

Zero Waste

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Waste is the shadow side of the economy. Stripped of desire, it weighs like a corpse around the necks of the living. It is placed in black bags and transported, like the dead, to sites of exclusion—to landfills and incinerators, the graveyards and crematoria in the kingdom of objects.

From the perspective of policy, waste has first and foremost been seen as an issue of public health, something that needs to be removed from society as quickly and cheaply as possible. What has developed in response is a system of mass disposal, where household rubbish is collected and disposed of as a single stream of mixed waste. Scale and speed have been everything. Mass production has generated as its counterpart mass waste.

Mass waste is not simply the discards of mass consumption. It also comprises the waste generated at each phase of production, in mines or fields, in factories and shops, all of which far exceed consumer waste. In England, "producers" account for 91% of national waste. With food, for every kilo people eat ten kilos of waste is generated along the food chain. For consumer goods the trail of waste can be much greater. A car that weighs a tonne takes seventy tonnes of material to produce. Waste is the leviathan of the modern industrial system.

Over the past thirty years there has been a growing recognition that this system of extensive exploitation of the material world cannot be sustained. It is not just a question of the profligate use of materials: it is also the energy it takes to process the materials, and the ever mounting problem of disposal.

In many countries the trigger for change has been political—the opposition by local communities to extraction and logging at one end of the chain, and to new landfills and incinerators at the other.

But what started as primarily a movement of resistance has turned into a movement of alternatives.

The case is highlighted by organic waste. In England people throw away a third of all the food they buy. In the pre-modern period much of this would have been composted or given to pigs and chickens. But urbanism and food regulation broke this cycle and resulted in a double loss. Not only did the land lose a major source of nutrients, but food waste was concentrated in landfills where, coupled with garden and other organic waste, it became a significant contributor to climate change.

However, as evidence grew about soil degradation and erosion, the environmental impact of artificial fertilisers, and the potential role of compost-improved soils for the prevention of flooding and for the sequestration of carbon, the pressure rose to restore the biological cycle. In the UK, a community composting movement grew up. Municipalities encouraged home composting and introduced "green" collections. By 2003, 2 million tonnes of organic waste were being composted at 325 facilities nationwide.

Industrial composting systems are now well established in the Netherlands and Germany. But the most striking model has been developed in Italy. Municipalities found that making a separate collection of food waste from households and restaurants and encouraging home composting meant that they could both create marketable compost and keep organic waste out of

mainstream disposal. Instead of the big black plastic bag, they introduced small, transparent, biodegradable bags, which could be collected by small electric vehicles and composted close by. A local biological cycle was restored.

In the Italian model, food waste was made separate and visible. Visibility is everything if food waste is to be transformed into a useful material. The same holds true for other waste. The moment waste is removed from the dustbin into the light, it becomes clear that, like food, much of what had been discarded as waste is potentially a source of value: recyclers in cities now refer to waste as "urban mines".

More than that, much so-called waste embodied what is called "grey energy"—the energy used in every stage of production. By the early 1990s the five leading nonfood materials in the Western domestic waste stream paper, cardboard, steel, aluminium and glass—were found to account for two-thirds of industrial electricity use in the US. Rescuing these materials from disposal has meant that the energy needed to manufacture from virgin materials is no longer required.

So, alongside the restoration of biological cycles, there has been a parallel move to restore material cycles, thereby preserving the value of the materials, the energy, and the work embodied in the discarded commodities. It is a question not just of recycling, but of "upcycling": finding ways in which the qualities of the discards can provide more valuable inputs in their next life (crushed bottles as water filters, for example, or old tyres into basketball court surfaces). As with food, the perspective involves a shift from the linear model of mass waste to a circular model that conserves value and resources.

The critique of traditional waste systems and the development of alternatives has been led by community and environmental movements.

Community recyclers and composters pioneered new systems of collection and processing in Australasia, Germany, the UK and much of North America. In response, local and regional governments started promoting the new policy. They found that quite quickly they were diverting 50% or more of household waste from disposal, with some pioneering municipalities up to 70% and even 80%.

What was stopping progress to 100%? The manual sorting of dustbin waste found some items that were technically difficult or very expensive to recycle—like Tetrapaks and plastic bags. Some are made of unrecyclable compounds, or are hazardous to recycle or reuse. But those problems are in principle resolvable. So, having progressed that far up the mountain, why not aim for the top?

This is the background to the idea of Zero Waste. It was pioneered by community groups in Australasia in the second half of the 1990s and has spread remarkably in a decade. Not only have many municipalities signed up to Zero Waste, but so have regional and state governments, particularly in California, Nova Scotia, Victoria, South Australia, and Western Australia. The first country to adopt it is New Zealand. Lebanon and Taiwan have followed suit and even the Chinese (who now account for one-third of the world's garbage) have adopted the principle of the circular economy. In England there is a Zero Waste Charter, and Zero Waste International was formed as a network of community groups. It is an idea that has caught fire.

Zero Waste was initially both an aspiration and a methodology. As an aspiration it sought to eliminate all waste by restoring the material and

biological cycles. In the phrase of the German biochemist Michael Braungart the move is from "cradle to grave" to "cradle to cradle". As a methodology, it requires all levels of production to identify the origins of waste, to find innovative ways to reduce it, and to reuse or recycle that which cannot be prevented.

To restore the pre-modern biological and material cycles, Zero Waste has had to adopt post-modern tools. It needs the most advanced methods for handling complexity. The best modern recycling systems use bar codes, on-board weighing, data-based feedback systems and sophisticated incentives. Post-modern recycling is a form of reverse retailing.

But because of its aspirations Zero Waste is also a critique and a programme of economic alternatives. What began as a movement to reclaim recyclable materials led to the questioning of many features of production itself not just the trail of waste it produced, but its hazards, and its blindness to the need to recycle and reuse. Waste came to be seen as a symptom of an unsustainable system of production and consumption.

Out of the critique has emerged the agenda to redesign current systems of production, distribution and consumption. To reduce waste, design has to move to the centre stage, and it needs the design industry to shift its focus from the innovation of surfaces to a new form of transformational design: the redesign of productive systems and each of the elements within them in line with contemporary environmental imperatives.

How can products and processes be designed that will enable reuse, reduction, repair, reverse manufacturing, reskinning, re-refining and reverse engineering? How can products be modularised, and commodities leased as part of a service? How can product lives be extended, and how can products be more intensively used? Alongside assembly lines there are now disassembly lines. In local garages there are car-share pools. Are these the emerging patterns of a new economy?

Zero Waste has come to these questions from the vantage point of reducing waste. On the way it has met with many others, coming from different places but on a similar track. As with tributaries flowing into the same river, these are currents that are already creating in practice the outlines of a different kind of economy: one with greater lightness and fewer shadows. □□□