco (University of Technology Sydney, Australia

The papers presented in this session all related to the implementation of sustainability innovations. Two (Scheltema and de Oliveira et al.) were concerned with voluntary standards, two (McLellan et el. and Deutz et al.) with materials recovery. The session sought to ask whether there has been a positive tipping point in resource recovery.

Scheltema discussed the potential of voluntary sustainability standards (VSS) to provide global standards for corporate behaviour, in the light of the challenges of establishing global regulation. The paper referred in particular to VSS in a supply chain context, using FSC and UTZ certifications (of sustainable forestry and coffee/tea/cocoa production) as examples. Specifically the paper examined (i) are VSS a viable alternative to public regulation as a mean to control CSR and sustainability issues in supply chains and if so, (ii) which legal conditions have to be met for VSS to perform. A key issue that emerges is that whilst VSS can fill in gaps public regulation, nonetheless to be effective there needs to be mechanisms to monitor progress. The clarity of an organisations' aims does not guarantee that they are met; effectively the trappings of a regulatory body are required, but under the auspices of the private sector. Problems emerge regarding the distribution of risks and rewards in supply chains – with large international producers usually leading the initiative and taking most of the risk and reward, payment to smaller operators may be subject to delay.

Conversely, de Oliveira et al. (presented by Tomás Ramos) focused on sustainability monitoring in the public sector, presenting a web-based tool for measurement and benchmarking of sustainability performance. Although governments have taken an interest in the greening of government, this can neglect non-environmental issues. Furthermore, there is a need to integrate sustainability considerations from the strategic (policy making) and operational levels of government activity. This paper presented a Sustainability Performance Evaluation Framework for the Public Sector (PS) supported by a web-based graphical interface which addresses both strategic and operational PS's broad domains. The computer model was tested and validated through a case study – the Portuguese PS. The system architecture is based on open-source technology and could be used as a voluntary performance instrument by public organizations. This application also aggregates sustainability data for PS activities, contributing to the performance reporting, assessment and to confer the sustainability "PS label" or performance category – Sustainable Public Service (SPS).

McLellan et at. (presented by Damien Giurco) aimed to quantify and analyse the implications of geographically dispersed production for the capture and re-use of materials. Localised energy production offers benefits, e.g., incentives offered to householders in urban areas, or alternative to grid infrastructure or fuel transport in rural areas. Conversely, the cost and complexity of is increased. Furthermore, the cost and supply challenges associated with some metals critical for renewable energy generation (e.g., Indium, Gallium, Germanium, Selenium and Tellurium) has resulted in design prioritizing minimising content, over design for disassembly. Results suggest that critical metals are being utilised in local generation on a scale that implies a risk of significant quantities of material becoming uneconomic to recover. The authors point to new infrastructure requirements for material recovery, the

need to incentivise holistic approaches to both design and usage rather than set targets e.g., for energy usage that ignore materials implications. Ultimately, decentralised approaches to energy generation may be less efficient in terms of material and water use than more traditional centralised approaches. This raises questions of where the decision making authority lies, e.g., between public planning bodies, individual homeowners, and private companies making/installing decentralised energy systems.

Finally, Deutz et al. presented a paper considering the governance implications of recovering metals from legacy waste. As with the previous paper, the context for this is the demand for key metals for use in industries such as renewable energy which are geo-politically constrained in their supply. However, high alkaline waste streams, such as steel slag, can contain concentrations of metals such as vanadium that are equivalent to those found in mined deposits. This talk was reporting on a multi-disciplinary study designed to explore both technical and social barriers to the recovery of metals from wastes arising from previous industrial activity. One proposal was to recover vanadium from slag leachate by the application of organic waste to landfilled slag. However, this option was found to be controversial to stakeholders including the producer, current users of the slag and the regulatory body. This was because of the perceived current risk to the environment from increasing the rate of leaching of vanadium; the potential for the environmental impact of legacy waste to be confused with that of current slag; the mixing of two different waste streams, which creates a distinct and material with uncertain properties. Adding a time dimensions of industrial symbiosis brings additional issues of regulation and ownership which compound the challenges of 'real time' symbiosis.

The three papers examining private sector initiatives to implement sustainability all show that the distribution of power, risk and reward are important considerations. Significantly, whilst regulatory authority may be needed to drive an initiative, and can be geographically bounded and may itself be wary of innovation. The public sector of course has a role in increasing its own sustainability as well as overseeing the actions of others. The tool presented may be enabling in this regard. It is difficult to conclude that a positive tipping point has been reach in the areas represented by this session. Whilst intentions may be good, the pathway to sustainability remains strewn with distractions and grounds for disagreement between fellow travellers.

Deutz P, Gibbs D and Baxter H, 2015, Waste tips and tipping points: governing the timelines of industrial symbiosis. Paper presented at ISDRS 21, Geelong Australia 10-12 2015.

McLellan B, Giurco D, Corder G, Govel A, Kishita Y, Flin N, and Sharpe S, 2015, Mineral-water-energy nexus: implications of localized production And consumption for industrial ecology. Paper presented at ISDRS 21, Geelong Australia 10-12 2015.

De Oliveira THM, Painho M and Ramos T, 2015, Web application for performance assessment and benchmarking framework towards a more sustainable public sector: the sps project as a case-study. Paper presented at ISDRS 21, Geelong Australia 10-12 2015.

Scheltema M, 2015, Balancing public and private regulation. Paper presented at ISDRS 21, Geelong Australia 10-12 2015.