



UK seeks a “zero waste economy”

It is a mistake to look upon waste as an inconvenience that we have to get rid of, says Barry Sheerman, the UK Member of Parliament for Huddersfield. He has long championed the notion of “urban mines” and the idea that, as he puts it, “waste that flows from towns and cities is not rubbish, but a resource that we should use rather than digging holes in the earth.”

Sheerman made these comments when he set the scene as chair of a meeting in the UK parliament, held under the auspices of the Parliamentary Office of Science and Technology (POST) and the Associate Parliamentary Sustainable Resource Group, a “forum informing the debate between parliamentarians, business leaders and the sustainable resource community.” The event, “Valuing Resources: The Science and Economics of Recycling,” marked the launch of a POSTnote “Maximising the Value of Recycled Materials.”

The remit of POST, an office of the UK Parliament, is “to help parliamentarians examine science and technology issues effectively.” Chris Tyler, POST’s director, told *MRS Bulletin* that the organization tries to anticipate issues that will rise up the political agenda. It then prepares background material on the underlying science and technology. The POSTnote points out that “The waste and recycling sector in the UK was valued at £11 billion in 2011 and is forecast to grow by 3–4% a year in this decade.”

Since 2004, the amount of material recycled in the United Kingdom has increased by 50%, amounting to an extra 48 million tons of material recovered. There is, though, pressure to increase the percentage of material recycled. The UK government has said that it sees a “zero waste economy” as a priority for sustain-

able resource management. However, rather than legislating to tell the industry what to do, the focus is on voluntary approaches to recovering high-quality material for recycling by domestic and international reproprocessors.

While the POST event dealt with science and technology, the speakers and the audience also highlighted several political issues that can get in the way of technical solutions to effective recycling of waste materials. In particular, the current hot topic in the recycling community is the need for a code of practice for plants that recover reusable material from domestic, commercial, and industrial waste.

The key to effective recycling, according to Chris Dow, CEO of Closed Loop Recycling, a commercial recycler of plastics, is to be able to determine how materials are given value, and how they can be returned as far back up the chain as possible. “The most important thing is quality,” said Dow, “and another important factor is consistency.” Technology in the shape of automatic sorting systems, with near-infrared technology and laser sorters to separate out flakes of different materials, can do a lot to achieve quality. “It is incredible technology and it has allowed us to get to new levels of recycling,” said Dow.

In 1996, the UK government began imposing a charge on all waste dumped into a hole in the ground. This landfill tax drives much of the economics of recycling, says Marcus Gover, Director of Closed Loop Economy, with WRAP (the Waste & Resources Action Programme), a nonprofit company backed by government funding from England, Northern Ireland, Scotland, and Wales. “The landfill tax has been there a long time. It has worked very well.”

Sheerman agrees that the landfill tax “has been a mover,” but cautions that “it has not been a magic wand.” As it is, for example, the United Kingdom already exports large amounts of recovered plastics for recycling in China, which can handle the lower grade raw materials that are uneconomical for local processors.

One way to reduce the need for these waste exports would be to raise the quality of the material recovered from waste disposal. A recurring theme of the POST meeting was the idea of a code of practice for materials recycling facilities, MRFs, pronounced *murf*s. An MRF takes mixed waste and uses a range of technologies and manual sorting to “separate materials based on size, weight, magnetism or chemical make-up,” as the POSTnote describes it.

Many MRFs have already signed up to a voluntary code of practice. And the UK government is consulting on a wider implement of the concept.

Any code of practice will have to accommodate a range of variables. Nick Cliffe, of Closed Loop Recycling, pointed out that the composition of a bale of recovered waste plastic “varies enormously. It varies from area to area of the country, between countries. There are seasonal variations as buying patterns change depending on the weather.” So an MRF cannot state the exact composition of a bale of recovered polymer. “Those are the sort of certainties that you need when you are dealing with the material, not long after collection.” However, after sorting, he pointed out, contamination levels can be measured in parts per million.

While codes of practice can do much to improve the quality of materials recovered at a separation plant, research can help to improve the “recyclates.” There is pressure on the industry to recycle more and more polymers, and to process mixed plastics, rather than carefully sorted materials. This will not happen without technological improvements and some research and development.

Dow sees mixed plastics “as a dawn of a new era for recycling,” but it will take research to get there. “The amount of money being spent on investment in

research and technology on sorting technologies is growing all the time,” said Dow. Much of that research has been supported by the public sector, through such organizations as WRAP. “Fortunately,” Dow added, “we have got them to stimulate the private sector.” This has made it possible for companies to explore areas that people think would be too risky for them to invest in on their own.

One idea that Dow described is the development of new materials “with something added to the bottle when it is being manufactured.” As he put it, the idea is “just throwing another additive in, what we call a marker.” That marker would enable an optical sorter to detect what type and color it is and to put it in the right recovery stream. “Fantastic stuff,” Dow enthused.

Gover suggested an even more sophisticated way of marking material that could ease waste sorting, especially if the idea is to produce “food-grade materials” so that recycled polymers can go back into food packaging. If a material has not previously been used to contain food, then it cannot go back into food packaging.

“If it has been used for detergent then it cannot go back into food grade,” Gover explained. This throws a heavy burden on the sorting process. It has to be an automated process to make it economical. “Where we have been making progress there is to actually make diffraction gratings that can be molded into the plastic and then can actually give a signal that can tell the sorters that this was food



Mixed plastics—can materials research deliver a new era for recycling? © WRAP 2013.

grade before and therefore can go into food-grade polypropylene,” Gover says. But not all food-grade material will go back into food packaging, so it has to lose its “marker” during processing. “You want something that disappears when it is recycled. A diffraction grating can be built into this material and when it is melted it has gone again.”

He added that this is not something he would have expected to have seen in packaging and waste a few years ago. “It is really showing how we are using science to help us,” he said.

One topic that barely arose during POST’s meeting was the role of the European Union (EU). Cliffe did point out that there are European standards for recycled materials that are destined to

come into contact with food, and “these are slowly taking over from national legislation.” There was, though, no mention of the “EU Waste Framework Directive,” under which the European Commission may introduce a range of measures such as laying down end-of-waste criteria for specified waste streams.

POST points out that the EU’s directive “is the main policy instrument covering recycling and diversion from landfill.” There is as yet no sign that this would be one of the measures that the UK government will want to include in its plans to renegotiate the country’s role in the EU.

Michael Kenward

US releases report for a manufacturing innovation network

http://manufacturing.gov/docs/NNMI_prelim_design.pdf

The Obama Administration’s National Science and Technology Council (NSTC) has released a report that describes an approach to implementing and managing a National Network for Manufacturing Innovation (NNMI)—a proposed national network of up to 15 manufacturing institutes around the country that would serve as regional hubs of innovation. The NNMI was announced

by President Obama last March and is designed to accelerate the development and adoption of cutting-edge manufacturing technologies.

This report, *National Network for Manufacturing Innovation: A Preliminary Design*, includes the framework for the competitive process and the criteria for selecting the Institutes of Manufacturing Innovation (IMI). The report rec-

ommends that each of the IMIs be led by US nonprofit organizations and have diverse funding sources and an independent Board of Directors composed predominantly of industry representatives. IMI partners would include private industry, academic and technical training organizations, government agencies, and unions among others. Federal matching funds for IMIs would be disbursed over a five-to-seven-year period, after which the institutes would be self-sustaining. □