

An underwater photograph showing significant plastic pollution in the ocean. A large, clear plastic bag is the central focus, floating in the water. To its left, a green and silver metal can is visible. The water is filled with smaller pieces of debris, including bits of plastic and organic matter. The GWPF logo is in the top right corner.

GWPF

SAVE THE OCEANS

Stop recycling plastic

Mikko Paunio

The Global Warming Policy Foundation

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About the author

Mikko Paunio, MD, MHS was born in Turku, Finland in 1961. He graduated and then completed and defended his doctoral thesis at the University of Helsinki in 1990. He has post-graduate training from the Free University of Brussels in 1991 and has graduated from the Johns Hopkins Bloomberg School of Public Health (Master of Health Science in 1993). He is a certified (University of Helsinki) specialist in public health (1999) and is an adjunct professor in general epidemiology at the University of Helsinki.

He comes from a family with academic traditions and is a third generation social democrat. He joined Finland's Social Democratic Party in 1977. He has worked in the following institutions: the Institute of Health and Welfare of Finland, University of Helsinki, Johns Hopkins Bloomberg School of Public Health, the European Commission, the World Bank and Finland's Ministry of Social Affairs and Health. He is a member of the American Council on Science and Health Board of Scientific and Policy Advisors. He has 40 publications listed in the US National Library of Medicine at the National Institutes of Health.

For the past 20 years he has actively followed and participated in discussions on EU and international waste policy issues from health protection angle.

Executive summary

A marine plastic litter crisis has been declared and the mass media around the world has given their front pages over to the story for a while now. The European Union – among other actors – has declared a war against marine litter. Annually over 10 million metric tons (Mt) of plastic litter end up in oceans, harming wildlife. The International Solid Waste Association (ISWA) – the most competent specialist organization in the field – has summarized the origins of the marine litter crisis:

75% of land based marine litter in low to upper-middle income economies comes from litter and uncollected waste, while the remaining 25% of the land-based sources is plastic which leaks from within the waste management system.

In other words, the ISWA report shows that 25% of the leakage is attributable to the waste management option preferred by green ideologues; meanwhile, waste incineration can prevent *any* leakage of plastic if municipal solid waste (MSW) is incinerated along with sewage sludge. Despite this, incineration is vehemently opposed by green ideologues and also by the EU, which chooses to believe in the mirage of a circular economy.

The vast majority of the marine litter problem is attributable to poor waste collection and other sanitary practices in Asian, and to a lesser extent African, towns and cities in coastal areas and along rivers. The problem is particularly acute in China. The neglect of urban sanitary policy – the backbone of development agendas until that time – started when the ‘mother of sustainability’, Norway’s Prime Minister Gro Harlem Brundtland, personally refused to have it be part of her World Commission’s work program and ultimately its 1987 report, which famously led to the adoption of ‘sustainable development’ goals by the UN General Assembly.

This report describes the absurdities, inefficiencies, double or even triple waste management structures and horrible consequences of the EU’s erratic green waste policy (such as the terrible waste catastrophe in Naples in 2008), its fact-free claim that its waste policy helps to implement the Paris climate agreement, and its dumping of 3 Mt of plastic in China each year, with horrific consequences for the marine environment and health.

The EU has now started to sideline – in the name of circular economy – the highly successful waste incineration policy implemented in seven EU member states – Austria, Belgium, Denmark, Finland, Germany, the Netherlands and Sweden – which all have major waste incineration capacity and now landfill less than 3% of their MSW.

1 Introduction

A paper by Jambeck *et al.*, published in *Science* in 2015, was a wake-up call for the global community.¹ It gave metrics of how much plastic is ending up, one way or another, in the oceans: perhaps around 8 million tons (Mt) per year. This is a big number, but it needs to be compared to something. It is roughly equivalent to the quantity of crude oil Finland – a country of 5.5 million inhabitants – imports for its own consumption annually. So although it is a big number it is not an overwhelming number. However, from the environmental littering perspective, according to Jambeck *et al.*, this amounts to: ‘...the same as five five-gallon bags filled with mixed plastic on every foot of coastline around the world’. A later paper, by Lebreton *et al.*, showed that certain rivers and their watershed areas, especially in Asia, add significantly to marine pollution: around 2 Mt of plastic litter.²

Plastic will continue to be an integral part of the world’s economy. Plastics are mainly used for packaging (around 35%), and plastic packages account for almost 60% of discarded plastic in the EU’s municipal waste streams.³ However, plastic food packaging is an integral and vital part of food hygiene and has had important health and environmental benefits. In particular, it has proven to be an effective means to control and prevent the accumulation of municipal solid waste (MSW), chiefly by reducing the amount of food waste.⁴

Plastic is mostly made from natural gas or by-products of oil refining. Global production of virgin plastic is currently around 350 Mt per year, so 10 Mt that ends up in the ocean each year is around 3% of production.⁵ The production of recycled plastic is around 2% of the virgin production figure.⁶ Plastic production is growing rapidly with increasing global GDP and population growth. As of 2015, approximately 6300 Mt of plastic waste had cumulatively been generated; only around 9% of it had been ‘recycled’, 12% had been incinerated, and 79% had accumulated in landfills or in the natural environment. If current production and waste management trends continue, roughly 12,000 Mt of plastic waste will be in landfills or in the natural environment by 2050.⁷ The world’s oil consumption in 2016 was 4400 Mt.⁸

In the paragraph above, the word ‘recycled’ is in quotation marks, because all official statistics in this area are notoriously misleading and exaggerate particularly the recycling of plastic, because the figure given is simply the quantity of plastic collected in that form, or separated and recovered from mixed waste. In other words, in official terms, plastic is deemed ‘recycled’ if it is recovered, no matter what ultimately happens to it. In real life, plastic is barely recyclable, because the process requires homogenous waste streams, which in practice are hard to achieve.⁹ Recycled PET or RPET (plastic bottles) and certain other polyethenes can be recycled to some extent,¹⁰ but the understandable reluctance of the food industry to accept recycled plastic and the abundance of cheap hydrocarbons will make recycled plastic non-competitive for the foreseeable future. The shale revolution and the consequent flow of cheap gas has made virgin plastic still cheaper.^{11,12}

In this paper I will argue that ideologically motivated environmentalists in the 1980s and their dreams of recycling and a ‘circular economy’ are the ultimate cause of the marine waste problem, because they have discouraged development of municipal waste schemes in Asia and Africa, and because they have encouraged developed nations to use management schemes that make it hard or expensive to deal with waste and therefore tend to ‘leak’ to the environment, sometimes catastrophically so.

I will explain how this problem will become worse if current ‘sustainable’ policies are not critically assessed and how the situation is set to become critical. I will also set out a way to put an end to the problem of plastic waste in the oceans.

2 Three ways to deal with waste

There will always be MSW and more than 258 Mt is generated in Europe every year.¹³ Although health protection is theoretically still the primary objective of waste management, it is in reality a secondary concern nowadays, with climate change mitigation becoming a principal driver, as will be detailed below.

Waste management policy in the EU follows a three-tiered strategy, in order of preference:

1. waste prevention
2. reuse, recycling and energy recovery
3. disposal of waste.

The EU's Waste Framework Directive stipulates¹⁴ that each country must build a countrywide system to deal with MSW. There are myriad ways to do so, from global trading to the array of polices and collection and recycling schemes preferred by green ideologues. However, almost all of these, including paper recycling, leak plastic litter and/or microplastics to land surfaces, rivers and eventually to the oceans. The three main methods are considered below.

Landfills

Sanitary landfills have been the traditional way of disposing of municipal solid waste. To plan, license, build, operate and inspect sanitary landfills involves an array of specialists, from waste engineers to geologists, who ensure that they are safe for disposal of MSW. The EU, through its Landfill Directive, regulates safe disposal of MSW, including plastic.

Environmentalists have strong objections to landfilling, driven by concerns over emissions of methane – a greenhouse gas – as their contents break down. In fact it is possible to collect most of this for use as a fuel,¹⁵ and the directive sets strict rules to prevent environmental leakage of pollutants from landfill sites and requires pretreatment of MSW before landfilling. This has led to a sharp decrease in the number of landfill sites in Europe, with a concomitant increase in fly-tipping.

Recycling

Environmentalists much prefer recycling. However, its benign reputation is mostly undeserved.

There is a marked contrast between the fates of pre- and post-consumer plastic. Almost all pre-consumer waste is recycled or reused within the UK, while almost all post-consumer waste plastic is not, for reasons that will be explained shortly. However, green ideologues are obsessed with the highly visible post-consumer waste streams and they therefore ignore the much larger streams and the huge savings in plastic material that are constantly achieved in the industrial realm in the normal course of business.

The reason for this difference is that pre-consumer it is relatively easy to achieve streams of one type of plastic waste. Post-consumer, this is much harder to do since it involves sorting of waste, and it is impossible do this effectively at source. There are many reasons for this, including people's unwillingness (e.g. lack of time) or inability to effectively sort waste at home or in their place of work. Technical issues, lack of space, or hygiene concerns may also be important.

This means that if recycling is to take place, waste must be sorted *after* collection. For this purpose, so-called mechanical-biological treatment (MBT) plants are the favoured op-

tion in the EU. Many MBT plants – especially in south-eastern Europe – are to all intents and purposes frauds. They accept mixed waste, allowing municipalities to meet their nationally imposed recycling targets. Governments are thus able to comply with EU legislation. However, instead of being sorted, the waste is simply landfilled; something that is possible because many southern European countries do not enforce the landfill directive.¹⁶

However, even legitimate MBT plants have proven to be hugely problematic. The idea of MBT plants is to split off recyclable waste from an MSW stream. They first separate off biowaste, which is then dealt with using anaerobic digestion or composting. Other recyclable materials – mostly plastic, paper and metal cans – are then separated out via mechanical, manual and chemical processes.

A great deal of water is needed to wash the waste to make it useable, so the amount of waste water generated is enormous. Moreover, this process leaves prodigious quantities of dirty solid waste, including biological waste that is hazardous and highly undesirable. Moreover, it is not possible to fully mechanize the sorting process, so human hands are needed. MBT plants often feature poor occupational health protection and the public image of these plants is of the waste sorter who has come from the Third World to Europe but is reduced to handling dirty waste and inhaling toxic fumes.¹⁷ Even with this human intervention, MBT plants are highly ineffective. Often less than one third of the waste that arrives at an MBT plant can be separated into material that is recyclable (at least in principle; see Section 3).

The remaining two thirds, and thus the main product of an MBT plant, are the non-recyclable materials, both organic and inorganic. It was originally intended that most of it would be incinerated, along with other fuels, in industrial processes that require heat. For this reason it is generally referred to as 'refuse derived fuel' (RDF). However, in practice, this turned out to be impossible, because the EU's Waste Incineration Directive of 2000 created strict emissions regulations, which made RDF uneconomic to burn in this way.

These problems are epitomised by the story of waste management in the Italian region of Campania. Here, there was a long political struggle over the direction of waste policy. Greenpeace¹⁸ and other green utopians were strongly in favour of MBT waste policy, despite the known environmental problems. There was an aggressive campaign, led by a local schoolteacher named Rossano Ercolini, against the alternative approach of high-temperature incineration. Eventually, the greens won out, and in 1997 a policy of MBT treatment was selected. No incinerators were built.¹⁹

As we have already seen, when the EU Waste Incineration Directive was introduced, co-incineration became uneconomic. But with no specialist incinerators having been built, Campania now had no way of disposing of RDF at all. As a result, it was dumped; first in legal landfills, then in illegal ones, before finally being left at the MBT plants, where it piled up until there was no longer any space.²⁰ Ultimately, hauliers refused to take MSW from homes and businesses; they could not deliver them at MBT plants that were already overflowing with RDF.

Then the fires started: people started to burn waste at source, and there were suspicious outbreaks at both legal and illegal landfills. As a result, much of Campania was severely contaminated with dioxin,¹⁹ and officials had to ban locally produced dairy products which had become contaminated.²¹ Civil disorder broke out and the military had to be called in to help. RDF had to be exported to other countries – including Sweden – at astronomical cost.²⁰ There was long-term reputational damage to the region and the legacy of illegal waste management activities still haunt the area. Mercifully, biomonitoring and cancer epidemiology studies have not revealed any major public health consequences, despite rumours that these

would be severe.¹⁹

Despite playing such a central role in bringing the disaster about, Ercolini was feted by the green movement, the BBC labelling him a 'hero' when he received the 2013 Goldman prize.²²

High-temperature incineration

It didn't have to be like this. Despite the problems of MBT plants, European waste management is, at least in part, still a success story, although little of the credit is due to Brussels. This is because environmentally conscious countries such as Austria, Belgium, Finland, Germany, and the Netherlands, and in particular Denmark and Sweden, have dealt with the waste problem by building vast networks of incineration plants.

Incineration stands apart as the best way to deal with MSW. Because it does not require waste to be sorted, it does not suffer from the problems of leakage that are found with almost every other approach. Moreover, modern MSW incinerators are designed to burn everything, including even sewage sludge,²³ an important source of plastic pollution (including microplastics) in rivers and the ocean.² As a result, Campania has been able to deal with its mountain of RDF – as we have seen, a mixture of mainly paper, plastic, and organic matter – by shipping it off for incineration.

However, the advantages of incineration are so great that the sorting of waste in MBT plants should be seen as an entirely redundant step. For example, incineration leaves only 15–20% of the original weight in the form of ash, and this can be landfilled directly in specialist landfills, or in standard ones after treatment; much is recycled, for example as road-building materials. And although new EU legislation stipulates that by 2030 only 10% of MSW can be landfilled,²⁴ the success of the incineration approach means that some European countries are already landfilling less than 3%. Moreover, it is envisaged that we will soon 'mine' incinerator ash for valuable metals, thus further reducing the quantity that has to be dumped.²⁵

Incineration plants are required to have very low emissions levels, and as a result incineration is healthier and more environmentally friendly than any of the waste management options supported by green ideologues.²⁶ The whole Swedish incinerator network (32 plants in 2009) emitted only about half a gram of dioxin in 2009, which is 200 times less than in 1985.²⁷ One deep landfill fire of the kind that was seen across Campania can emit almost as much dioxin as the Swedish incinerator fleet produces in a year.²⁸

Moreover, mixed MSW incineration is by far the best waste management option if one is concerned about greenhouse gas emissions. This is due to the simple fact that if you put mixed waste, including plastic packages or organic waste, directly to incineration you can effectively reduce the need to burn coal or natural gas.²⁹ Despite this, both environmentalists^{30,31} and the European Union³² vehemently oppose incineration, arguing incorrectly that it increases carbon emissions.

3 Exporting the waste problem away

In Section 2, we noted that the small proportion of plastic that is successfully extracted in MBT plants or separately collected is in principle recyclable. However, the economics of recycling plastic are adverse, and there is thus a strong incentive for processors to cheat the system. Once the material has been sent to an MBT plant for recycling, it more or less counts

as 'recycled' for EU monitoring purposes, so it is then a matter of dealing with it in the most convenient way, which may well not involve recycling at all.

Much of the plastic recyclate from MBT plants has been sent to the Far East, where it may or may not be turned into new plastic objects. The EU has been, until now, the largest exporter of plastic waste to China. Annual exports recently reached 3 Mt.³³ However, it is increasingly clear that this trade is leading to significant environmental problems. In particular, the waste stream may 'leak' to the oceans in at least three different ways:⁵

- The shippers of second-grade plastic waste may simply dump it in the oceans to avoid gate fees at landfills.
- Excess non-recyclable plastic waste has often put a strain on the already overwhelmed municipal waste management capacity, and waste ends up being dumped on land or in rivers, from where a significant fraction ultimately reaches the sea.
- Small unregulated Chinese recycling businesses have often burned non-recyclable plastic in the open air, but some have also dumped illegally, again with a significant fraction reaching the ocean.

4 The ocean plastic problem

The International Solid Waste Association (ISWA) is the most competent international actor when it comes to assessment and management of international MSW issues. In 2017 it published the report of its 'Marine Task Force' on the problem of waste in the oceans.⁵ The report was written under severe pressure from green ideologues, NGOs and EU politicians. Thus a careful reading is required to discern its real meaning. For example, the proposed long-term solutions are idealistic and driven by green ideology, and suffer from non-solvable issues similar to those with alternative energy sources.

Asia's contribution

Although it is not obvious, it is possible to discern from the report's text that it is China and certain other Asian countries that are mainly responsible for the global marine pollution problem. The key to controlling marine pollution is to understand the role of certain rivers in Asia, and to a much lesser extent in Africa, that are in close proximity to population centres. These watercourses are now effectively just sewers.

The ISWA report stated that:

A recent study has estimated that 75% of land based marine litter in low to upper-middle income economies comes from litter and uncollected waste, while the remaining 25% of the land-based sources is plastic which leaks from within the waste management system.

In other words, 25% of the leakage is attributable to waste management options preferred by the greens. The rest is attributable to negligence of urban waste collection and sanitary practices.

The neglect of municipal waste management in the developing world can be traced back to the Brundtland Commission in the 1980s, with which the current 'sustainable development' agenda had its beginnings. The commission's chairman, Gro Harlem Brundtland, a former Prime Minister of Norway, was transfixed by new and exciting environmental issues such as climate change and water and energy conservation – in particular, her secretariat

was in close contact with Bert Bolin of the embryonic Intergovernmental Panel on Climate Change.³⁴ As a result, she personally prevented urban sanitary programs being included in the commission's remit.^{35,36}

Since that time, there has been an almost total neglect of the environmental health agenda and related urban sanitation programs^{37,38} including those relating to municipal waste collection. This is despite the fact that it was attention to these issues that lifted western countries out of poverty, misery and malnutrition from the late 19th century onwards.^{37,38} This neglect has been devastating for public health³⁸ and, as we will see, for the environment too.

The EU's contribution

As noted in the introduction, the Jambeck *et al.* paper opened the eyes of the global community and the mass media to the marine litter problem. The paper gave the first global ranking of the worst polluters of the oceans, with China a clear number one. It stressed that the problem ultimately derives from human populations living in coastal areas.

Although the paper correctly identifies China as a major source of marine waste, it still contains an important error.³⁹ This prevents the world community from understanding the full implications of the global plastic 'recycling' business in the context of the problems of marine litter and microplastics. The paper states:

...we did not address international import and export of waste, which would affect national estimates but not global totals.

The paper's methodological starting point is that the more a country mismanages waste, the more plastic litter it leaks to oceans. China imports from countries where mismanagement rates are very low, at around 1%. In China the mismanagement rate is close to 30%. However, Jambeck *et al.* only take into account *domestic* generation rates of plastic waste and so their figure for marine litter produced in China is a substantial underestimate. In essence, the paper has ignored the annual 8 Mt of plastic waste imports (cumulatively around 100 Mt⁴⁰), probably assuming that this has been recycled. This is – of course – far from the truth. In other words, the fact that recycling in the EU (as well as in the USA, Japan and Australia) is a major source of marine litter in Asia is completely hidden.

It is impossible accurately and with precision to estimate how much of this 100 Mt of imported plastic waste has leaked to the environment and ultimately to the oceans. One informed guess suggests a figure of 20% is plausible.⁴¹ The figure is undoubtedly substantial: the easy pickings – waste that is readily sorted or mechanically recovered to give a homogeneous plastic waste stream (typically PET bottles) has already been extracted (and even 20% of this ends up being treated as waste⁴²). The remainder is therefore of lower quality, making it more likely that a high fraction will be burned or dumped in rivers and oceans.

We know that there has been a lot of illegal dumping disguised as recycling: waste owners in rich countries have paid Chinese hauliers to get rid of the problem,^{5,33} thus enabling them to avoid landfill taxes or the high costs of dealing with hazardous waste. The quantities involved are hard to determine, although it seems clear that much of it ends up being dumped in the oceans or rivers or illegally on land. The sheer volume of annual importation of recyclates to China has been so large that the Chinese government could not have properly inspected it.^{5,33}

5 The growing crisis

In Asia

In 2013 the Chinese government erected the so-called 'Green Fence', refusing any longer to accept poorly sorted waste streams. An ISWA report anticipated that this would not be the end of the story:³³

The current model of operation (predominantly export dependence on China) has become vital for the successful operation of Western/Northern municipal recycling systems. There are doubts about the system's resilience and overall sustainability.

This conclusion was reached because the horrendous consequences – for both the environment and for public health – of the green 'recycling' scam had begun to emerge. As the report noted:

The important concerns expressed in relation to environment and health aspects of the international plastic scrap trade have not been systematically explored sufficiently to be verified or dismissed.

Unfortunately, the mainstream media has chosen to draw a veil over these horrors, so that ordinary people are kept ignorant of what has happened in the name of 'saving the planet'.⁴³ However, the Chinese government had no illusions. In December 2017, a meeting of world environment ministers declared a global marine litter crisis, and the Chinese environment minister indicated that China would soon put an end to a variety of waste imports. The ban was put in place at the start of 2018, and covered 24 categories of waste, amounting to 85 Mt annually, with 8 Mt being plastic waste.⁴³ Chinese ships carrying exports to rich countries now return empty to China, rather than full of plastic or other waste.

In the EU

The EU has remained silent about the horrendous environmental and health effects of its recycling strategy.^{3,43} Indeed, rather than trying to fix the problems, it has doubled down by declaring a 'war on plastics'.⁴⁴ Its new plastic strategy boasts of what it assumes is its small contribution to the marine litter problem, although it also admits that almost half of the plastic waste collected in the EU over the past two decades or so has been sent to China,³ with horrendous consequences. It has even tried to stake out a position on the moral high ground by claiming – incorrectly – that plastic recycling will support the implementation of the Paris climate agreement.³

The EU's recently adopted EU plastic strategy aims for all plastic packaging to be recyclable or reusable by 2030, which is an unrealistic and potentially very harmful delusion. Because of the Green movement and the twin obsessions with waste prevention and recycling, many countries have chosen to build MBT capacity. In the future, however, the amended landfill directive is going to make it much more challenging to use the MBT approach: the non-recyclable portion of MSW can no longer be exported to China and EU law now mostly stipulates that by 2030, only 10% of MSW can be landfilled, thus effectively closing off that option too.²⁴ Countries like the UK – with little incineration capacity – might therefore be expected to export their RDF for incineration in other European countries, just as happened in Campania.

However, there are signs that this route may be in danger of being closed down too. The EU Commission's new plastic strategy says that there should be:

...clearer obligations for national authorities to step up separate collection, targets to encourage investment in recycling capacity and avoid infrastructural overcapacity for processing mixed waste (e.g. incineration), and more closely harmonised rules on the use of extended producer responsibility.³

In other words, incineration capacity – already insufficient – will be reduced and the focus will shift to recycling. The point is only emphasised by EU Budget Commissioner Oettinger's recent proposal to introduce a levy for incinerating plastic.

These 'recycling' absurdities are only going to get worse; environmental protection requirements will soon prevent recycling of biologically treated waste and animal by-products. At the same time, however, new amendments to the EU Waste Framework Directive are requiring ever more complex sorting at source, which will significantly increase the volume of biowaste collected from 2022.²⁴ The likely fate of this ever-increasing stream of very costly (even without including the unpaid work required from householders) treated biowaste is, as with RDF, an incinerator. The waste management firms who lobby, alongside the green NGOs, for ever-more-complicated waste schemes and unnecessary additional layers of waste management will thus be rewarded. The public will pay the price

All this will undoubtedly make it much more likely that plastic litter will end up in the oceans, and the EU, USA and Japan have all been desperately trying to find countries – Vietnam, Malaysia and Indonesia are the favourites – where they can now dump plastic waste. Data for the first few months of 2018 suggests that there has been a dramatic shift in the destination of waste exports – from China to other countries in East Asia.⁴¹ These countries have until now been staging posts, sorting waste ahead of onwards shipment to China. However, the rejected fraction still has to be dealt with, and since the waste management infrastructure in south-east Asia is much more primitive than in China, it remains unclear to what extent the rejected 'recyclates' end up in the oceans or are burned in the open. The environmental and public health effects hardly need to be mentioned.^{5,33,45} However, it is unlikely that these small countries will be able to entirely replace China as a destination for waste, which will now pile up in richer countries.

Clearly, the EU's decision to focus on recycling and China's closing itself to western waste exports together mean that the situation is going to get much worse.

6 Solving the waste problem

Since the Jambeck *et al.* paper first appeared, there have been some odd ideas about how to deal with the marine waste problem. Jambeck *et al.* themselves had this to say:

Historically, waste management by burying or burning waste was sufficient for inert or biodegradable waste, but the rapid growth of synthetic plastics in the waste stream requires a paradigm shift. Long-term solutions will likely include waste reduction and 'downstream' waste management strategies such as expanded recovery systems and extended producer responsibility...

The anti-incineration and anti-landfilling bias is clear, and emphasised by the two papers they cite in support of this position. The first one is a strange metaphysical paper, which ends:⁴⁶

Nature does not respond to interdependence by seeking to minimize itself out of existence, but by growing and flourishing. Similarly, the key to generating a productive and sustainable economy is not through strategies of damage control and minimization, but through nourishing the industrial metabolism.

It is unclear how this metaphysical reasoning challenges the current waste management paradigm with respect to plastics. The second citation⁴⁷ was of the paper behind the EU's notoriously dysfunctional, inefficient and unhygienic producer responsibility scheme, which in addition to all its other flaws – causing leaks of waste to the environment being an obvious one – leaves internet traders in other parts of the world entirely unaffected.

The ISWA paper, meanwhile, described two case studies, neither of which will help address marine litter prevention or the efficient use of resources. The first concerned Europe's number one plastic recycler, the Netherlands, which is supposed to have achieved the highest plastic recycling rate (67%) in the EU. However, a recent paper from the CPB Netherlands Bureau for Economic Analysis has looked at the effects of Dutch recycling processes, and concludes they result in low-grade plastic of limited use, saving the country just 0.15% in equivalent carbon emissions.⁹ What is worse, recycling sites are wondering what to do with ever-increasing piles of plastic now that China has banned imports; Dutch incineration capacity was overwhelmed immediately after the Chinese ban.⁴⁸

The report also hails a new refinery in Bristol which produces diesel from plastic, no doubt with the generous financial support of Her Majesty's government. In fact, heat and electricity are much more efficiently generated in an MSW incinerator, and with a much lower carbon footprint as well.

Marine plastic waste in the seas of Asia mostly comes from production in Asia itself, a problem that can be blamed, at least in part, on greens diverting the development agenda away from dull problems like municipal waste management and onto the sexier issues like climate change. But green concerns are also behind the European contribution to the marine waste problem. The mirage of a circular economy has resulted in a series of badly designed, costly and complex waste collection schemes, and often non-functioning and environmentally harmful approaches to waste management. These all leak plastic to the environment.

The solution to a problem caused by unthinking environmentalism is surely not more unthinking environmentalism. Why would we want to risk environmental damage by pursuing the hopeless dream of a circular economy? The analysis above shows that the only sustainable way forward – in both the developed and developing worlds – is to collect waste and either dispose of it in properly managed landfills, preferably well away from rivers,⁵ or to incinerate it.

Austria, Denmark and Sweden have been at the forefront of implementing sound MSW policies and should be seen as environmental leaders. However, their remarkable progress in managing MSW (and, in Japan, sewage as well⁴⁹) is now being compromised by the EU's new anti-incineration stance. This stance is absurd, and involves a belief in a future utopia in which householders and businesses take part in ever more complex sorting schemes. It is also driven in part by an unholy alliance of green NGOs and waste management firms⁵⁰ with a shared interest in having three trucks coming to take away waste, rather than a single one that removes bags of mixed waste, hygienically sealed and ready to be burned. The irony is of course that, at least in EU, these multiple streams of waste meant for 'recycling' will probably all end up in the same place anyway – an incinerator.

This paper represents the author's views, and not necessarily those of his employer.

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