Communications and Strategy Challenges Of The Plastics Issue


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Any campaigns taking on the plastic crisis face some significant communications and strategy challenges. These include getting rid of the L-word, the visual 'less is more' problem (debris> microplastic), the communications legacy effect and potential motivational dead-ends of beach clean-ups, and the inability of increased 'recycling' to deliver a solution.

Advocates also need to persuade politicians to take an entirely new approach to plastic based on a production phase-out, temporary essential use exemptions, imposing responsibility 'bonds' or similar measures on allowed uses, and substitution rather than continued reliance on 'recycling'.

Campaigners, scientists and politicians need first to signal that plastic is an inherently dangerous substance. The plastics industry can be expected to fight, and starts with the advantage that it has already colonized 'recycling' and many 'community' activities, most notably on beach-cleans.

Recap: this post follows four others which explored the rapidly breaking ‘issue’ of plastic pollution. If you’ve looked at them, skip this bit. If not, here’s a summary:

The first (September 27, 2017), A Beautiful if Evil Strategy, looked at the plastics industry strategy for avoiding controls on production, by framing plastic as litter and not ‘pollution’, and co-opting litter-picks, beach cleans and the goodwill they rely on. It described the classic ‘Iron Eyes Cody’, Crying Indian advertising campaign as ‘the greatest communications dis-service ever done to nature’ and noted: ‘The pure genius of this highly emotive campaign was that it bought a social licence for mass production of disposable packaging, by championing action to clean up the pollution it led to’.

It pointed out that ‘the exact same strategy still sustains the plastics industry’ and is today being used by groups like http://www.plasticseurope.org/ through projects such as https://www.marinelittersolutions.com/. So successful is this misdirection and deception that scientists, politicians and many NGOs routinely use the “litter” frame without a second thought, even though the discovery of microplastic fragmentation means plastic pollution is quite unlike litter, and we are eating plastic pollution.
The second (November 16, 2017) *Do Some Good and Shop Before Black Friday*, delved further into microplastic, how its eaten by plankton and flows out of washing machines before draining into the sea, now that most of our clothes are made of synthetic plastic fibres (eg nylon, polyester, acrylic), which continually shed microfibres. Visible plastic containers or fragments big enough to pick up are only a small part of the problem, meaning that beaches or anywhere else can’t really be “cleaned” without removing plastic microparticles and even nano-particles.

It featured the *Guppy Friend* fibre-trapping wash bag and other ‘end of pipe’ fixes which won’t cure the whole problem but may, like the catalytic converter for vehicles, help spur awareness as well as reducing emissions. It proposed that Frans Timmermans and the European Commission could require manufactures to put filters on all washing machines.

The third blog (December 7, 2017) offered a concept: *A Two-Track Tool for Issues Development and Campaign Design*, which is applicable to any issue not just plastic. It argues that Kahneman’s ‘System 1’ (unconscious intuitive) and ‘System 2’ (conscious, analytical) thinking are not simply choices for individuals (often involving instant substitution of System 1 to avoid the mentally arduous System 2) but our societies have developed whole social domains (eg science, economics, ‘disciplines’) specialised around System 2. This leaves the ‘mainstream’ and the ‘general public’ to get on with ‘normal life’, very much relying on System 1, which means decision making based not on analysis but things like framing, heuristics and motivational values. The consequences for issue development, campaigns and any attempt to ‘mainstream’ a concern, are substantial.

The fourth (December 11, 2017) *Why We Suddenly Have a Plastics Crisis*, traced the history of ‘the plastics issue’ in Track One and Two terms, from its fleeting appearance on Track One in 1970 (Thor Heyerdahl), through its long immersion in the research world of Track Two, until with Charles Moore’s ‘discovered’ microplastic pollution in the vast Pacific garbage patch in a Track One way, around 2000. It shows that it was not a lack of knowledge of its hazards that kept plastic pollution from being recognized as a crisis but the effects of communications psychology, and the consequences of plastic being framed as ‘normal’, ‘beneficial’ and ‘essential’, even by scientists concerned to raise the alarm.

Subsequent pressure for action has come as much from scientists as NGOs or politicians, as they have completed analysis of the plastic pollution threat, from the most micro to macro levels. Now at least in the UK, it’s on Track One. Newspapers like the *Daily Mail* and TV programmes like David Attenborough’s *Blue Planet 2*, are taking Track Two research evidence into the mainstream.

It argues that for Track Two policy-makers, in terms of ‘risk’, plastic pollution poses a ‘Pandora’s Box’ type problem, similar to Persistent Organic Pollutants, and in order to tackle the crisis, we must ‘rethink’ plastic:

> ‘if scientists governments, the UN, EU and campaign groups working against plastic pollution want to make rapid and effective progress, they have to stop using the ‘litter’ frame for plastic, and start thinking of it as inherently dangerous stuff, and acting and communicating accordingly.'
Perhaps more challenging, the reality is that ‘recycling’ and conventional waste strategies are not only incapable of taking plastic out of circulation to the point where plastic pollution actually declines and stops, but they, like ‘litter’ framed beach cleans, have been heavily co-opted by the plastics industry, whose simple objective is to maintain the flow of plastic production’.

This blog picks up that thread and makes suggestions for strategies for dealing with the plastic pollution crisis.

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Marine Styrofoam from a fish box on the strandline. Plastic pollution about to go off and spawn more pollution.

Dumping the L-Word

What’s the difference between Litter and Pollution? Essentially that pollution is bad stuff, and litter is just untidiness. It’s embedded in the litter frame, the set of mental rules that constitutes’ the frame’, that litter can be easily remedied by clearing it up. This has long attracted politicians, for a number of reasons.
Mrs Thatcher arrives for her infamous litter-pick photo opp of March 1988. Litter was collected from St James’s Park in London (man left) and then redistributed for Mrs Thatcher to be seen to pick up. Thatcher was good at dodging calls to control pollution. Litter was ok as it was a question of personal, not industrial-corporate responsibility. A Guardian journalist reported: "This is not," she insisted, "the fault of the government. It is the fault of the people who knowingly and thoughtlessly throw it down." That tells you a lot about why the plastics industry likes dealing with ‘litter’.

Categories matter, including whether or not something is a pollutant, and thus a ‘bad thing’. During his 2000 campaign, G W Bush pledged to control emissions of carbon dioxide as a pollutant, alongside others such as sulphur and nitrogen oxides. Once elected President, Bush reversed this commitment in March 2001. Officials said it had been a ‘mistake’.

‘A White House spokesman, Scott McClellan, said Mr. Bush had made his decision in consultation with his cabinet.

"The president is following through on his commitment to a multipollutant strategy that will significantly reduce pollutants," Mr. McClellan said. "CO2 should not have been included as a pollutant during the campaign. It was a mistake."'


In the US, acknowledging that CO₂ was a pollutant had important legal implications as it potentially led to an obligation to control it under clean air legislation. Two weeks later, Bush walked away from the Kyoto Protocol. He’d been fixed by the oil, coal and gas industries. The rest is history: American foot-dragging over CO₂ pollution has undoubtedly consigned the world to far worse climate change.

We are now at a similar point with plastic, although campaigners should not get hung up on a legalistic route for bringing about change.
Legal specifics aside, the more important point is that pollution is bad. There is no good amount of pollution, only less is better, and none is best. The word has many derivations including cultural and moral defilement as well as over-flowing into a wrong place but it’s never a good thing.

Seeing as CO₂ is invisible, the “litter strategy” was not available as a diversion for the fossil fuel lobby but for the users of oil making plastic, it is, and every time scientists, NGOs, politicians or advocates of less-plastic-in-the-environment use the ‘L-word’, they are helping sustain the problem, not cure it. As George Lakoff has pointed out, you cannot argue with a frame from inside it: doing so only makes it stronger. So when plastic escaped being framed as pollution in the popular mind, it had long-lasting consequences.

How the ‘litter’ frame works:

When plastic (on the beach) is framed as ‘litter’, it is a question of personal responsibility, not corporate, or political, consumer or retail or even social responsibility. To drop is bad, to pick up is good. Down is bad, up is good (as it so often is in frames, heaven hell etc). The problem action is elegantly reversible into the solution. It’s binary, either/or, tangible, visualisable, bounded, human-scale, resolvable and discrete: all factors which make it an appealing causal story. Applied to the story of a beach clean, the challenge is overcome, beauty is restored, good people prevail, the problem is solved, the arc of the story is completed.

Any frame functions by its rules. It’s a mental metaphor, usually triggered by or triggering an image. What does not fit gets filtered out or ignored because it is not ‘relevant’: it cannot fit. There’s no point in raising it. Arguing with the frame merely strengthens it as we mentally refer to the rules and confirm them.
Seeing plastic-on-the-beach now triggers the long-established clean-up litter frame. This is why plastic-on-the-beach works so well for the plastics industry which does not want anyone to talk about questions such as sources, need, how much, consequences, risks or social benefit. And why continuing to use plastic on the beach as the primary visual in environmental campaigns about plastic, is perhaps not always the best idea.

Right and wrong from the world of litter

How the ‘pollution’ frame works:

In the pollution frame, it escapes. It over-flows. The source producer is responsible. There’s usually a victim: it has a bad effect for the surroundings and those in them. The responsibility is bigger than individual. It is by definition, not easily recovered and put back so emission has to be controlled. No amount of it is good.
Clip art and official warning sign of pollution.

If you need political and corporate action, you face a big difficulty if responsibility for the pollutant in question is framed as personal and individual. As Mrs Thatcher pointed out decades ago, companies and government literally do not fit in the litter frame and so are out of sight, and out of mind. And as an earlier blog established, in the case of plastics, this is no accident.

Anyone who wants to bring the plastics pollution crisis under control needs to avoid framing it as about ‘litter’ for this reason. Although perhaps inconvenient, it’s the quickest and easiest first step that the relevant policy communities can take, and they should do everything they can to make sure that pollution rather than ‘litter’ appears in the title and texts of any government or corporate policies ostensibly intended to tackle the plastic crisis.

Some examples of advocates trying to cut plastic pollution while at the same time calling it ‘litter’:

EU science and policy and technical reports on marine plastic

The European Union routinely frames the plastics problem as ‘litter’ rather than as plastic pollution. So do many governments, and so of course does the plastics industry.
EU policy report (left), EU funded project with aquaria (right) and ‘Marine Litter Solutions’, a plastics industry greenwash ‘NGO’ with 69 plastics industry members

Above: some of the signatories to the Marine Litter Solutions ‘declaration’. A who’s who of those producing the plastic problem.

EU policy on marine plastic pollution is currently framed as about ‘litter’. For example:
'The Marine Strategy Framework Directive (MSFD) sets the framework for Member States to achieve by 2020 Good Environmental Status (GES) for their marine waters, considering 11 descriptors. One of these descriptors (descriptor 10) focuses on marine litter, stating that GES is achieved only when “properties and quantities of marine litter do not cause harm to the coastal and marine environment”.'

(My emphasis)

This illustrates the considerable success of the plastics industry in hijacking ‘the issue’ and rendering it as about individual responsibility (for littering) rather than control of corporate pollution.

The EU clearly understands the issues of microplastic and plastic beneath the waves that you can’t see. It even produces this ingenious if slightly weird graphic:

But note the child: visually it still says ‘litter’ and personal responsibility, not the need to control plastic pollution at source, even though the accompanying text states:

Cleaning up the oceans is one option, it is however not the most efficient method against marine litter. You could compare it to scouring the sand in the desert and this is simply something that no country could afford. The solution is to tackle the problem at its source.

Nor does it stop there. One of the most active and respected research groups is the International Marine Litter Research Unit at Plymouth University, led by Professor Richard Thompson who first coined the term ‘microplastic’ in 2004. Thompson was one of the authors of this compendious 564 page report ‘Marine Anthropogenic Litter’, produced in 2015.
Even some NGOs conducting vigorous campaigns against plastic pollution are also still using the ‘litter’ frame:

**Surfers Against Sewage**

Some scientists and others familiar with ‘the issue’ on Track Two may feel that it simply does not matter because the term is just a ‘technicality’ and what matters are ‘the facts’ but it does matter because on Track One, in public and political communication, reference to plastic as ‘litter’ neutralises the impact of plastic pollution.

It’s also true that some may use the terms interchangeably and some researchers have framed papers as about ‘pollution’ for instance [examples] but that only strengthens the case for avoiding the L-word.
In my view the long-established custom and practice of framing policy and even research in ‘marine litter’ terms undoubtedly delayed recognition of plastic pollution as a crisis.

**Going going but never actually gone**

**Less Can Be Worse**

In communications terms there’s another more counter-intuitive reason why the ‘litter’ frame is problematic and no longer matches the plastic problem. That’s because with *items of litter*, more = worse, and that can be confirmed visually. On the other hand, with microplastic caused by fragmentation, unless you are using a microscope, the visual signal is the *opposite*. 
As described in an earlier blog, a single coke bottle can fragment to produce 17,000 1mm microplastic particles. So if you find half a coke bottle, and 8,500 microparticles have got free, that’s worse than a whole coke bottle. Once you take fragmentation into account, a beach with ‘less litter’ may not be one with less plastic pollution: less can be more.

Moreover litter as items large enough to hold (macroplastic in Track Two jargon) is tangible, and microplastic is effectively intangible. This makes plastic pollution more like any widespread and spreading threat which multiplies.

Plastic pollution sorely needs reframing, and to do that, the key question is what other bad things work like this, things, which get more dangerous as they become less visible.

A plague perhaps, or a biological weapon formed of a dangerous virus or bacterium: safe when trapped in a sealed container, more threatening when it escapes, especially if it can go on multiplying. Or a fragmentation weapon, or a lump of radioactive waste, or toxic chemicals, or a sheet of asbestos which can break up into hazardous dust.

This is the unfortunate reality of plastic. It’s inherently dangerous stuff, and it takes us into the politics of the invisible.

The lynchpin requirement to stimulating effective change on plastics is simple: to recognize that it’s inherently dangerous and send unambiguous signals to that effect. Without that, the psychological impetus and political space necessary to restrict use, change behaviour, tighten those material ‘loops’ and rapidly develop alternatives, will simply not be there.

**Signifying Risk and Hazard**

If someone walked into your kitchen with a jar of white powder, you’d expect to be ‘told’ if it was hazardous. Or perhaps to be able to see that from the label. And if it was ‘really dangerous’, we wouldn’t expect it to be in our kitchens at all, nor indeed in our homes or shops: anthrax or asbestos for example. Yet asbestos was once treated as harmless enough to be used around the home, and we were taught about its many benefits, alongside plastic.
Likewise, when I was growing up, tobacco smoking was accepted as normal, and it was considered polite to provide ashtrays even in houses where nobody smoked. Right up to the 1990s if you were very polite, you might even keep cigarettes just to offer to visitors. As recently as 2006 cigarette smoking was still legal in UK workplaces (see ‘smoke and mirrors’ in Campaign Strategy Newsletter 26 on campaign strategies which changed attitudes and the law). Now smoking is so thoroughly desocialised that it is being restricted outdoors, and every time we comply with one of these measures, we reinforce the idea that smoking is hazardous.

If products or substances are dangerous, we expect to have our attention drawn to that by a symbol, usually in an orange box. These have become so familiar that they are part of our visual language. Such symbols and restrictions now need to be applied to plastic. The good news is that in Track Two world there’s a whole industry of designers and cognitive psychologists ready to nudge us into changing behaviours (and hence attitudes, opinions and potentially politics: see VBCOP), if only they are given the brief to do so.

The bad news is that like the tobacco industry, the plastics industry will move heaven and earth to stop this from happening. After generations in which their business has boomed without control, they now see the first signs of sunset on the horizon, and they will not go without fighting tooth and nail, every inch of the way, not least by lavish use of money.

But let’s imagine that somewhere the first company or government starts putting warnings on plastic (if they have already done so, please let me know). Our comms designers face an interesting problem: given that plastic poses so many different types of risk and hazard, which ones should we depict on a warning label?

Here’s one for starters:

![Dangerous for the environment](image)

It has the advantage of familiarity, for instance found on DIY and gardening products which should not be let out.

What about plastic’s inbuilt ability to fragment, and break down into micro-particles/ fibres, which is a multidimensional risk-magnifier in itself? In some ways this makes it a danger because it is very small. Hazardous dusts fall into this category and have their own symbols.
I looked up fragmentation as a hazard and found it also has a symbol to itself – an orange hexagon – although usually associated with explosive force. Perhaps this could be adapted something like this:

![Warning sign](image)

Plastic applications also differ in their propensity to end up in the environment. For example many plastic car parts are now supposed to be recovered when a car is scrapped and presumably (I have not checked) are therefore at a low risk of ending up dumped, or in the Track Two jargon, ‘as leakage’. At the other extreme, packaging for on-the-go foods are highly likely to ‘escape’, or become ‘feral’ plastic. In the technical world of hazardous gases like CFCs these escapees are called ‘fugitive’ emissions. All examples of framing (as in a fugitive from the law, etc). So it could make sense to label plastic things to recognize particularly high probability of escape (escape risk if you like), and this might please users of lower-risk-of-escaping plastic applications.

Volatile substances are escape-prone and have their own sign, although it doesn’t quite do justice to plastic:
Plastic also poses a problem because it’s very long lived in the environment, in some cases with a half-life of centuries or longer (it’s even arguable that the ‘half life’ concept isn’t fully applicable to plastic). Perhaps it needs labelling like radioactive waste for similar reasons?

*Does plastic merit a new version of this?*

But then cycling in food webs as it does, plastic also behaves like a biohazard, which has its own established sign:

![CAUTION BIOHAZARD
BIOLOGICAL HAZARD](image)

Given that plastic poses a multiplicity of risks and hazards including transport of toxic chemicals, I suppose you could settle for the simple ‘harmful’ catch-alls:

![TOXIC HAZARD
PLASTIC HAZARDOUS TO LIFE](image)

So where might these be applied? Plastic packaging and clothing see two obvious starting points but they should be on all plastic. So at the moment, clothing labels look a bit like this:
But maybe need to look a bit more like this:

And Coke labels maybe need to look more like this:

And so we could go on. Plastic Free Zones, Low Plastic Communities, Plastic Free Products: they all send a signal that plastic is a problem and, that something can be done about it. Visual language, risk avoidance behaviour, flagging of responsibility, and social proof are all Track One communication dynamics.

Commercial or social initiatives to give up, ban or restrict plastic, or to offer alternatives, also send important signals. For instance the recent UK decisions by the café ‘Pret a Manger’ to
offer glasses of filtered water rather than water in plastic bottles, and the decision by pub chain Wetherspoons to stop using plastic straws:

Report from The Independent

Such moves are a target category with high leverage (supply chain) and high visibility, as well as being high-touch in Track One life, which makes them great intermediate campaign targets. On this issue ‘plastic-free’ lifestyle blogs are also hugely important gearing, and a test-bed for proof-of-possibility for substitution. I’ll write more about that another time.

Can We Win By ‘Fighting On the Beaches’?

A reality facing campaign designers is that plastic on the beach is already established as the iconic visual. The beach is emotional Ground Zero for most communications aimed at curbing plastic pollution. Here’s what I got when I put ‘plastic pollution’ into a Google image search.
Beach plastic is where public motivation has long met public opportunity to take a chunk out of the problem. It’s what gets us going but where to? Getting the context or battleground right or wrong can often make the difference between campaign success or failure. The beach has been a great location for showing there’s a problem with plastic and for public engagement but can it now meet the needs of campaigns to end plastic pollution?

Call of the Beach

‘Beach-combing’, walking the strandline is an ancient activity, going back at least to the Stone Age. Today from Mumbai to Hong Kong, from Australia to the US, people voluntarily take to their beaches to try and combat plastic pollution. Let me be clear: I’m all in favour of beach-cleans, and I do them too.

There’s something awfully satisfying about cleaning the plastic from a beach, particularly a beautiful one. Restoring natural glory knocks emotional spots off a tidy-up of plastic behind a supermarket car-park. It also produces pleasing, visually definitive results, as with this beach-clean in Utila, Honduras:

*Beach clean in Utila (Honduras) by Ecodive. Problem solved?*

A beach of plastic bottles is the defining visual poster-child of the issue. A plastic-covered beach counter posed with a ‘pristine’ beach provides a dramatic visual polarity. That makes it the first choice for news media imagery, and a choice emulated by millions of us on social media.

So as click-bait visual language and starting from where concern-is-at, a good plastic-littered beach is hard for campaigners to resist, and for the public, the relative presence or absence of beach plastic has become a critical visual indicator of the ‘health’ of the seas, and a social barometer of how we are doing on ‘plastics problem’.
In 2016 a team of academic researchers analysed a decade of UK beach-cleans and wrote:

The aesthetic impact of anthropogenic litter has implications for tourism and human well-being. For example, 85% of 1000 residents and tourists said they would not visit a beach with an excess of two litter items per metre ... [and] „„, beach choice was more strongly determined by clean, litter-free sand and seawater than by safety [plus] the restorative psychological benefits ordinarily experienced by people visiting the coast were undermined by the presence of litter.

In other words we prefer clean beaches, and they make us feel better.

So sensitive are we to the visual signal, that any ‘fiddling’ with the beach plastic barometer is worth remarking on. Recently I was talking to a fisherman about plastic and he raised the “unfairly blamed” point with me. A piece in Fishing News, he said, had pointed out that when the BBC visited Cornish plastics campaigners to report the amount of fishing industry waste (about 15% of UK beach-clean items), they first piled it all up to make a ‘better picture’. Conversely, Jo Ruxton, formerly a producer on the BBC’s Blue Planet, and now an anti-marine-plastics campaigner, told the Daily Telegraph: “I’ve known film crews spend two hours clearing up beaches before they can take shots of turtles.”

[David Attenborough’s programmes have been increasingly criticized for giving an unrealistically positive view of the state of nature, including by me but to his credit, Attenborough used the latest, Blue Planet II, to make a strong call for action on plastic].

Beach Clean Ups – Do They Really Make a Difference?

Now we know about microplastic, does a beach with little or no visible plastic give a misleading picture? And might the act of beach-cleaning even function as a sink for public concern, and create a ‘dead-end’ stopping public concern from reaching the places where it really could help cut-off the problem at source?

At first sight, the maths suggest it is not even scratching at the surface of the problem.

The largest and best documented beach clean network is International Coastal Clean Up, co-ordinated by the US-based Oceans Conservancy. Starting in the US State of Oregon in 1984,
it went nationwide by 1988 and now includes over 90 countries. In 2015 800,000 volunteers recovered 14m items weighing 8m kg, almost entirely plastic. It’s a lot to pick up, weighing as the Conservancy says, ‘More Than 100 Boeing 737s’.

8m kg is 8,000 tonnes. By comparison, a 2015 study in Science estimated that in one year (2010) about 8m tonnes of plastic entered the seas from coastal communities (ie including via rivers) and that is increasing. So even the heroic efforts of nearly a million volunteers only accounted for about 0.1% of all the plastic estimated to be entering the ocean. Even if we added in other (maybe imaginary) clean-ups and increased the Conservancy figure tenfold, we’d still only be recapturing about 1% of the plastic getting free into the sea.

Oceans Conservancy’s home page features a striking image of a woman collecting beach plastic with the words: ‘ending the flow of trash at the source’, which is the right idea as a mission but exactly what beach clean ups do not do because plastic is not made on the beach and 80% of the plastic in the sea, does not come from disposal at sea.

Is this the source of plastic pollution?

To be fair, if you drill down several levels the Conservancy does offer some educational information on behaviours, such as a ‘6 week trash free challenge’ including in week two: ‘Use as few single-use beverage bottles and cups as possible’ but it does not seem to propose anything intended to ensure corporations make less plastic.

The Conservancy argues that the data on types of ‘trash’ collected during beach-cleans enables others to ‘divert solid waste’ before it reaches the sea, or recycle it, for example a scheme to recycle flip-flops in a Kenyan Marine Park.

The Conservancy’s 2016 ‘data release’ on ‘International Coastal Cleanup’ does mention microplastic turning up in seafood and wildlife but regards it as a matter for ‘further study’. In short, the proposition of this global network is to do something good in itself, which is removing plastic from our beaches but it seems to be the same framing activities, described in A Beautiful If Evil Strategy: one liable to reduce demand for effective regulatory action by drawing well-intentioned citizen consumers into litter picking rather than change campaigns.
Alarmingly to some, the Conservancy’s lead sponsor for its beach cleans is Coca Cola, while Dow Chemical appears as a ‘Healthy Bay partner’, while Keep America Beautiful (see earlier blog) is an ‘Outreach Partner’.

**Actions attached to a beach-clean – Surfers Against Sewage**

In the UK, the Marine Conservation Society is a contributor to International Coastal Clean Up. It’s known for the Beachwatch survey/beach clean run since 1993. In 2016 its volunteers picked up nearly 270,000 pieces of beach litter, mostly plastic, and encouragingly, have found a 22% reduction in plastic carrier bags since charges on them were introduced in 2011.

MCS does not seem to weigh its plastic but another UK organisation running beach cleans does, the more campaign-oriented Surfers Against Sewage or SAS.

In 2017 SAS reported: ‘the Big Spring Clean saw us remove over 55 tonnes of marine plastic pollution and litter from 475 beaches across the UK’ and SAS netted another 35 tonnes in the Autumn clean-up, making a total haul of 90t. Some 10,000–27,000 tonnes of ‘mismanaged’ plastics are estimated to be discharged from land in the UK, so in relation to say 18,000 tonnes, 90 tonnes represents around 0.5%.

Recapturing 0.1% - 0.5% of the plastic getting into the sea is not a lot but the activity is obviously worthwhile in many ways. For one thing, marine plastic tends to be concentrated near the coast. A study modelling the potential of floating ‘plastic collectors’ to trap microplastic found that if placed near coasts they could remove 31% of microplastics, versus 1% if they were all in the ‘Great Pacific Garbage patch’.

Fortunately for collecting, it also turns out that many beaches act as traps for plastic. Consultancy Eunomia points out that the average global concentration of sea-surface plastic is less than 1kg/km², and the highest concentration is in the North Pacific Gyre at 18kg/km² but on beaches it is five times greater at 2,000kg/km². Eunomia says ‘there is a ‘flux’ of litter
between beaches and the sea. By removing beach litter, we are therefore cleaning the oceans’.

![Figure 1 – Concentration of plastic per km²](image)

Above: from *Plastics in the Marine Environment* by Eunomia

So keep cleaning your beaches: it’s more effective to pick it up there, than to try catching it at sea. Just do it frequently enough to get to the plastic before it’s washed back out to sea, or before UV from sunlight makes the plastic brittle, and before wind, waves, pebbles and small life-forms break it up into microplastic. Eunomia also worked out that if beaches were cleaned on a daily basis rather than just twice a year, about eight times more plastic would be recovered.

Of course it is very hard to pick up very small bits of plastic. On some beaches over 80% of all the pieces of plastic found between the high and low water marks are now ‘invisible’ microplastics.

This also leaves the problem that beach-cleans and beach-plastic dominate the engagement visuals of the plastics issue. Showing beach cleans solving a problem does not show beach cleans solving the problem and cannot do so but perhaps it is also possible to adapt beach-cleans to give them greater leverage.

**Enhancing Beach Cleans**

Beach-cleans offer a good opportunity to show and involve people in the reality of microplastic, including on the beach itself. There is potential ‘citizen science’ projects such as this one in Florida and this at St Kilda in Australia:
Community members investigating microplastics with Environment Protection Authority Victoria

Hands-on activity to sieve and reveal microplastic on the spot would be the best way to bring home the reality of fragmentation and microplastic, and if conditions do not allow, then ‘one we made earlier’ type displays could be used.

A big weakness of beaches as a context for plastic campaigns is the absence of corporations and politicians. Unlike the urban environment, beaches tend to be brand free zones. One approach to bridge this gap between beach plastic and responsible decision-makers is to celebrate clean-ups, and then ask the participants to demand political action, such as via the petitions run by Surfers Against Sewage. But even this does not actually put corporates or politicians ‘in the picture’ on the beach. Indeed plastic-makers and users probably hope that by becoming corporate sponsors, they may shelter behind projects like beach-cleans and evade campaigns such as Greenpeace’s push against Coca Cola.

A beach brand audit can bring plastic-using brands to the beach by attaching them to individual bits of pollution. In the Philippines Greenpeace identified plastic from Nestlé, Unilever and Proctor and Gamble as amongst the worst offenders. A step on from that could be a RTS or Return-to-Sender action; taking the plastic back to the users or producers.

Such enhancements could help retain the satisfaction of ‘cleaning the beach’ while embedding awareness that it’s not a complete solution. The ideal outcome is that the beach gets cleaner but participants, having ‘done their bit’, are motivated and enabled to press for upstream action.

A Massive Expansion of Beach Cleans?

It’s possible that growing awareness of the plastics crisis will stimulate calls to increase beach-cleans. Eunomia estimates that as beach cleans cover only 1.9% of the world’s coastline, at any one time the actual amount of recoverable plastic on beaches could be around 1.4 million tonnes. Expanding beach cleaning 50-100 fold could therefore harvest more of the plastic washing onto and off beaches but would also require significant resources.
If campaigners set about pressing governments to fund a massive increase in these mainly voluntary activities, there is a chance that they might succeed. The MacArthur Foundation notes that even in the EU, cleaning coasts and beaches of plastic could cost up to EUR 630 million per year, as pollution grows. So it could appeal to politicians as a great way to encourage volunteering, boost civic minded participation, be seen to do something ‘big’, and possibly divert the unemployed or low-paid into useful activity. Some charities might love the idea as it could create a new profile and cash flow for them.

But unless beach-cleans are enhanced as campaign platforms as discussed above, just scaling them up could actually prevent effective action by reinforcing a perception of the problem and solution to plastic pollution in terms of ‘beach+litter+cleanup’. Something similar happened in the past with ‘clean ups’ of beached oil spills and oiled wildlife.

One way to avoid a reinforcement of the status quo would be to make the polluters pay. Why should the taxpayers or volunteers pay to clean up plastic pollution just because the ‘leaky’ plastics system is a profitable business model for chemicals companies?

The MacArthur Foundation has pointed out that on conservative estimate, ‘costs of the negative externalities of plastics in the oceans’ total least USD 13 billion each year. In other words, the impact of plastic pollution is costing us at least US$13bn per annum but the plastics industry is not paying.

Governments could use tax or other measures to extract at least these sums from the plastics industry, and then to use some of that to recover plastic from our beaches. Alternatively, one could take the ‘community service’ penalty approach and make the plastics industry executives get out and pick up the plastic themselves. Campaigns to demand this might at least force corporations into the open.

Of course none of this makes much sense so long as the ‘Niagara Falls’ scale flow of plastic into the environment continues unabated.

In the end campaigns to tackle the plastics crisis cannot be won just ‘fighting on the beaches’. Campaigners have inherited a legacy activity conceived to manage a local impact, not resolve the underlying causes. It’s a problem management activity not a problem solving strategy, and can only partly be transitioned into a battle winning campaign tool. Effort needs to migrate upstream, into homes, shops, schools, workplaces, legislatures, investment, design and industry.

The Limitations of Recycling

Perhaps the biggest communications challenge facing architects of new plastics campaigns, is ‘recycling’, an activity which has become almost synonymous with ‘being green’. Our customary ‘Track One’ conceptualisation of the ‘plastics issue’ includes plastic waste (often on the beach), and recycling. Unfortunately, in the case of plastics, this simple WYSIATI, (what-you-see-is-all-there-is), is an illusion.
What we imagine, because of what we ‘see’. Not what happens. Leastways, hardly ever.

That it is good to recycle, has become a social norm and so it has become conventional wisdom that if we recycled plastic, then coupled with recovering it from the environment, as in beach-cleans, we could ‘solve the problem’. Unfortunately when experts have looked into this, it seems that whereas recycling may indeed achieve great things on say, aluminium, that’s not the case with plastic. It can’t solve the plastics crisis.

This poses a communications challenge but it’s unavoidable, as it’s part of the reason why we need to stop using plastic. Yes the current recycling system can be ‘tightened up’ but that only makes sense as a transitional mitigation during a phase out. Substitution of non-plastic alternatives, needs to loom large in campaigns, communications and government strategies.

Re-appraising how we communicate about recycling within a plastic phase out framework is going to take some working out. The naieve version of ‘recycling the solution’ is well embedded.

Above: the first US plastics recycling facility was opened in 1972. The magical green box takes plastic away to be ‘recycled’. It helps us feel good by doing good but it too often it is an exercise in deception. From industry site Plastics Make It Possible
'Track Two’ type analysis shows that the plastics recycling ‘system’ is not ‘fit for purpose’ when it comes to delivering a solution to the plastics crisis. It’s not just like a bucket with a hole in it, it’s more hole than bucket, in fact about 90% hole.

In 2009 as part of the Royal Society study Our Plastic Age, two plastics industry consultants described a great many recycling processes that could in theory make a difference to overall waste and pollution, but no examples of it actually reducing production of new plastic. (The industry provides countless examples of pilots and prototypes that are very ‘closed loop’ but the forest of examples disguises the fact that hardly any plastic is actually in anything like a closed loop system: a case of not seeing the wood for the trees).

In 2014 ‘Stemming the Tide’, a report by consultants McKinsey’s for Oceans Conservancy, identified a series of ‘drivers’ of ‘leakage’ into the environment offering scope for relatively rapid reduction (mostly incineration).

McKinseys wrote:

Analysis suggests that recycling alone is not a solution, as about 80 percent of the plastic waste stream is too low in value to incentivize extraction, and almost 30 percent cannot be distinguished at a polymer level without additional investment in optical sorting equipment.

Writing in the Journal of Industrial Ecology in 2015 under the title Common Misconceptions about Recycling, Roland Geyer noted:

‘in the long run, recycling reduces waste generation only if it reduces primary material production; otherwise, it merely delays it’.

In other words, recycling plastic may not lead to a reduction in the production of new and extra plastic, and even the best imagined improvements won’t resolve the pollution crisis.

In 2016 the Ellen MacArthur Foundation study The New Plastics Economy, detailed a huge range of steps required if plastics were to be made and used on much more ‘circular economy’ basis. It noted:

32% of plastics escape the collection system globally. Plastic packaging is particularly prone to leakage due to its small size, high rate of dispersion and low residual value

and although ‘a critical first step in addressing leakage [a euphemism for pollution] would be to urgently improve after-use infrastructure in high-leakage countries’:

‘this measure in isolation is likely not sufficient ... even under the very best current scenarios for improving infrastructure, such measures would stabilise, not eliminate, leakage into the ocean.

The expected reduction of global leakage (45% by 2025 in a best-case scenario) would be neutralised by the annual growth of plastics production of currently around 5%. As a consequence of such stabilised leakage, the cumulative total volume of plastics in the ocean would continue to rise quickly’.
Meaning that even with a huge effort to improve the performance of the many steps in the ‘recovery’, collection, recycling and ‘waste management’ systems, plastic pollution would increase, unless production is curtailed.

In 2017 Jenna Jambeck and others published *Production, use, and fate of all plastics ever made* in Science Advances. They estimated that so far, less than a tenth of all the plastic ever made, has been recycled, and wrote:

‘Recycling delays, rather than avoids, final disposal. It reduces future plastic waste generation only if it displaces primary plastic production; however, because of its counterfactual nature, this displacement is extremely difficult to establish’.

![Cumulative plastic waste generation and disposal](image)

*Fig. 3. Cumulative plastic waste generation and disposal (in million metric tons). Solid lines show historical data from 1950 to 2015; dashed lines show projections of historical trends to 2050.*


The authors calculated that half of all plastic ever made, had been produced in the preceding 13 years and over 40% of the non-fibre plastics had been used in packaging, with a very short life before becoming waste.
From *Production, use, and fate of all plastics ever made*. Of the 4900Mt discarded (environment or landfill) some 600Mt are fibres. Of the 600Mt recycled, only 10% have been recycled more than once.

Geyer et al estimate that worldwide, 18% of non-fibre plastic was recycled in 2014 with higher rates in Europe (30%) and China (24%) than the US (9%). Very little fibre plastic is recycled. They concluded:

*The growth of plastics production in the past 65 years has substantially outpaced any other manufactured material ... without a well-designed and tailor-made management strategy for end-of-life plastics, humans are conducting a singular uncontrolled experiment on a global scale, in which billions of metric tons of material will accumulate across all major terrestrial and aquatic ecosystems on the planet*.  

**More New Plastic**

The plastics industry is fond of talking about recycling and the need for more of it. *Plastics Europe says* 7.5m tonnes were recycled in Europe in 2014. What we don’t hear much about, is how much difference plastic recycling is actually making in terms of ‘closing the loop’ or avoiding the need for creation of ‘new plastic’ or taking it out of circulation.

Plastics Europe says 59mt of plastic were produced in Europe in 2014. It does not say what percentage came from ‘recyclize’ or recycled plastic but even at the most optimistic, it won’t be more than 7.5mt or about 13%. In reality it might be nearer 1.3%.

The most likely reason for this is a combination of economics – only when the oil or gas price rises high enough does the industry turn to ‘recyclize’ – the massive fuss and bother involved with using recycled as opposed to virgin materials, and fears of users (such as Coca Cola) that recycled material may be hard to make as nice and shiny as virgin plastic.
When Recycling Really Means Relocation

For decades ‘plastic recycling’ in many developed countries has often really meant plastic waste export. A 2014 report for the International Solid Waste Association found the EU was exporting ‘almost half of the plastics collected for recycling ... corresponding to 12% of the entire post-consumer plastic waste arisings’. 87% of this ended up in China. Unless the European plastic industry is at the same time buying in plastic waste from outside Europe, it seems certain that it is using very little of the plastic sent for recycling by Europeans.

So might China hoover up all the world’s recyclable plastic instead of using fossil fuels to make more? Probably not. Hearing their plastic has been “sent for recycling”, consumers might imagine it was recycled. But no. It turns out that most of the plastic ‘recyclize’ is too dirty to be used. Since 2013 China has adopted a ‘Green Wall’ policy, restricting what it accepts as waste imports. China recently shocked European and especially UK plastic waste exporters by announcing vastly tighter quality rules. These outlaw shipments of 24 classes of recyclize, including some plastic, with more than 0.3% contamination.

Isabel Hilton: : “the rest of the world finally has to face up to its own problem”

Isabel Hilton editor of China Dialogue told the BBC World Service ‘World Update’ on 5th December 2017 that “only ten percent” of the plastic waste ‘sent for recycling’ in China “is actually recyclable”, and “the rest tends to get dumped in China, it finds its way into rivers, and eventually into the sea, and that has prompted the Chinese authorities to impose a ban on several varieties of plastic”. Asked what this meant for countries exporting plastic waste to China, Hilton replied: “the rest of the world finally has to face up to its own problem”.

Whether this does indeed stimulate greater and better domestic recycling, product redesign and substitution or simply a search for another place to dump plastic collected for ‘recycling’, remains to be seen. It also presumably means that some of the marine plastic pollution ‘from China’ is actually plastic pollution from Europe, the US and other developed countries.

Incineration is actually what happens to most plastic collected for ‘recycling’ in the European countries with higher rates of ‘recovery’.
‘Energy recovery’ means incineration. The highest rate of plastics recycling is in Germany but that was under 40%. From: *Our Plastic Age*, Royal Society 2009.

**Plastic’s Downcycling Problem**

Massive incineration happens even when ‘recovery’ is high, because the plastics industry does not much want to use ‘recycled’ plastic to make new versions of the original item. One reason for this is ‘downcycling’, as illustrated by these examples from Cambridge University Engineering Department. They are some years old (2006) but the basics are unchanged.

**Recycling of polymers: the reality**

- *In-house scrap* (generated at the source of production) is near-100% recycled already.
- *Recycling of used plastics* (here PET bottles): few plastic recycling plants make a profit. Many have closed.

**Why, if recycling is energy-efficient? And is it?**
- Collection is time-intensive, so expensive
- Sorting of mixed plastic waste is difficult – contamination is inevitable.
- Removing labels, print, all but impossible at 100% success rate
- Contamination of any sort compromises re-use in “hi-tech” applications (a carbonated water bottle is a pressure vessel – a failure is unacceptable to the supermarkets that sell them)

**The consequence:** most plastic (apart from in-house) is reused in lower-grade applications
- PET: cheap carpets, fleeces
- PE and PP: block board, park benches
In-house scrap means inside the plastics production factory. Once it’s outside in the supply chain, most plastic is difficult to recycle and especially, to make back into the same product. PET, often used to make plastic bottles, is the easiest plastic to recycle but even that mainly gets made into lower-grade products like polyester carpets or wood-substitute ‘plastic lumber’. These in turn are very rarely recycled (they are dumped), while both carpets and polyester fleeces made from PET, continually shed microfibres while in use. This, as Geyer says, is only delaying pollution, not preventing it.

In this example only 5% of PET from sources like bottles, stand any chance of going around a ‘closed loop’ and re-emerging as another plastic bottle. For most of the dozens of other types of plastic, the position is worse.

The Impractical Complexity of Plastic

Psychologically, we probably equate ‘recycling’ with re-use, as we imagine that a used plastic bottle becomes a new plastic bottle. If we see a plastic bottle return-vending machine accepting old plastic bottles and rewarding us with a returned deposit, our childlike understanding of whatever goes on inside that box, is probably that it’s ‘solving the problem’. Likewise if we hear about the ‘Circular Economy’ we may simply picture a much bigger version of much the same thing.

Sadly, plastic is a category of substances not a single substance, so it’s massive headache for recyclers. Although there is a whole industrial ecosystem of recycling engineers, product innovators and NGOs trying to make it work, the problems are formidable: a case-study of non-sustainability

A 2016 EU report Sustainable supply of raw materials: Optimal recycling by Business Innovation Observatory pointed out that packaging involves 250 different kinds of plastic, so:
‘during recycling, different kinds of plastics tend to get blended together as it is difficult to separate them in the recycling process. Processes which try to separate polymers generally involve first melting the plastic and then separating the polymers through a chemical process. However, the output is not as high quality as virgin material, which limits its use and decreases the demand for recycled plastic. A large part of the packaging plastic instead goes to landfills or for incineration’.

This provides a huge incentive for plastics producers to make new plastic from virgin materials, which currently means to oil, coal or gas. When those are cheap, that incentive is greater and recycling companies may go out of business. This has happened with falling oil prices in the UK and gas from fracking in the US.

Fibre Problems

‘Downcycling’ has long been recognized as an economic problem in seeking a more ‘circular economy’ but the realisation that plastic microfibres from textiles are a massive source of microplastic pollution, makes converting container plastic to plastic fibres, or re-circulating fibrous plastic, look like a very bad idea. The recycling policy community do not seem to have caught up with this.

In November 2017, the industry-linked ‘environmental non profit’ GreenBlue published a report Making Fiber-to-Fiber Recycling a Reality for Polyester Textiles arguing that new forms of chemical rather than mechanical recycling could enable recycled PET to create feedstock for any desired grade of PET, and laying out a vision for a large PET-based textile economy. PET fibre is ‘polyester’ and according to GreenBlue represents 55% of all textile fibres produced.

GreenBlue’s enthusiastic endorsement of inter-company exchange of PET (involving apparel manufacturing, contract textile mills, carpet manufacturing and contract office furniture manufacturing) foresees ‘watersheds’ of regionally linked enterprises, in a gigantic upscaling of the famous rent and take-back model of Atlanta-based company Interface. It may make sense in terms of avoiding landfill and energy use but do we really want to be carpeting any country in vast areas of plastic which sheds microplastic fibres?
Geoff Wooster from Dow Chemical is a member board of GreenBlue and authored a 2016 article, *You’ve been thinking about plastics all wrong*, in *Business Insider*. The mission of such ‘sustainable business’ groups looks similar to environmental sustainability but for companies like Dow it is essentially to keep their business sustainable. Jeff’s article may be all his own work but it certainly reads like it was written by a PR, and in a style familiar since the 1970s. It starts:

‘Plastics are an indispensable part of our lives today, and recent advances in material science have delivered truly amazing products from dissolving heart stents to lifesaving air bags to smart packaging that both protects our food and warns us when it’s about to be “past its prime.”’

It hits the good old Settler ‘Security Driven’ hot buttons of saving life and limb in order to smuggle in an overall message that plastic is ‘indispensable’ which is simply untrue.

We don’t need plastic as ‘lumber’: we could use wood. We don’t need plastic for bags, we could use paper, or cloth, or string. We don’t need bubble-wrap, we could use cardboard. We don’t need polyester: we could use cotton, wool or other naturally derived fibres. We don’t need plastic straws, we could use straws made of ... what’s the word?

**Recycling Has Been Colonized by the Plastics Industry**

Recycling is a case of ‘do what we say, not what we do’: you the consumer ‘recycle’, we the plastics industry make more new plastic.

Like decrying litter, emphasising the importance of ‘recycling’ is a brilliant way to distract the public from the fact that plastics production is in effect pollution production, as except for indefinite dry storage (like radwaste), or incineration (with its own pollution issues), or pyrolysis or chemical-recycling (to make more raw materials for plastic), there is no way to get rid of the stuff.

As Michael Warhurst from Chemtrust has said, recirculating an inherently hazardous and substance is not ‘green’, it’s a risk.

Scientists and advocates should recognize what’s going on: the plastics recycling business is significantly co-opted by the plastics industry, as well as being a public waste service. For the plastics industry, on the one hand it supplies feedstock when convenient (rarely), and credibility, respectability and a shield against campaigns and regulation that threaten to downsize plastic production and use on the other (frequently).

**Untrustworthy**

If one truth emerges about the plastics industry from the history of this issue, it is that it cannot be trusted. It promotes plastic recycling for example, and uses 90% virgin materials but it does not explain this to the public.

By colonizing the response to plastic pollution the plastics industry has put itself in a strong position to influence that response so that it does not threaten its core business. It has even
convinced well-intentioned but naïve scientists trying to stop plastic pollution, that they should talk about benefits of plastic.

By sponsoring and becoming part of the global beach clean community, the plastics industry saps the energy from what should be anti-pollution campaigns.

It cynically co-opts goodwill and takes on the clothes of voluntarism to play on the side of citizens looking for a solution. [https://www.marinelittersolutions.com](https://www.marinelittersolutions.com) shows you schoolchildren looking for ‘litter’, not plastics executives.

By participating in and funding ‘research’ into how to make plastics ‘more sustainable’, it buys itself more time. If groups like GreenBlue are serious about their mission for ‘sustainable use of materials in society’ they should not be developing new markets for plastic.

And it still tries to normalise the idea that reliance on plastic is inevitable and desirable. It tries to rob alternatives of attention, credibility and resourcing (preventing a renewables moment).

**Conclusions and A New Political Ask**

The world is swamped in plastic. It’s time governments followed the call of the director of UN Environment and “declared war” on plastic. We need a phase-out, and quickly.

The plastics industry estimates that global production will double by 2035 and quadruple by 2050. According to The Guardian, ‘a million plastic bottles are bought around the world every minute and the number will jump another 20% by 2021 … equivalent to about 20,000 bottles being bought every second’.

NGOs, scientists and other advocates of action on the plastics crisis need to call it as it is: pollution, not the L-word. And scientific experts on plastics pollution need to understand the basics of communication psychology if they are not to repeat the mistakes of the scientific community on climate change.

Environmentalists need to grasp the nettle and say that more ‘recycling’ simply cannot solve the plastics crisis. It can only make a contribution within a context of a phase out of plastic, meaning a rapid year on year reduction in production.
In 2016 consultancy Eunomia have put together this infographic summarising recent knowledge about marine plastic pollution. Four fifths of it comes from land and 94% of the plastic going into the ocean ends up on the sea floor. ‘There is now on average an estimated 70kg of plastic in each square kilometre of sea bed’.

We now need political leaders to accept that the risk posed by plastic is different from the long-recognized public nuisance caused by discarded packaging, and even the choking and strangling of endangered wildlife.

The fragmentation of plastic into micro- and nano-pollution, it’s extreme persistence, ubiquity, its ability to release, concentrate and transport toxic chemicals damaging to health, all make plastic both a real and present danger, and a threat to future generations.

So policy needs to change: plastic needs to be rapidly phased out. It needs to be labelled, to raise awareness of the different types of risks it poses, and to aid appropriate recovery.

Policy makers should emulate the Montreal Protocol and the case of CFCs and treat plastic as a crisis substance. The Montreal Protocol started from the assumption that ozone destroying chemicals had to be banned, and for practical purposes, it established lists of “essential uses” which could continue while substitutes were developed. The same approach should be adopted with plastic, which means we can keep blood bags and other medical applications, while rapidly getting shot of things like bubble wrap, blister packs, and plastic cups, bags and bottles.
Setting phase out dates also sends an unmistakeable signal which stimulates redesign, reformulation, substitution and changes in investment decisions.

Given the untrustworthy nature of the industry, policy-makers should also find ways to lock in responsibility and liability. For example, with versions of Germany’s ‘Green Dot’ scheme, or financial bonds only redeemable once plastic is proven to be recovered from use. We are used to thinking of plastic as cheap and something that can be bought. Maybe given its inherently hazardous nature, it should only be rented?

All this is quite a big ask and in return, politicians are likely to ask advocates to help ‘educate’ the public and build ‘awareness’.

A lot of ‘Track Two’ work has already been done on technical feasibility but campaigners, communicators and funders of programmes would be making a big mistake if they responded by now trying to explain to the public all the possible steps which might make a real difference.

That would be trying to immerse the public in ‘Track Two’ detail in order to make something happen on Track One, and it is one of the cardinal errors made by climate scientists when they found themselves at the forefront of public communication, and assumed that effective political action depended on first explaining the problem, starting with how the climate system works.

The principal task of campaigns should first be to associate plastic with pollution, and get it treated as an inherently dangerous substance, as without that, not a lot is going to change.