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Teddy Goldsmith (1928-2009)

By now I'm sure that many of you will have heard the sad news that *Ecologist* founder and environmental luminary Edward Goldsmith passed away on Friday, 21st August. He had been suffering from a long illness, and died peacefully in his sleep at home.

As with any passing, it leaves a collection of disparate emotions. Sadness, of course. But fond memories as well. And, in the case of the *Ecologist* and its readers, it should convey a renewed sense of purpose.

Teddy's life was, above all else, dedicated to pointing out the folly of conventional thinking. The very first issue of the *Ecologist* (which is free for all to read in our online archive) depicts a man sinking into a pool of mud (or slime – it's in black and white), one hand extended as if trying desperately to save himself.

It was a wordview – of a society sinking under its own weight of environmental folly – that very much dictated the path of the magazine. In his forthcoming book, Teddy's nephew Zac Goldsmith describes the *Ecologist* as 'for a while perhaps the world's gloomiest magazine'. It's an epithet I'd like to think we've outgrown, but it's a valid observation. When all the evidence in front of you suggests that the world you know and love is sinking into the mire, then the desire to exhibit that evidence en masse to your readership becomes overwhelming. If rather tough reading.

While later incarnations of the *Ecologist* have tried to balance sombre news with practical solutions, the core thinking that underpinned how that news and those solutions were approached was undeniably Teddy's. Perhaps not as finessed (the man did once spend an entire year reading about nothing but cybernetics), but clearly his.

Which is why I think that Teddy would have been interested to read this month's investigations. Jayme Otto's thoughtful profile of Madeleine Nyiratuza, coordinator of the Gishwati Conservation Project, cuts to the heart of a crucial issue: when there's a choice between people's welfare and the environment, which do you choose? Nyiratuza insists, as did Teddy, that you can still have both.

Similarly, David Ord's in-depth look at attempts to rein-in the chemical industry since Rachel Carson's *Silent Spring* would, I suspect, have brought a nod of grim recognition from Teddy. The first issue of the *Ecologist* ran an article forseeing that the pesticide DDT had merely 'retired for a moment to lick its poisoned wounds', and that other, similarly dangerous compounds would follow in its wake.

Paul Miles' graphic portrait of the indigenous communities fighting to keep their land safe from the tar sands industry– which gobbles up energy and ecosystems with abandon – would have reinforced much of what Teddy had said for years.

And David Strahan's shocking investigation into how UK councils may be about to waste one of our most important green resources – food waste – would, I suspect, have elicited a snort of knowing derision from our founder.

Times, media, and circumstance may have changed. The basic issues have not. Teddy's take on them will be sorely missed.

Mark Anslow, Editor

A real waste of waste

Biogas - a methane-rich fuel made from food waste or sewage - has huge potential as a green fuel. But current UK subsidies, rules and contracts could mean the technology is stillborn. David Strahan reports

When David and Ruth of *The Archers* decided to set up an anaerobic digester to make biogas from farm waste, they quickly ran into trouble. Intended to produce electricity for the national grid and heat for their polytunnels, the project was defeated by boardroom bust-ups and NIMBY protests led by local battle-axe Linda Snell.

But the would-be energy entrepreneurs of Ambridge don't know the half of it. The real-life obstacles to anaerobic digestion (AD) are massively greater, the unintended consequence of perverse British subsidies, EU deadlines and local authorities scrambling to sign long term PFI waste contracts. As a result, the potential of hundreds of thousands of tonnes of organic waste to produce sustainable energy and mitigate climate change could be squandered for up to 25 years.

Clean and green

Unlike most biofuels, the climate credentials of biogas are uncontestable. The AD process involves feeding organic wastes into a digestion plant that excludes oxygen, where microbes break it down to produce methane-rich biogas for energy, and a nutrient-laden 'digestate' that can be used to make fertiliser or compost. Because AD displaces fossil fuels and carbon-intensive fertiliser - and because it exploits methane that might otherwise be released to the atmosphere – biogas is reckoned to deliver negative greenhouse gas emissions of as much as 200 per cent in some circumstances.

The energy potential of biogas is also huge. National Grid estimates that biogas could supply half our household gas consumption, or one fifth of total UK gas demand, while Environmental Protection (formerly the National Society for Clean Air) calculates biogas could replace 16 per cent of our transport energy – three times more than is needed to run the entire public transport system.

Yet Britain may not reap the full benefit of biogas for a generation. One problem is that around a third of the 16-18 million tonnes of food waste we jettison annually is controlled by local authorities, and they are in a bind. Under the EU Landfill Directive, councils face strict deadlines in 2010 and 2013 to divert organic waste from landfill to more sustainable means of disposal. And these looming EU targets are creating 'a degree of crisis management', says Steve Burdis, vice chairman of the National Association of Waste Development Officers.

In fact, current British targets, subsidies, and procurement rules are driving councils and their private sector waste contractors towards a range of far less energy efficient options such as incineration, and some that recover no energy at all, such as industrial composting. The Government, which is a recent convert to biogas, plans to introduce new incentives in 2011, but by then it may be too late. To avoid swingeing fines under the EU directive, councils are rushing to seal PFI deals with waste disposal contractors that could effectively lock in their choices for a quarter of a century. According to Johnny Johnston, sustainable gas manager for National Grid, 'There is a concern that valuable waste streams for generating biogas may be lost'.

Anatomy of gas

Anaerobic digestion has been used in the British water industry for over a century to treat sewage sludge because the process kills pathogens. But the energy content of the biogas is still largely wasted. Some is simply flared off, but most is used to produce electricity in inefficient combined heat and power (CHP) engines at the sewage works where there is little demand for the excess heat because, unsurprisingly, nobody wants to live next door to a sludge farm. That makes the process only about 30 per cent efficient overall, meaning two thirds of the energy in the sewage effectively goes up the chimney.

That level of inefficiency offends John

Baldwin of CNG Services to the core. As an energy consultant, he argues passionately that the best thing to do with biogas is inject it into the local gas mains, where it could be consumed in domestic boilers that are up to 90 per cent efficient, or used as transport fuel, particularly for lorries and buses where good low carbon alternatives are in short supply.

'It's a scandal to use biogas to make electricity when we can get around three times as much energy from the same volume of gas by putting it into the gas grid,' says Baldwin. 'There are lots of other ways to generate green electricity, but very few for making renewable heat and transport fuel, so that's how we should use it'.

Injecting biogas into the gas grid (BtG) already happens routinely in Germany, Austria, the Netherlands, Sweden, and Switzerland, but has never been done in Britain – until now. In June the water company United Utilities and National Grid won £4.3m from Defra to fund a pilot project at the Davyhulme sewage works in Manchester using gas from an existing AD plant. Raw biogas, which is 65 per cent methane, will be upgraded into 'biomethane', which is 97 per cent methane, the same concentration as natural gas in the mains. Some will be used to fuel 24 converted sludge lorries, and the rest injected into the gas mains to supply about 500 homes.

If all the country's organic waste resources were used for BtG, National Grid calculates it could supply about half the gas currently consumed in British homes. Combined with a major improvement in home insulation, it could be even more significant, says Johnny Johnstone, the National Grid manager responsible for the Davyhulme pilot.

The digestion and gas storage tanks at the Ludlow anaerobic digester. The facility is one of the few operating municipal food waste digesters

'Biogas combined with increased energy efficiency has the potential to completely eliminate emissions from heating in the UK,' Johnstone says.

But the playing field is tilted steeply against BtG by the current subsidy regime. At the moment there is no subsidy for renewable heat, whereas renewable electricity attracts hefty subsidies in the form of Renewable Obligation Certificates (ROCs). Electricity generation from biogas gets two ROCs per megawatt hour, currently worth about £100 in total, roughly double the market price of the electricity itself. This gives a perverse but powerful incentive to process waste in ways that squander two-thirds of the potentially recoverable energy, and which reduce greenhouse gas emissions by far less.

'[Councils] might as well start out by saying "build us an incinerator, boys, what's the best price?"'

Mass burn

An even bigger threat to the development of biogas in Britain is the continued construction of large numbers of 'energy from waste' (EFW) plants – otherwise known as incinerators. These burn rubbish to produce electricity, but have a number of major drawbacks. They are usually only 25 per cent efficient, partly because there is seldom any use for the waste heat; nobody wants to live next door to an incinerator any more than a sewage plant. Because incinerators are inefficient, and because much of the waste they burn is plastic, their fossil CO_2 emissions are a third higher than those from a gas fired power station, according to a report produced by waste consultancy Eunomia for Friends of the Earth.

Worse, because incinerators are large plants that require a steady diet of hundreds of thousands of tonnes of waste per year, they tend to discourage councils from collecting food and garden waste separately – the recommended policy of WRAP, the Government's waste watchdog – and that prevents further increases in recycling and means less feedstock available for anaerobic digestion.

In Sheffield, for instance, around 70 per cent of municipal waste is incinerated and less than 30 per cent recycled, and there is no separate collection of food waste. Nor is it likely in future, because the city is producing less waste than originally forecast, and this 'shortfall' means the contractor now wants to truck waste in from neighbouring districts to keep the incinerator going.

In East Sussex, where the county council has just won final planning approval for a controversial 240,000 tonne per year incinerator at Newhaven, government funding is conditional on the county achieving 50 per cent recycling rate, but there are no plans for separate collection of food waste, which will end up in the incinerator by default.

'Once you go for incineration, you close the door on the production of biomethane', says Michael Chesshire, Technology Director of Biogen Greenfinch, which runs an AD plant for Shropshire County Council, one of only three based on food waste in the country, 'it's a big risk'.

'This could be a huge missed opportunity that will cost our children dear,' says Oliver Harwood, of the Country Land and Business Association, whose farmer members could provide much of the feedstock for AD.

'It really is the last minute of the last hour in a major crisis'.

Yet incinerators are still being actively considered in major PFI (Private Finance Initiative) waste deals up and down the country, including Leeds, Staffordshire, Hertfordshire, and South Tyne and Wear. In total there are 28 PFI deals in the pipeline, of which 16 include incinerators as their 'reference case' – the template against which private sector bids are assessed. If all these incinerators were built, they would require around 3.4 million tonnes of waste per year. On average about one fifth would be food waste, which John Baldwin of CNG Services estimates could produce enough biogas to supply 43,000 homes with renewable heat, or transport fuel equivalent to over 50 million litres of diesel, worth about £55 million at the pump.

Of course, AD cannot process plastics and other non-organic residual waste, but there is a range of technologies that can, without the major drawbacks of incineration, and which can be used in combination with AD – as demonstrated by a deal struck in April by Greater Manchester with Viridor Laing to manage 1.2 million tonnes of waste annually. Most of the waste will go through a Mechanical Biological Treatment (MBT) plant, which

shreds, sorts and recycles much of the waste before turning the residue into fuel pellets for a chemicals plant nearby and processing the remaining organic fraction in four AD plants. The biogas will be used to generate electricity, and some of the heat will be used to dry the digestate to make more fuel pellets.

Technology neutral?

Yet most local authorities continue to favour large incinerators – which are inefficient, and block further progress on recycling and biogas – over solutions such as MBT and AD that are better for the climate and the energy supply. According to Dominic Hogg, director of the waste consultancy Eunomia, it is the result of a litany of policy blunders over the years, and two structural problems in particular.

First, although councils overwhelmingly claim to be 'technology neutral', and their job is simply to pick the most competitive bid, the entire PFI procurement process favours incineration. The technological conservatism and financial interests of all the players – waste companies, legal and technical advisors, banks, Defra – pushes councils towards big energy-from-waste plants, says Hogg. As a result, councils are anything but neutral: 'They might as well start out by saying "build us an incinerator, boys, what's the best price?"'

Second, the division of responsibilities between county councils and district councils discourages joined-up thinking, and that discourages anaerobic digestion. District councils are responsible for collecting household waste, and county councils for disposing of it. That means the counties have tended to worry about disposal costs, and that makes AD look expensive relative to composting. However, once the cost of collecting the food and garden waste – borne by the district councils – has been taken into account, there is 'scarcely any difference' between the overall costs of AD and composting, according to a study by Eunomia. The report concludes: 'This is an important observation as traditionally local authorities have tended to view AD as an expensive alternative to composting options'.

And still do, apparently. As part of Greater Manchester's deal with Viridor Laing, almost 180 thousand tonnes of food and garden waste per year will be collected separately. But surprisingly the separated waste will be processed through 'In-Vessel Composting' rather than AD, despite the construction of four MBT-AD plants for the residual, 'black bag' waste. In an email, David Taylor, Director of Contract Services for Greater Manchester Waste Disposal Authority, explained:

'All of the garden/food waste destined for IVC is suitable for AD treatment. However if this was mixed back with residual waste to go through MBT-AD it would not count towards recycling under DEFRA definitions. This separately collected stream would need a dedicated facility to produce a compost-like product'.

To find out whether your local authority is about to squander the potential of your waste, go to www.theecologist.org/investigations/waste_and_recycling/

When I began to probe why they had not procured such a facility, Mr Taylor stopped replying to my emails.

If the waste that Manchester plans to put into IVC – producing no energy – were diverted into an AD plant, John Baldwin of CNG Services estimates it would produce over 22 million cubic meters of biogas per year, enough to supply 12,000 homes, or produce transport fuel equivalent to 13 million litres of diesel - worth £14 million at the pump.

Wasting time

It is difficult to avoid the conclusion that policy on biogas is a farce, but it wouldn't be hard to put right. Dominic Hogg favours a simple rule restricting the capacity of incinerators to just 25 per cent of an authority's residual waste. That would force councils to develop more recycling, anaerobic digestion and flexible MBT to deal with the rest. 'Flanders already recycles 70 per cent of its waste,' says Hogg, 'so we must be able to recycle 75 per cent by 2020'.

Michael Warhurst, senior waste and resources campaigner for Friends of the Earth argues we should scrap the Private Finance Initiative altogether. The think-tank Policy Exchange recently proposed abolishing two tier waste authorities, and introducing an incineration tax, which is also being developed in Ireland.

In the waste industry, contractors would be grateful even for an early indication of the level of support the Renewable Heat Incentive will deliver for biogas from April 2011, but the Government will only launch a consultation this summer. Tony Lewis, business development manager for Aecom Design Build, which provides both incinerators and AD plants, says the uncertainty is damaging. The company is bidding for five projects at the moment, and Lewis says if he knew what the value of the RHI was going to be, they would be offering very different solutions: 'In three years' time when all the waste PFIs have been let, and tied up for 25 years, we've missed the opportunity to push digestion because at the time everybody was bidding it didn't make commercial sense to do it'.

That would be a disaster not only for the climate and our energy supply, but also for council tax payers, according to another Peter Jones, former director with waste company Biffa, and now waste advisor to Boris Johnson. As glacial as the development of British waste policy may be, the direction of travel is clear, says Jones, and organic waste is going to become a valuable commodity that local authorities will be able to sell, not pay to be taken away. Any council signing an incinerator contract today that ties it into rising fees for 25 years would be 'crazy'. The problem is, that may be exactly what many are about to do.

David Strahan is a journalist specialising in energy issues, and author of The Last Oil Shock (John Murray, £12.99).

photograph: Will Chesser

Forests or hungry people?

On the one side stand half a million poor farmers, desperate for more land. On the other, a patch of forest that is the area's ecological lynchpin. **Jayme Otto** reports on the one woman standing in-between the two

Madeleine Nyiratuza has an unenviable job. As programme coordinator for the Gishwati Conservation Project, it's up to her to convince half a million subsistence farmers that 15 chimpanzees stranded in a clump of trees that used to be Rwanda's second-largest forest are worth saving.

Starving farmers and their families, living on the edge – literally and figuratively – have targeted the chimps as obstacles to their own survival. In response, the Gishwati Conservation Project has been forced to set up border controls around the forest, and is also trying to create a 30-mile corridor down to the Nyungwe National Park, which would reunite the chimps with a protected population there.

It's safe to say the region sees an uneasy relationship between man and his evolutionary ancestors.

In a country desperate for tourist dollars, primates provide the biggest draw. More than 20,000 visitors come every year to see the mountain gorillas of Rwanda's Volcanoes National Park, made famous by the movie Gorillas in the Mist.

Created in 1925, Volcanoes was Africa's first national park. When Rwanda gained independence from Belgium in 1962, the new republic chose to maintain the park as a conservation area, despite the fact that the country was already suffering from overpopulation. During the war leading up to the genocide in 1994, Volcanoes became a battlefield. The park headquarters were attacked in 1992 and all tourist activities ceased. The park resumed operations in 1999.

What once was

At one point in history, Gishwati was a rich forest corridor connecting Volcanoes in the north to Nyungwe in the south. But human encroachment and farming split the area into three distinct forests. In the 1980s, Gishwati had already shrunk to one fourth its former size. When refugees resettled after the genocide, they slashed the forest down to less than one percent, marooning the handful of chimps that survived.

Those chimps got President H.E. Paul Kagame's attention in 2007, when Gishwati's potential as a conservation and tourism site was highlighted in VISION 2020, Rwanda's long-term development plan to overcome tribal division and poverty. Gishwati could become the next Volcanoes. When combined with Volcanoes, home to gorillas in the north, and Nyungwe, home to chimpanzees in the south, a restored Gishwati could turn Rwanda into a compelling eco-tourism destination.

'Our president sees the value in managing our natural resources. The simple fact is that we can make money from it,' says Rose Mukankomeje, the Rwanda Environmental Management Agency's Director General. The Gishwati Conservation Project was born.

33-year-old Nyiratuza learned about the project through a job posting on the internet last year. She beat out 11 other candidates for the role of Project Coordinator. With a Masters degree in Environmental Management specialising in Gishwati, she already

understood the complicated relationship between the forest and its denizens. So despite the area's designation as a conservation showcase, she wasn't surprised to find herself in the midst of a volatile situation from Day One.

A few months prior to Nyiratuza's appointment, a farmer shot and killed a chimpanzee for stealing corn from his field. Then a research team from the US-based Great Ape Trust arrived and suddenly, these pesky crop-raiders were sacred cows. By the time Nyiratuza arrived on site, locals had the idea that their government cared more about a band of monkeys than its people.

'I saw it as a matter of education at that point,' says Nyiratuza, who worked as a school teacher prior to her job with the conservation project. 'No chimps meant no tourism dollars. We had to find a way to live together.'

Nyiratuza led a village outreach program, aimed at the four sectors adjacent to the forest. She initiated discussions on sustainable solutions to crop-raiding. She formed a cooperative for farmers with crops on the forest edge. The group decided to switch from corn to crops with no chimp appeal – Irish potatoes and beans.

At this point, Nyiratuza stayed away from talking about relocation, or the forest boundary's effects on people's farms.

Border Control

But, difficult thought it was, the issue had to be broached. The project had a goal of replanting 316 hectares, bringing the forest up to one percent of its former size, and land for reforestation doesn't just come from thin air. In Rwanda's most densely populated district, that meant land from beneath a family or a farm.

Nyiratuza approached the problem logically. An official forest boundary was set in 2002 by the government as part of a smaller-scale reforestation effort to address issues with landslides and flooding. The families living there had agreed to the boundary, but nevertheless encroached upon it. Nyiratuza upheld the boundary, using markers to remind villagers where it was, so there would be no excuse for farm creep.

'While researching the actual boundary, I came across one farmer who had half his farm outside the boundary, and the other half in what used to be the forest,' she says. 'He told me he knew he was breaking the rules, but figured he'd get away with it as long as he could.'

A few people had respected the original boundary. Philippe Gasasira, head of the primary school in the Kinihira village, says that he too was tempted to expand his cattle pasture into the Gishwati forest, but refrained because 'the land did not belong to me.'

But for most, doing the right thing was a luxury they could not afford. Other villagers, lacking Gasasira's headmaster income, destroyed the Gishwati out of necessity, trying to free their children from poverty.

'It's one thing to put food on the table,' says Nyiratuza, who grew up in this district, which falls 70 per cent below the poverty line, and as much as 90 per cent below at the forest perimeter, 'but families need a little something extra for school uniforms. Without uniforms, their children cannot attend class.'

While she understood their reasoning, Nyiratuza was the one employed to reclaim the land. With the support of a newly-implemented team of four eco-guards to patrol the barrier, she introduced concrete posts at the perimeter.

'This makes it clear,' she says. 'You can't be

Madeleine listening to Gishwati farmers

photo: Will Chesser

accountable for something you can't see, can't quantify. Now the people know, "this is our forest."'

Despite the uneasy atmosphere, it is significant that Gishwati's are the only unarmed eco-guards (pictured on the previous page) in all of Africa. They patrol the park boundaries in groups of two 24-7. Of the four men, only one, Etienne, has military background. Even he admits to being scared.

'When you come upon a group of men in the forest using machetes to cut bamboo, it is very unnerving to be without a weapon yourself because you can't anticipate how they are going to react,' he says. 'Our mission is education, not force, and we take that risk everyday.'

So far, no one has resorted to violence. Illegal activities, like tree-cutting and charcoal-making, have nearly disappeared since the arrival of the eco-guards. Encroachment is no longer possible, since the boundary is clear and enforced.

'The best indication that we're doing something right is that the locals have started reporting unsustainable activity,' Nyiratuza says. 'They are starting to understand the importance of this forest.'

A Forced Marriage

Nevertheless, the current situation could be called an uneasy truce. One year into Nyiratuza's appointment, some areas have embraced the saving of the Gishwati, working with her to create environmental clubs in local schools and adding conservation to their curriculums. Others remain sceptical at best, resistant at worst. Residents of the mountain village of Kinyenkanda, facing impending relocation, uprooted 70,000 freshly planted seedlings in an area adjacent to their homes. All 152 households lie within the forest boundary, and residents were understandably fearful of their forced departure, even with the promise of $250 million-worth of Rwandan Francs in government support.

Ultimately, of course, the fate of the chimpanzees and the of the farmers are tied together. Nyiratuza struggles to make locals understand that the destruction of the forest is directly responsible for the floods and landslides that have plagued the community since 2006. More than 30 people died during the last two rainy seasons, hundreds of families fled, farms flooded, and homes were destroyed. The Sebeya River, a major watershed at the base of Gishwati's hills has become contaminated by run-off.

'We need trees on those hills, not houses,' Nyiratuza says.

The challenge for Nyiratuza in Rwanda has been making people understand the gravity of deforestation before a large-scale disaster occurs - often disguised by the short-term gains of increasing farmland.

'The gain is an illusion,' Nyiratuza says. 'Long-term, environmental degradation leads to even greater poverty.'

Quantifying the intrinsic value of a forest in an area of resource scarcity has proven difficult, if not impossible. It's easier to think of it in terms of the opportunity cost of tourism dollars. 'But that's really only a small part of the benefit of the Gishwati Forest for the people of Rwanda, and for the people of the world,' Nyiratuza maintains.

If Nyiratuza fails, the Gishwati will disappear totally. A once-vital habitat will become a wasteland, unable to support either chimps or humans.

If she succeeds, The Gishwati Conservation Project will become a world-wide model. The Great Ape Trust is already hoping to duplicate the methodology in areas suffering similar situations in South America.

'That's why we've nicknamed Gishwati the Forest of Hope,' Nyiratuza says.

Jayme Otto is a freelance journalist. Photographs by William Chesser.

Still Silent Spring?

In 1962, *Silent Spring* – Rachel Carson's famous exposé of the impacts of DDT – rocked the chemical industry. Today, Carson's EU legacy, REACH, ought to safeguard public health. But will it? David Ord investigates

The earliest origins of green consciousness can be debated at length, but many point to the publication of naturalist Rachel Carson's *Silent Spring* as the key event that triggered public awareness and the beginning of environmental activism in its present form.

Silent Spring was first serialised in The New Yorker in June 1962, and arrived in the bookstores later the same year. Selected by the Book of the Month Club and endorsed by Supreme Court Justice William O. Douglas, it rapidly became a bestseller.

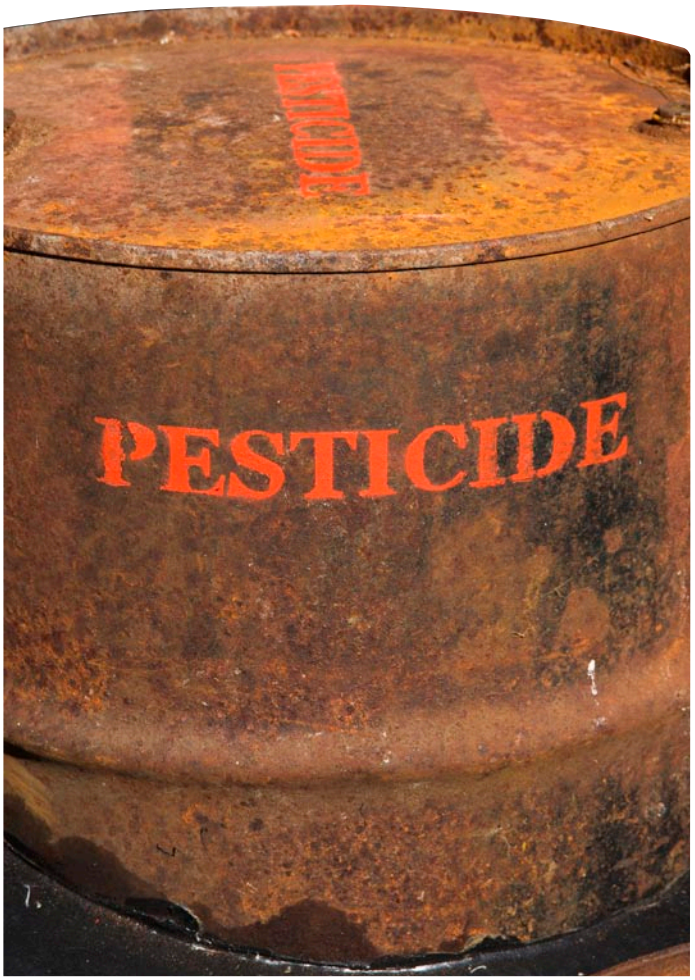
In the book, Carson drew attention to the damage to the environment being caused by pesticides, particularly the toxic effects of dichloro diphenyl trichloroethane (DDT) on the bird population. Carson's conclusions also suggested potential harm to humans.

The chemical industry's reaction to *Silent Spring* was, predictably, explosive. The sector was enraged both by the book's claims about its products and also by Carson's attack on the lack of effective scrutiny of chemical companies' activities.

More fundamentally, Carson was seen as an opponent of progress and the freedom of chemical companies to do business unencumbered by regulation. Biochemist and chemical industry spokesman Robert White-Stevens claimed that embracing Carson's thinking could have apocalyptic results. 'If man were to follow the teachings of Miss Carson,' he said, 'we would return to the Dark Ages, and the insects and diseases and vermin would once again inherit the earth.'

The sector did its utmost to savage Carson's credentials, ignoring her long career as a naturalist and depicting her as a fanatic, a hysterical female, and, possibly worst of all in those uneasy Cold War days, a communist. The Velsicol Chemical Company of Chicago, a manufacturer of pesticides, threatened Carson's publisher with legal action. Both The New Yorker and Audubon Magazine received demands that the serialisation be stopped. Confident in the accuracy of Carson's science, both editors refused to comply.

The response of the Kennedy administration to the book was mixed. Although the U.S. Agriculture Department initially sided with the chemical companies – it was Secretary of Agriculture Ezra Taft who applied the 'hysterical' tag – Stewart Udall, Secretary of the Interior, praised Carson's work, organising an investigation of the industry which led ultimately to the Pesticide Control Act of 1972, which banned the use of DDT.



A measure of Carson's success in rattling the composure of the chemical companies is that, almost 50 years on, criticism of *Silent Spring* still surfaces from time to time in the scientific community and the media. Opponents continue to criticise Carson for failing to include the beneficial aspects of pesticide use in the book, in particular against malaria-carrying mosquitoes. Over the years, however, they have failed consistently to discredit the science – Carson, all too aware that she would come under attack, checked her facts meticulously.

Change?

It would be encouraging to think that, almost five decades later, with every major corporation fully equipped with at least one sustainability director and mission statements printed in the brightest green, the chemical sector has seen the error of its ways. According to the Green Party's Axel Sindhofen, the reality is less comforting.

Based in Brussels, Sindhofen is the Green's advisor on health and environment policy. He has been following chemicals policy in Europe for 15 years. While he may regard the chemical sector with a sceptical eye, Sindhofen stresses that he is not a radical. 'I have strong positions, but I'm not a fundamentalist,' he says.

'I'm working in the European Parliament for a small group - you need to find alliances, so in that sense it's not an extremist position that I represent. I see it as a sad reality in a way.

'It's like two paradigms. The mindset for the NGOs is of course above all about protection of human health and the environment. Whereas for the industry it's all about competitiveness, growth and profit.

'NGOs try to make the point that absence of evidence does not mean absence of a problem. The industry tries to do it the other way round – no evidence, no problem.

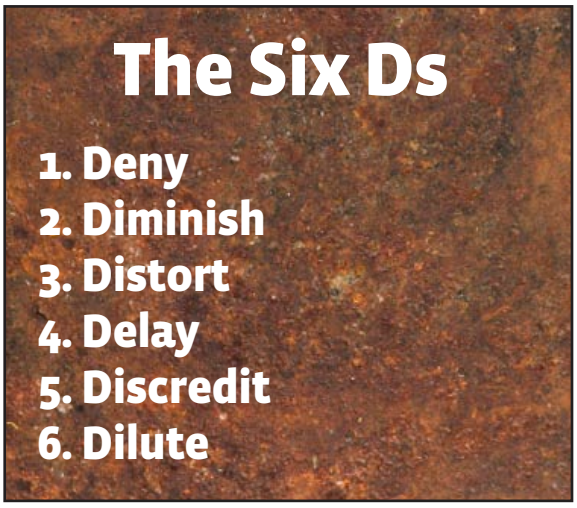
He sees little evidence of progress in the attitudes and behaviour of the chemical industry.

'Of course it is perfectly legitimate to lobby

and to try to influence decisions in your interest. Where it gets dirty is the limit – that's why I tried to summarise it with the six Ds. It's always the same pattern over and over again, starting first by Denying there is a problem. If that doesn't work then they try to Diminish the science or Distort the facts.

'If that doesn't work, the next course of action is to Delay things. If it gets really nasty they try to Discredit the opponent by going after their reputation. If none of that helps they try to Dilute the substance of legislative action.

'Of course it's unfair to speak of 'industry' – you have different players. There are the recalcitrant ones, and the more progressive ones, although even the progressive ones are far from being green.'



Silent Spring 2.0

In 2001 the European Commission stimulated debate within the EU with the report Strategy for a Future Chemicals Policy. The result was a proposal to replace the existing chemicals control legislation, which dated back to the 1970s. REACH (Registration, Evaluation, Authorization and restriction of Chemicals) was the result.

The period before REACH, which came into force in 2007, saw acrimonious debate between the chemical sector and environmental campaigners, with the industry lobbying the European Parliament, claiming unworkably high costs, issues with confidentiality, a disastrous impact on the European economy and, harking back to the *Silent Spring* era, flawed science.

The Greenpeace report, *Toxic Lobby – How the chemicals industry is trying to kill REACH* says, 'The European chemicals industry has systematically aimed to postpone and undermine REACH, ever since the first talks about a new chemical regulation began in 1998.'

The European Chemical Industry Council (CEFIC) told MEPs 'there is little direct evidence of widespread ill health or ecosystem damage being caused by the use of man-made chemicals.' CEFIC later dropped the argument when confronted with the mass of unsinkable data proving otherwise.

Unable to claim bad science, the lobbyists turned to bad economics. The German Industry Confederation (BDI) funded a study by consultancy firm Arthur D. Little. Published in 2002, the most alarming of the report's scenarios estimated that REACH would cause up to 2.35 million job losses in Germany alone.

The report, like later studies funded by the industry, was widely criticised for its poor methodology and doom-laden conclusions. Nonetheless, the publicity it received succeeded in raising concern on the economic impact of legislation.

'From a piece of legislation which was required to better protect human health and the environment against hazardous chemicals, [REACH] became a threat to the competitiveness of the chemical industry,' says Sindhofen. 'That's how it was perceived.'

'Scientific and economic experts looked at the study in detail and found that it was completely flawed', he says. 'But nobody [in the media] covered that. Industry had it their way – they got the headlines and it really changed the mood.'

Greenpeace's report quotes Chris Davies, member of the Liberals group (ALDE) in the run-up to the vote on legislation in 2005. 'Too many in the chemicals industry – and particularly its German lobbying arm – seem to believe that if you are going to tell a lie, then lie big; the costs of REACH have been grossly exaggerated from beginning to end.'

Sindhofen believes that chemical companies are unembarrassed by consistently making claims which are subsequently proven wrong, and for a simple reason. 'They don't really care,' he says. 'You would think it would harm their reputation, but the reputation of the chemical industry is not good – there's not much to lose.'

A silver lining?

The news is not all bad, however, says Sindhofen. 'Of course things have changed,' he says. 'We don't have, at least in Europe, crude environmental pollution as we had in the past – thick black smoke coming out of the stacks. Industry has taken action.'

But, he says, every bit of progress has been a struggle. 'They fight it to the end. When it's over, and they've lost, they will of course pretend that nothing has happened and they fully agree with it and supported it.

'It's frustrating when you see people who have fought [against change] again and again, presenting themselves as environmentalists.'

Nadia Haiama, Greenpeace's EU chemicals policy director, concedes that the chemical lobby to some degree succeeded in its attempts to water down REACH, but still sees the result as a major step forward.

'The whole issue with Rachel Carson and the environmental movement of the 70s was that the burden was on public authorities, society and government to prove a chemical was not safe before they were able to act. That has been the game for the past decades.'

'That's one of the things that have changed with REACH. For the first time the sector will finally have to prove that all those thousands of chemicals we've been using for half a century are safe.'

'What we really want is to make sure that the chemical industry is walking the talk. They're saying that chemicals are safe, so show us the data. Not only us, but make it public.'

Haiama also sees the beginnings of dialogue between the opposing sides.

'Both sides are more open and believe that we can discuss things and find compromises,' she says.

Sindhofen agrees, but is not convinced that the sector as a whole has had a change of heart. 'While there are certainly people in the industry who are very open, it very much comes down to individuals who are willing to share information.'

'Informally I probably have better contacts than I had before, but it's not because of a change of philosophy or approach in the industry – it's just certain individuals who are more interested in talking.'

Sindhofen's position is clear. 'For myself, when it comes to chemicals, voluntary action just doesn't work. The only instrument that works is legislation. It's the only language that they understand.'

In 1962, wrong-footed by the unexpected success of Silent Spring, the chemical sector's aggressive and clumsy approach did little to help its cause, drew unwelcome attention to its activities and may well have increased support for Carson and for subsequent environmental campaigning.

The industry has learnt new tactics over the years, and while the ill-temper and threatened litigation of the 1960s appears to be changing, if slowly, to a measure of reluctant cooperation, the battle goes on.

Sindhofen returns to the tactics employed time and time again in that battle, the 'Six Ds'. 'Deny the problem, Distort the facts, Discredit the opponent, Distract by suggesting voluntary action, Delay legislation, and Dilute its substance.'

'I think it's the same old fight,' he says. 'It's still a good old trench war.'

David Ord is a freelance journalist.

Tearing flesh from the Earth

photography: Paul Miles

As the price of oil increases again, Canada's oil-rich tar sands once more look like a giant cash cow to the industry. Paul Miles reports on the First Nations people risking everything to stand up to the might of Big Tar

'Albertans call that the smell of money!' says the helicopter pilot as we fly over Alberta's tar sands. Even 2,000 feet above open-cast mines, man-made lakes of mining waste and refineries belching fumes and flames, there is the acrid stench of burning oil. It stinks.

Until the 1960s, this Canadian landscape was unspoiled boreal forest, home to moose and caribou and the Clearwater people who hunted them. Today, this First Nations' people go shopping for processed food in an industrial wasteland. Flocks of migratory birds die as they land on toxic lakes, that cover over 50 square kilometres. Downriver, further north, in the remote First Nations' settlement of Fort Chipewyan, on the shore of Lake Athabasca, the incidence of bile duct cancer is significantly higher than expected.

The Alberta government rebuffs such claims of environmental and medical impacts. 'We do not proceed with development at the expense of the environment,' says the website of Alberta Environment.

The government prefers to highlight that the Athabasca tar sands is the second largest known deposit of oil in the world, after the Middle East, and, geopolitically, represents a secure source of oil for North America.

An estimated 173 billion barrels is considered to be recoverable. No wonder every major oil company – and many minor ones – has rushed to get a piece of the action. $215 billion worth of projects have been proposed and billions of dollars have been paid to the government of Alberta in mineral rights and royalties. (Meanwhile, billions more have been given to the oil companies in tax breaks.)

The process of extracting the oil from the sands is expensive and energy intensive, so when oil prices dropped from their high last year, the rush of investment and exploration slowed and projects were cancelled. Now, with prices reaching over US$70 a barrel once more, the tar sands (called 'oil sands' by the industry) are looking attractive again. The first new project since the recession has just been approved - a US6.3 billion dollar venture by Imperial Oil, forecast to extract 110,000 barrels of oil a day by 2012.

For centuries, the indigenous people have dug up handfuls of this bitumen-rich sand to burn for light and heat and to caulk their canoes. For the last few decades, oil

companies have been chopping down the forest and gouging out the land around the remote oil-boom town of Fort McMurray.

Canada's tar sands yield around 1.7 million barrels of oil per day, with projections to reach as high as 6.2 million bpd by 2020. Excavators scrape at the black sand and load it into waiting dumper trucks as large as houses. These 400-ton dumper trucks can flatten a 4WD without noticing. They rumble over the scarred landscape, driven by school leavers earning $100,000 a year. The tar is heated to release the thick oil: a process that uses as much natural gas in a day as could heat three million homes. There are even proposals to use nuclear power in the processing. (A scheme to explode nuclear bombs below ground, melting the oil in the sands whilst at the same time creating caverns into which it would flow, was shelved.)

All this demonstrates that it is not the energy *per se* that is so vital: rather energy in the form of liquid hydrocarbons, to which our species has become addicted for everything from transport to clothing. This addiction is killing us: producing one barrel of synthetic crude oil from tar sands emits up to five times as much greenhouse gases as extracting one barrel of conventional oil. On top of this, tar sand mining necessitates that large swathes of one of the world's most important carbon-sinks – the boreal forest – are destroyed. The government of Alberta boasts that it is investing $2 billion in carbon capture and storage in ambitious plans for reducing its heavy CO_2 emissions but environmental groups dismiss this as being unworkable.

Pockets of resistance

While other nations have been reducing carbon emissions since the Kyoto agreement was signed, Canada's have increased 26 per cent. No wonder the First Nations' people who call this land their home, describe the tar sands as 'Mother Earth bleeding to death'.

Now, one small community is determined to make sure its hunting and fishing grounds – and perhaps the planet – do not become irreparably damaged by expansion of this industry.

The story is unfolding further south, away from the ugly epicentre of Fort McMurray. Here, the tar sands are in seams deep below the forest of spruce, birch and poplar. Surface mining is not viable, so a different, even more expensive and energy-intensive method is used to extract the oil. Steam Assisted Gravity Drainage (SAGD) is visually less obtrusive as much happens below ground, melting the oil from the sand in situ. However, pipelines criss-cross the forest above ground, leading to and from industrial plants where steam is made and bitumen collected. Look on Google Earth and it shows the pipelines like fine wires on a circuit board.

'The moose and the caribou, they can't get over the pipes,' says Len Benson, of the Beaver Lake Cree, the small 'band' of indigenous people at the forefront of the fight against the expansion of tar sands mining happening on the doorstep of their small reserve. As we tour a network of roads carved in the forest, where Shell and Imperial Oil have SAGD projects, Benson, who works in the band's new 'office of intergovernmental affairs and industry relations', explains the impact.

'These pipes prevent the animals from migrating, from reaching their calving grounds and escaping from wolves.' The oil companies put in occasional wildlife crossing points – steps up and over the pipes – but Benson says this is of little help.

'The animals don't cross at the same point all the time. They get confused and panic,' he says. 'You see there?' he says, pointing to a big dent in one of the pipes, 'that must be where a moose tried to jump across.'

Suddenly, an oil tanker stops on the gravel road and the driver leans out the window, his engine still ticking over. 'You shouldn't be taking pictures,' he warns, even though this is public land. 'Magnetism from the camera can cause an explosion.'

Pipelines and industrial developments – with their spurious 'health and safety' prohibitions – also restrict access by the people to traditional hunting grounds and to pick medicinal plants.

As for pollution – there is much less waste water from in-situ mining than there is from open-cast mining and no toxic lakes. However, the waste is pumped below ground into salt cavities.

'The problem is, animals go to their natural salt licks and they're getting poisoned,' says Benson. 'People are scared to eat the moose now.'

The Cree themselves are afraid to drink the water because of possible contamination of the water table. 'When I was a kid, I used to dip a mug in the muskeg [wetlands] and drink. We don't do that now.'

400-ton dumper trucks carry the bitumen rich sands from the mine face to refineries where it is heated with natural gas to drive off oil.

Quiet please: we're consulting

Benson's office documents breaches of environmental law by oil companies – the damming of a river, important for spawning fish, to lay a pipeline and the filling in of wetlands. His office also has to deal with literally tonnes of paperwork.

'They deliver these,' he says, in his office, standing next to a pile of folders measuring over a metre in height, 'and our office – just two people – is supposed to respond to them in a few weeks,' he laughs. 'They call that "community consultation"'.

In the forest, elders talk of animals being sickly, thin and unfit to eat. So far, these claims remain uncorroborated by science but what needs no proof is the disturbance to their habitat by industrial development, including lines, several kilometres long, where forest has been razed for seismic exploration. Other parts are filled with the noise of building works and trucks.

The Beaver Lake Cree number just 920 worldwide. Less than 400 live on their small reserve, in the Lakeland area of Alberta, 260km south of Fort McMurray. Yet, in a story that is shaping up into a Hollywood film script, the Beaver Lake Cree are preparing to take the governments of Alberta and Canada to court for violating their treaty rights.

The constitutionally enshrined treaty that the Cree signed in 1876 promises that they can have access to the land of their 'core territory' to hunt, fish and collect plants. Lawyers acting for the Beaver Lake Cree argue that some 17,000 approved mining projects within this 195,000 square kilometres (almost the same size as England and Scotland) will result in habitat loss and environmental degradation that renders the treaty meaningless. 'It has to be a meaningful right to hunt and fish,' says Jack Woodward, a leading authority on aboriginal law with a history of winning such cases. 'It's all about habitat – you don't preserve animals, you preserve the habitat'.

A hard fight

In preparation for a trial that looks set to last several years, battle lines are being drawn up in what is being (predictably) billed as a 'David and Goliath' encounter. The adversaries are still thrashing out pre-trial motions but the struggle looks set to cost millions.

UK-based Co-operative Financial Services has donated C$100,000 to get the wheels in motion for the challenge's first injunction, with more to follow for a wildlife impact assessment. A charitable trust has also been set up to raise a fighting fund.

'Supporting First Nations' legal challenges is possibly the best chance we have of averting new tar sands development,' says Colin Baines, ethics adviser to Co-operative Financial Services. 'This inspiring community deserves our support and we are confident that they will win, but it's going to take money. If you care about climate change, this is a key cause to support.' As part of its Toxic Fuels campaign, The Co-operative has mobilised investors, representing US$3 trillion, to pressurise the tar sands industry and, in the UK, is campaigning for a financial reporting standard that would penalise carbon intensive oil reserves like tar sands.

Len Benson stands next to the pipes that supply steam to the bitumen deposits. The Cree believe that the pipes make it difficult for moose and caribou to move freely through the forested area

For the Beaver Lake Cree, it's not about any money that may come their way in the form of compensation. 'It's about preserving the land, the water and the animals for future generations,' says their Chief, Al Lameman. 'We know how to survive.'

Supplementing their diet with wild meat, fish and berries is still important to the Cree. Even those with the latest mobile phones and shiniest 4WDs have a moose in the freezer which they shot and butchered themselves.

It is about respect too. The indigenous people of North America share a similar story with other indigenous people worldwide. Over generations, their land, their names and even their children have been stolen from them. Land is key to their identity.

Jackie Gladue, a fashionable Beaver Lake Cree woman in designer sunglasses, doesn't, at first glance, look like the kind of person who could survive in the wild but she talks passionately of ice-fishing, canoe trips and hunting moose. Her 21st century appearance belies an age-old connection with nature.

'I hate the thought of oil workers stepping on our medicine plants,' she says. She talks of 'court medicine' - a root that, when chewed in court, leads to a trial's success. 'When we win this case, I will feel so proud.'

Paul Miles is a freelance journalist and photographer. For more information on the campaign, visit www.co-operativecampaigns.co.uk/beaverlakecree/

Is the 'Cleaner Planet Plan' just greenwash?

Laundry giant Unilever's new plan for creating a 'Cleaner Planet' seems to tick all the right boxes. Until, that is, you look at what gets washed down the drain during the rinse cycle. **Laura Sevier** went for a closer look...

The idea that using conventional detergent (instead of an 'eco' brand) can be 'good' for the planet has been floating around since Ariel's 'Turn to 30C' campaign launched in 2006. A number of other brands have since added their own energy saving messages to their packaging.

The latest big campaign on the block is Unilever's 'Cleaner Planet Plan', endorsed by its laundry brands Persil, Surf and Comfort. The plan is a global sustainability programme designed to drive both Unilever and consumers to reduce the impact of laundry on the environment. It'll start in the UK and then be rolled out across four continents.

It's great that a manufacturing giant like Unilever, with its €5 billion laundry business, is launching a plan on such a scale. What's more the company itself has been making some efforts in the energy, water and waste department for some time. Since 1995, Unilever says it has reduced the energy-related greenhouse gas emissions from its laundry product factories by 44 per cent, waste for disposal by 70 per cent and water consumption by 76 per cent, per tonne of production.

But what does the Cleaner Planet Plan actually entail for consumers? A key part is in encouraging the use of compact, concentrated products that work in quick or cold water washes. Unilever claims that if all its customers currently using conventional detergent powder switched to compact powder, and those using liquid detergent switched to Small & Mighty concentrate, every wash would use up to 41g and 16g less CO_2, respectively. Which would save 4.3 million tons of CO_2 a year – equivalent to taking a million cars off the road.

Whilst these figures are impressive there is another environmental issue that needs addressing – the ingredients themselves. Turning the temperature dial down, in itself, is not enough. Focusing on temperature and rinse-ease obscures the fact that conventional powders, tablets, liquids are all laden with chemicals that place a considerable burden on our water system.

When all that foamy water mixed with detergent goes down the drain thousands of litres of water is required to treat it before it is safe to re-enter our water system. Last year I met Ecover's Mick Bremans who said that one way a product's impact can be understood is in terms of 'critical dilution volumes', (CDVs) which measure how much water it takes to neutralise each dose of a product.

Ecover makes its products from plant and mineral based ingredients that biodegrade quickly and completely as opposed to petrochemical ingredients that can take longer and might not do so completely.

'If 5 per cent of UK families switched from a conventional product to Ecover, more than half a million swimming pools' worth of water would be safeguarded against pollution in a year,' Bremans told me.

Well, he would say that, wouldn't he? But what does Unilever have to say about reducing the CDVs of its products?

Keith Rutherford, Global Sustainability Programme Director says that their ingredients are subject to a 'scientific-based environmental risk assessments conducted by their independent Safety and Environmental Assurance Centre' which it claims is a 'more comprehensive and rigorous way to assure safety than the CDV approach.' That doesn't sound like a target, as such, to me.

Asked whether Unilever intends to make any plant or mineral based formulations Rutherford maintains that the Cleaner Planet Plan is 'built upon the science of in-depth Life Cycle Analysis' which takes into account raw materials sourcing as well as manufacture, consumer use and disposal. It is used so as to guide the company in making what it calls the 'the right choices and not just the intuitive choices' about what has the ability to reduce the impact of doing the laundry.

'A product that is fully based on natural ingredients is not necessarily best for the environment or the consumer,' Rutherford says.

In two minds, I rang Henry King, science and technology leader for sustainability, who works at Unilever's Safety Environmental Assurance Centre. Is petrochemicals really better than natural?

'It's difficult to say one is better than the other,' he told me. 'Each source/route has its own set of impacts that need to be managed. For example, with plant based materials there could be fertiliser and pesticide usage that you don't have with petrochemicals. But then you don't get oil spills or flaring of gases with crop production. Then you've got possible land use issues and the competition for crops between food and non-food uses (e.g. biofuels).'

Do all Unilever's ingredients break down completely?

'No, some may be poorly biodegradable (e.g certain long-chain polymers) but their levels of usage tend to be low.'

Are some of these toxic?

'Toxicity is a property of all materials which is why we use a risk assessment based approach to assure safety and set acceptable use levels for materials so that we protect the environment. Typically, materials that degrade rapidly – you can use more of.'

He stressed that Unilever is investing in biotechnology and new polymer and biopolymer science – 'part of this could mean developing more degradable ingredients and formulations.'

'Are petrochemical-derived products in laundry products really better than natural ingredients?'

I then went to David Santillo Senior Scientist, Greenpeace Research Laboratories, to ask what he thought of the Cleaner Planet Plan.

'In general aiming for lower temperatures and shorter wash cycles is a good thing. But the trouble is they're still stuck using the same old brands of chemicals. Looking for the least hazardous chemicals rather than reformulating and repackaging what they've got would be the more responsible approach' he says.

Whilst there may be no such thing as a 'green' wash – even plant and mineral-based detergents require water to neutralise their impact on the water supply as well as energy for the manufacturing process and transport for their raw ingredients – natural products usually break down in the water more easily and quickly. You can wash at low temperatures with them and still get white(ish) whites. They don't contain ingredients like phosphates, the problems of which have been well documented.

Nor should they contain optical brighteners (chemicals that make clothes appear cleaner than they are) which David Santillo says are 'environmentally persistent' – that is, they don't biodegrade. The presence of optical brighteners in treated sewage effluent is now such a common occurrence that measuring the fluorescence of water is being used as a cheap way of detecting sewage contamination of waters, both freshwater and seawater.

There's no doubt that any plan that aims to reduce energy and water use is an inspired idea. But what happens when the soapy remains go down the plughole and into the water supply and natural world is of equal importance.

Let's hope that Unilever succeeds in that department too.

Laura Sevier is the Ecologist's Green Living Editor.