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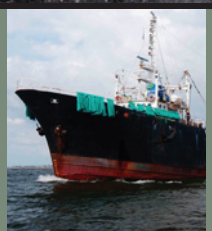
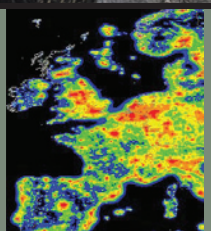
Toxic Time Bomb

The scandal of the Roma refugees forced to scavenge our unwanted e-waste

FISHERIES
Pirate fishing fuels human exodus from Africa to Europe



DARK NIGHTS
The global effort to tackle light pollution



PESTICIDES SCANDAL
Government inaction is destroying lives

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Toxic questions...

President Sarkozy's recent (highly controversial) crackdown on Roma communities in France received widespread coverage across Europe. Much less reported was the story of how these highly persecuted people struggle to scratch a living on the margins of many large cities, including Paris.

For an Ecologist special report we commissioned Carolyn Lebel and Steven Wassenaar to investigate how Roma communities in and around Paris are being forced to survive by 'recycling' the city's growing mountain of unwanted and highly toxic e-waste. Their startling report and photo story reveals both a health and environmental time bomb waiting to explode – and poses some awkward questions about France's recycling and waste policies.

Sticking with the toxic theme, in a highly passionate commentary, campaigner Georgina Downs accuses the previous Labour administration of gross inaction over the usage of pesticides in the UK – ruining lives and the environment – and calls upon David Cameron's Government to urgently act to remedy the situation. Watch this space…

Also this month, we sent Christopher Pala to closely scrutinise the recently announced Canadian Boreal Forest Agreement, which will, if all goes to plan, preserve vast swathes of the country's pristine wilderness whilst simultaneously allowing the sustainable harvesting of trees needed for timber.

Involving a unique partnership between NGOs and the logging industry, the historic agreement – about to enter a critical implementation period – took many people by surprise, not least because of the intensity of the war of attrition over the boreal forest fought between environmental campaigners and timber giants.

As Pala discovers, although green activists and industry reps are confident the agreement will prove successful, others are less certain. Indigenous communities say their rights and voices are being sidelined, and plans for new timber harvesting standards are mired in complex wrangling and stand accused of failing to adequately take into account social issues.

Eyes from across the conservation movement will be watching developments in Canada closely; if they get this right it could set an innovative example for a new wave of cooperation between the timber industry and campaigners elsewhere; get it wrong and the consequences could be felt well beyond the boreal's boundaries.

On a wider note, keep an eye out throughout November and beyond for some exciting changes and developments at www.theecologist.org. We're introducing some regular new features and columns, including insightful profiles of leading campaigners and a new series of practical 'how to' guides; we're expanding our business coverage – including interviews with leading figureheads from across the growing 'green' commercial sector – and, once the dust from the recent spending cuts has settled, we'll be scrutinising the environmental and ethical claims of the coalition Government in an exclusive new series by The Guardian's Bibi van der Zee.

For those with a taste for consumer affairs and corporate accountability, the long acclaimed 'Behind the Label' column will be evolving: watch out for a worthy and equally uncompromising successor to Pat Thomas's popular series.

Finally, you may have noticed too that our weekly and monthly newsletters have undergone something of a revamp. New designs and more varied content – along with a rapidly expanding social media presence on Facebook, Twitter and Youtube – will ensure Ecologist readers and subscribers continue to get what we think is the best package of environmental coverage available anywhere. Let us know what you think at editorial@theecologist.org.

Andrew Wasley, editor

Cover image: Roma people burning e-waste, Paris. Steven Wassenaar

Special report:

How pirate fishing is fuelling a human exodus from Africa to Europe

Illegal fishing to feed European demand for seafood is devastating coastal communities in The Gambia and across West Africa - forcing many people to leave their homeland and make a perilous and sometimes deadly voyage to Europe. Dawn Starin reports

Fishing by traditional methods is vital to The Gambia. It provides one of its main exports and is a major source of employment. According to the UN, the livelihood of over a third of all Gambians is linked to fishing. It is also crucial to the health of many of its 1,688,359 people, providing a source of much needed protein, minerals and vitamins.

Unfortunately, the fish stocks along the 80 km coast of this poor and densely packed country are dwindling and life for both the full-time and the part-time fisherman is getting harder.

Like many other communities based around the African coast, Gambian fishing communities are being adversely affected by the foreign-owned fishing fleets working offshore. The local fishermen claim that immature locally important species are caught unintentionally by foreign fleets and discarded as 'trash fish' or 'by-catch'.

Factory trawlers operating within The Gambia's 12-mile exclusion zone are said to be decimating fish stocks. Greenpeace estimates that sub-Saharan Africa loses US$1 billion dollars every year due to the activities of illegal, unreported and unregulated (IUU) fishing (or pirate fishing). According to Brian O'Riordan, the secretary of the Belgium office of the International Collective in Support of Fishworkers, one European super trawler has the capacity to catch in one day what it would take a fleet of large canoes to catch in one year - with good fishing.

But this over-harvesting of the ocean's larder is not just pushing fish stocks to collapse - it is also creating pockets of poverty up and down the West African coast. Take away the fishing and there are few options for those in fishing communities but to move elsewhere. And move they do, often across dangerous

seas in an ill-equipped pirogue (a dugout canoe with an outboard engine used by most artisanal fisherman) with little food and portable water and at great risk.

Means of escape

At Tanji, a fish smoking village on the Atlantic coast, a young man comes up to me. 'You think I want to be like these old men, working all day for nothing, sitting in the stinking hot sun and waiting for boats to come in with no fish and selling to people with no money?' he says.

'You think I want to watch the small numbers of fish I finally get rot and stink because the government gives us no money and no storage? No. I would rather take my chance and go away on a pirogue and try to get to Europe. Maybe I make it alive. Maybe I die. What difference does it make? I am just going to be poor if I stay here and be a fisherman.

'If I die going to the sea for trying to get to Europe I know that I have tried to go out and find a job in your countries and send money back to my family. The only thing the ocean is good for now is for getting away,' he continues.

Other young fishermen standing on the shore echoed his words. All of them agreed that the trip would be worth the potential death traps.

And there are death traps galore. According to the International Organization for Migration, over 31,000 Africans in 901 boats, and boats is a rather ambitious word for some of the vessels, attempted to travel from West Africa to the Canary Islands in 2006. 20 per cent of these seafaring migrants died or went missing at sea.

Cannibalism

In the fish market in Bakau, a group of young boys and men are listening to the radio. The station is interviewing a young man who attempted to sail the seas in search of a new life and a better source of income. Describing his experience he explains how many of his fellow passengers went mad, committed suicide or ate each other. This young man failed in his attempt and has decided not to make the trip again.

Whether his fellow countrymen are listening to his tale of woe is doubtful. One man explains to me that the government is just paying the interviewee to say lies and that if he had the chance and the money he would try to sail away tonight because there is no money to be made here at the fish market and there is plenty of money to be made in the Canary Islands.

'All these politicians tell us not to go and we will die and we should stay here and work hard and make lots of money,' the fisherman says. 'These people who say this are liars, just big fat liars with lots of money in their pockets and lots of money in other countries. We can't make money here and if we can't make money here we will die and so will our families. So, we might as well go out. Either way we could die so what difference does it make if we go or stay except we have a better chance and our families have a better chance if we get on a pirogue and make it to Spain?'

Another man tells me that if he was rich enough to own a pirogue, he 'would sell it to a people-smuggler.'

(Page 3) Pirate vessels are a growing menace for coastal communities across west Africa. Photo: Environmental Justice Foundation; (Page 4) Fish stocks have reduced drastically in recent years according to local communities. Photo: Dawn Starin; (left) Greenpeace is one of few organisations to be tackling illegal fishing. Photo: Greenpeace International

'The people-smugglers are the ones with money now,' he explains. 'They make thousands of dollars in every trip. They take our money and they get us to Spain and then we make money and send it home. The only way to make money in a pirogue now is to catch people, not fish.'

The fishermen complain that the size of their total catch and the size of individual fish is declining. The women, who are responsible for most of the on-shore handling, processing and marketing of fish, complain that the fishermen are not bringing in enough fish for them to make a profit. The young students, standing outside a market stall looking for a snack, complain that the cost of fish pies has escalated. The mother of three, sitting in the village no longer making fish ball stew for family, complains that the price of fish is too high.

Hatib, a full-time worker in one of the government departments fishes on the weekends to get extra food and tells me: 'The foreign boats come in and they have better machines and better engines and better ice. We are just poor Gambians with boats made from trees and engines fixed with broken wires. You toubobs (whiteys) have the money and the power and we have nothing and you take the fish away and we go hungry.'

Empty seas

It is not just Gambian waters that are being emptied of fish. According to Ousman Drammeh, a previous Gambian Director of Fisheries, up and down the West African coast foreign ships are encroaching into restricted zones and engaging in extensive illegal fishing.

In fact, IUU fishing off the coast of West Africa is truly extraordinary. According to the Environmental Justice Foundation (EJF), aerial surveys of Guinea's territorial waters found that 60 per cent of the 2,313 vessels spotted were committing offences. Surveys of Sierra Leone and Guinea Bissau over the same period found levels of illegal fishing at 24 per cent (of 947 vessels) and 24 per cent (of 926 vessels), respectively.

Over the years, the EJF, Greenpeace and the Coalition for Fair Fisheries Arrangements has followed some of these illegally caught fish and shown that Las Palmas in the Canary Islands acts as a major hub for fishing and fish transport vessels in illegal, unreported and unregulated (IUU) fishing (or pirate fishing) throughout the west coast of Africa and allows illegally caught fish to enter the EU market.

Right now Europe is consuming more fish than its own waters can provide – almost half of Europe's fish consumption depends on non-EU produce. As long as the EU continues to serve as a marketplace for IUU fish and Las Palmas serves as a major entry point, the illegal plunder of fish stocks from West African waters will continue.

According to the EJF and the Coalition for Fair Fisheries Arrangements (CFFA), Las Palmas acts as a major "port of convenience" for vessels involved in IUU fishing in West Africa. Unfortunately it is now also acting as a major port of inconvenience for many out-of-work West African artisanal fisher folk.

The Canary Islands are considered to be the largest point of entry for fish from West Africa coming in to Europe. It is also considered to be one of the most popular points of entry for West Africans coming in to Europe. When I consider the comparisons between fish and fisherman entering Canary Island space, I am reminded of something a Tanji fish smoker said to me. 'The toubob countries care more for our shrimps and fish than they do for our people. Our food goes in the good boats to Europe and our people go in the bad boats to die.'

Dawn Starin is an anthropologist and writer who has spent many years working in west Africa

Revealed:

scandal of the Roma people forced to scavenge toxic e-waste

In the wake of President Sarkozy's crackdown on the Roma people, reporter **Carolyn Lebel** and photo-journalist **Steven Wassenaar** uncover how poverty and discrimination are forcing persecuted communities to scratch a living recycling France's growing mountain of e-waste - potentially threatening health and raising questions over the effectiveness of waste policies

'It's a city within a city,' says a man who goes by the name of JP. 'They'll find a pair of old shoes on the street and resell them here for five euros. The kids will offer to fetch you water, but it'll cost you fifty cents. Everyone's in business!'

In a vast secluded parking lot on the outskirts of Paris, about 150 Roma people from countries such as Romania and Bulgaria have set up camp, erecting shacks of discarded planks and plastic sheets. It's mid-day and the women are outdoors cooking meats and stews on open stoves carved out of metal drums, or from charred shopping carts. The radio of a parked van plays the soulful rhythm of gypsy music.

A few of the older kids have made a game of riding municipal waste bins down a paved road leading into the encampment. The bins are empty. Instead the trash – empty water bottles, rotten mattresses, perished white goods, rubber tires and vast nests of tangled cables – are stockpiled in heaps throughout the site, amassing in ditches and swallowing up the surrounding vegetation. This abundance of waste is in fact the very engine of what JP calls a city; the source of a grubby, invisible, yet bustling micro-economy.

Roma men and women go gleaning the streets of greater Paris in search of discarded electrical and electronic goods (e-waste), shed by city's respectable citizens and businesses. Hauling dirty trolleys, on rickety bicycles, or – for the big timers – in dilapidated cargo vans, they round up old refrigerators, broken microwaves, obsolete television sets and other unwanted items, and bring them here. In a crude feat of reverse engineering, the e-waste is broken back down to its elements: aluminum, copper, iron, lead. It's the metals they're after.

With a vast network of scrap dealers in France, there is always a ready market for metals, which are becoming easier to recycle than to mine. The prices may fluctuate with global market forces that are far removed from the realities of slum living. But for the Roma communities who live in chronic poverty – often forced to survive on the refuse of societies that reject them – the business is lucrative. These days, a kilo of stainless steel goes for about 0.97 euro, while copper, a prized metal, varies between 1.20 euro and 4.30 euros, depending on the quality.

Scavenging waste

For a young man like Novak who lives in a caravan with his wife and two-year

old son in one of the more established encampments near Paris, scavenging for scrap metals (la ferraille) has become a way of life.
Twice a day, he sets out with a friend in a white cargo van, brought in from England. With the instinct of a hunter-gatherer and the rigor of an entrepreneur, he scours the streets of Parisian suburbs – Les Lilas, Saint Ouen, Vincennes, Pantin – on a schedule that's tightly aligned with the programmed routine of specialized municipal waste removal services, clocking some 70km a day.

'Saturdays and Sundays – they're good for ferraille. People stay home, clean the house,' he explains. On a good day, Novak and his friend can earn 50 to 60 euros, sometimes more. "When I find ferraille, I put 10 euros to 15 euros [of petrol in the van]. When I don't find, I put in five euros,' he says of his operating expenses.

The Sunday I tag along to hunt for e-waste is one of those good days. Just as we're leaving the encampment, Novak's brother arrives in a dark blue sedan packed with four other people. He's just driven in from Romania. And on the very last leg of his trip, dumped next to the road leading into the encampment, he's found a load of abandoned household appliances.

'They know we do ferraille,' Novak says by way of explanation as we approach the cargo. Three refrigerators, two dishwashers, a Miel washing machine and a Whirlpool dryer have presumably been dumped here by well-meaning, if lazy, deliverymen from a major retail chain. 'There is luck today. I am happy my brother is back. I am happy to have found la ferraille,' says Novak.

(Page 6) Cancer patient undergoing chemotherapy in Roma slum, near Paris; (above) a dump near to a Roma encampment, Paris; (right) A less than safe makeshift playground for these Roma children.

The booty represents more than just a stroke of luck. It is an encounter with a relatively recent source of competition for people like Novak, who for years, made it their business to peck away at over 1.5 million tonnes of e-waste generated by French households and companies every year – a figure that is growing.

With the implementation of an EU directive in France three years ago (the Waste Electrical and Electronic Equipment Directive or WEEE) however, manufacturers are now held responsible for collecting, recycling and safely disposing of their branded e-waste. So when your new refrigerator is delivered, the deliveryman is also charged with picking up your old machine.

Since 2006, some 22,000 e-waste drop-off points have also been put in place across the country, by retailers and municipalities. And for urbanites without cars, cities such as Paris offer a free collection service for large household appliances, furniture and other bulky items, either by appointment or on designated days.

Parallel networks

Despite these initiatives, recovery rates through official WEEE channels remain low. In 2009, the average French consumer generated some 22kg of e-waste a year, the equivalent in weight of a seven-year-old boy, according to the French Agency for the Environment and Energy Management (ADEME). Yet a mere 5.7kg (a 3 month old infant) was actually recovered (per person) through official channels. Meanwhile, businesses are left to their own devices to dispose of their e-waste; and they are possibly the main source of illegal exports to developing countries, according to Hélène Bourges of the CNIID, an independent environmental protection organization.

It's unclear exactly where it all winds up – forgotten in cluttered basements and closets, incinerated alongside organic waste, illegally exported to countries such as China, India or Ghana, or recycled by the likes of Novak through the scrap metal dealers. According to René-Louis Perrier, President of Ecologic – one of four accredited e-waste recycling organisations in France – about half of France's e-waste is lost to 'parallel networks'.

This means that significant quantities of the country's e-waste is winding up in the hands of the poor, being recycled in conditions that are hazardous to the health of these informal eco-workers and the environment. Whether it is in the slums of Paris, or at industrial-scale workshops in Guiyu, China, cables are often burned in open fires to extract precious copper. And it's not uncommon for the Roma to take an old car battery and melt it down for the lead.

'They would work directly above these clouds of black smoke,' states Dr. Bernard Moriau, talking about the Roma he examined living in the woods of the Val d'Oise region near Paris, while on mission with the humanitarian organisation,

Doctors of the World. 'I'm always very worried for them. But warning them of the danger is not going to change their ways. Today, it's their only means of survival.'

According to a local news source, in 2008 the grounds of an evicted Roma encampment near Lyon was found to be contaminated with heavy metals, known to cause cancers. Meanwhile, an investigation carried out by Doctors of the World and other local NGOs at three different sites in the south of the country (Bordeaux, Annecy and Toulouse) ten years ago revealed abnormal levels of blood lead in half of the children, while one in four suffered from lead poisoning. But these findings have yet to interest public health authorities, says Dr. Jean-Claude Guiraud, who estimates that thousands of Roma children are at risk of lead poisoning.

Toxic victims

Similar findings were described elsewhere, including at a site near Lyon where 19 children were recently reported to have elevated blood lead levels, and two were poisoned with lead. 'Children are especially vulnerable to lead poisoning,' says Dr. Guiraud, who has been working with the Roma since 1965. 'It can cause permanent damage to all the organs including the brain.'

The encampments themselves pose an immediate danger to children, who find themselves playing next to toxic bonfires and rat-infested Aladdin's caves of gutted machinery and sharp metal scraps.

As the head an accredited recycling organisation that pays special attention to providing job opportunities for the physically disabled and other marginalized people, Réné-Louis Perrier is particularly bothered by the practices of his informal competitors.

(Page 8) Living and working conditions in the Roma camps are poor, with a host of potential health risks for those dwelling in them; (above) A women holds a plastic doll presumably found dumped on Paris' streets; (left) There is no mains water supply for these Roma people.

Refrigerators, which are prized by recyclers for a copper-rich component – the compressor – pose a special environmental threat during recycling. They contain cooling agents that can damage the ozone layer, and potent greenhouse gasses within the insulation foams. 'When a scrap metal dealer takes a refrigerator and puts it through a car crusher to extract the metals, about four tonnes of carbon are released into the atmosphere,' says Perrier.

It's a source of competition he qualifies as unfair. 'They are not concerned with their recovery rates, nor with de-polluting their products. These costs have been cut from their operations,' Perrier says.

But scrap metal dealers provide proper invoices and a means of survival for an industrious tribe of Roma, who, thanks to discriminatory employment regulations in France, find it impossible to get legitimate work.

'Sometimes they'll go behind supermarkets and look through the bins. They'll find food that's well wrapped – yogurts, hams – that still have two days left before expiry,' says Liliana Hrispathe, a Roma woman who came to France six years ago and now works with an NGO that places Roma children in schools. 'In Romania, you don't find anything in the garbage. You don't find clothes for your children, food to eat, wood to heat during the winter, and scrap metals to make a bit of money. Romania, it's empty.'

Carolyn Lebel is a freelance journalist based in Paris

Steven Wassenaar is a photo-journalist based in France

(Above) A sleeping child is carried through a Roma camp, near Paris; (right) a Roma boy

Will the historic deal to protect Canada's mighty boreal forest work?

The unprecedented Canadian Boreal Forest Agreement will, if all goes to plan, preserve vast swathes of the country's pristine wilderness. But as environmentalists and the logging industry begin to roll the initiative out, there are claims that not everything is as it should be, reports Christopher Pala

Six months after campaigners and loggers signed the Canadian Boreal Forest Agreement to safeguard unprecedented amounts of forest land, the deal's real contours are starting to emerge, and they include papered-over differences that promise a rough ride ahead.

The historic agreement was announced at a press conference in Toronto on May 18 after two years of secret talks – two years during which the US construction industry collapsed, newspapers closed and the Canadian dollar went up. As a result, harvesting has fallen to about half the allowable amount.

The pact was designed to bring a fresh green lustre to the ailing industry and increase its market share, pave the way for unprecedented conservation, and end campaigns, boycotts and poor harvesting methods in one of the world's biggest spreads of relatively intact nature, which is home to Canada's iconic woodland caribou – and all by the end of 2012.

Shy and reclusive, the woodland caribou requires large areas of intact boreal forest, unlike the barren-land caribou that lives further north, in herds that can reach tens of thousands of animals. It has largely abandoned the southern, more intensely harvested part of the boreal forest and its numbers are in steady decline.

The boreal forest is composed mostly of slow-growing conifers such as pine and spruce. Unlike the temperate or tropical forest, in which trees die individually and there is habitat continuity, the boreal forest is renewed by vast forest fires or insect infestations every century or so. After 70 years, scientists say it's hard to distinguish a forest that has been clear-

Huge demand for timber has fuelled years of logging in Canada's boreal forest

cut from one that burned naturally. The differences reside mostly in the way the trees and plants grow back.

The boreal agreement was signed by nine environmental organisations (Greenpeace, the Nature Conservancy, the Canadian Boreal Initiative, the Canadian Parks and Wilderness Society, known as CPAWS, Canopy, the David Suzuki Foundation and the Ivey Foundation, ForestEthics and the Pew Environment Group's International Boreal Conservation Campaign) and 21 companies that are members of the Forest Products Association of Canada (FPAC). FPAC's members are responsible for 80 per cent of the wood cut in Canada.

Managing demand

The centrepiece of the agreement calls for companies that have acquired the right to harvest vast tracts of forested land – called tenures – to work with scientists and environmentalists to select which areas to conserve, privileging caribou habitat. They are then to approach the provincial government that sold the tenure to the company in the first place and propose that the area be removed from exploitation forever. In exchange, the company would be given the right to cut a comparable amount of wood in a less ecologically sensitive zone (some are available in Ontario and Quebec) or would be allowed to exploit some existing tenures more intensively (the only option in Alberta, where all tenures have been allocated).

The combined boreal tenures at play in the agreement total 73 million hectares, an area three times the size of the United Kingdom.

Since it was signed, says Richard Brooks of Greenpeace, teams have drawn 'circles on the map' from which the first potential conservation areas are to be drawn. The circles cover 2.3 million hectares in Quebec, 5.7 m hectares in Ontario and 7.1 m hectares in Alberta.

Canadian indian organisations (known as First Nations), already angered to have been left out of the talks that created the agreement, say the process of deciding which areas to set aside also leaves them out of the loop. 'Any agreement that directly affects our homelands should only be between those First Nations and the Crown (provincial government),' insists Grand Chief Stan Beardy of the Nishnawbe Aski Nation, which represents 49 First Nation communities in an area covering two-thirds of Ontario. 'This agreement disrespects our rights and was developed without our consent.'

Brooks says that the process of identifying which areas to set aside is now being worked on. But he expects that, in addition to company officials and environmentalists, it will include resource managers for both the provincial and aboriginal governments. 'This is a radically different approach, because in the past aboriginal government were mostly not recognised,' he says. He adds that when this becomes clear to the First Nations, he hopes they will come on board.

The agreement's second major component aims to improve harvesting methods – and it too is causing controversy. More precisely, the question is how it would affect the expansion of the Forest Stewardship Council (FSC), the international organisation that sets high and verifiable standards on how lumber companies can cut forests, and how they must respect the interests and rights of indigenous peoples, trappers and tour operators, as well as their own workers. Of the 135 million hectares of FSC-certified forests in 80 countries, 40 million are in Canada, mostly in the boreal forest, of which FSC makes up 20 per cent.

A new standard

The partners in the agreement pledged to create a new standard for harvesting trees that would be as good or better than FSCs. But a close reading of the agreement itself shows that the new harvesting standards would only equal or exceed FSCs in the environmental sphere, which regulates how many trees are left standing, which trees to cut, how best to mimic forest fires, and so on. The agreement leaves out the so-called social clauses that govern community, First Nations and workers' rights, which for most companies have been the main obstacle to adopting FSC.

Environmentalists have said that they hope the social clauses will be included in the new standards, due to be elaborated over the next year or two, but this seems unlikely. Only after these clauses are written and adopted, and the companies have finished the process of giving up as much land as they can (basic rule: no mills should close as a result of this), have the environmentalists said they would actively help non-FSC companies sell to major buyers such as Home Depot and Kimberly-Clark, which today privilege FSC products.

But on May 14, four days before the press conference unveiling the agreement, both sides signed a memorandum of understanding to 'confirm how the CBFA is intended to operate in relation to public advocacy in relation to certification'. It painted a different picture. The memo, seen by the Ecologist, said the environmental organisations 'from the outset' (i.e. the signature of the agreement) would 'encourage customers [lumber and paper companies]… to modify the wording of their procurement policies' if these exclude non-FSC companies.
It remains unclear what commitment the

The boreal forest is amongst the world's last remaining wildernesses. Photo: Chris Pala

Greenpeace has led the campaign to highlight the destruction of the boreal forest. Photo: Greenpeace

environmentalists will follow: the one to their partners, the logging companies, who hold the key to large-scale conservation, or the one to the general public.

Native rights

Larry Joseph, an indian forestry specialist who sits on the board of FSC Canada, calls the agreement nothing less than a betrayal of native rights by the environmentalists.

'First Nations have been pushing for conservation for years, we're not against it at all,' he says. 'The problem is that the agreement leaves us completely out of the decision-making process on protection. We like FSC because it mandates that we're consulted every step of the way.'

He says that if the social clauses of FSC aren't added into the boreal agreement, and if native representatives aren't brought into the conservation selection process, protests from native groups and their supporters will increase, buyers will stay away and the logging companies will lose whatever competitive advantage they were after.

That's a view that the environmentalists – who have maintained publicly all along that the agreement should help FSC – heartily endorse.

Bruce Lourie, chairman of the Ivey Foundation, one of the key funders that helped FSC take root in Canada, says: 'FSC is now a world brand, and the CBFA will never replace it. And in Europe particularly, the human component is a huge part of the FSC standard.'

Arnold Bercov, a trade union official who is also a member of the FSC Canada board, says FSC certification makes a big difference in the way both communities and workers are treated by small to medium-sized logging companies, adding: 'I think the companies will come to their senses and realise they can't get that competitive advantage without FSC.'

Inviting controversy?

Brooks agrees that the companies that signed the agreement would be making a huge mistake if they thought that the boreal agreement will provide the same marketing advantages as FSC. 'We urge them to adopt FSC, because if they don't they will invite controversy, and controversy is precisely what the buyers don't want,' he says. 'But if they do both, they can advertise that not only do they harvest to the world's best standards, but they also are actively conserving huge amounts of land.'

Still, the agreement's staff has put together a Customer and Investor Update Group composed of a dozen entities that will receive regular briefings on the progress of the agreement. It brings together representatives of major pulp and lumber buyers (Kimberly-Clark, Office Depot), paper buyers (Axel Springer, Hearst) and investors (Batirente), and will hold its first meeting in November.

Mark Hubert, an official of FPAC, the loggers' association, who has become co-chair of the CBFA, confirms that the agreement allows the 21 member companies to adopt FSC or not. Some, like West Fraser, have reportedly indicated that they have no intention of adopting FSC standards.

Tembec, arguably Canada's most eco-friendly company and the largest in the world to use FSC, issued a statement on October 15 reacting to the mounting controversy by reaffirming its commitment to the standard.

In an interview, the company's manager of aboriginal and environmental relations, Chris MacDonell, explained that while the environmental guidelines were relatively straightforward and easy to implement, the human ones were trickier.

Those providing for consultations with trappers, outfitters and other forest users were comparatively easy because their concerns tend to be the same everywhere. 'The more difficult requirements are the aboriginal ones, because their needs, their interests and their concerns vary a lot from place to place,' he said. 'We have about 30 First Nation bands in our tenures, and it's hard for a big company to work on a case-by-case basis, so we've had to learn to do that.'

But for Tembec, it was well worth it. In March 2008, its chairman, James Lopez, credited the just-finished conversion to FSC, which began in 2001, with saving the company from bankruptcy by keeping the orders coming from environmentally conscious buyers. Today, it still has 8,000 employees, down only 3,000 from early in the decade. The company goes beyond its FSC mandates to help aboriginal communities with training and education grants, which MacDonell says makes for smooth operations.

Commitment to FSC

The controversy over whether the boreal forest agreement will harm aboriginal rights swelled in October when a meeting was held to explain the benefits of the boreal agreement to indian leaders called 'The Canadian Boreal, our Home.' It took place in Prince George, British Columbia, which is not in the boreal forest region.

According to Joseph, the indian FSC board member, the meeting was by invitation only and he was not invited. Similarly, Algonquin Grand Chief Norman Young, in a press release condemning the boreal agreement, wrote: 'We were not even invited to the meeting in Prince George even though our Aboriginal Title Territory includes part of the boreal forest.' He called for 'a truly national meeting' to discuss how to react to the boreal agreement.

The next day, on October 20, the signers of the boreal forest agreement – minus the Nature Conservancy and the Ivey Foundation – issued a statement in which they strongly reaffirmed their 'ongoing commitment to FSC' and to 'the legal and customary rights of indigenous peoples to own, use and manage their lands, territories and resources'.

In apparent contradiction of the agreement and the May 14 memo, the environmental groups pledged to 'actively support and advocate for (FSC's) requirements'.

But the statement said nothing about what these groups would do if most of the companies adopted a boreal standard that were to leave out the FSC social requirements and not adopt FSC. Nor did it commit to inviting local native leaders to participate in the process of selecting what forests to preserve and what forests to cut.

'The agreement is based on the understanding that it's undertaken as a package,' says Hubert, the lumber association official who is co-chair of the agreement. 'The faster the progress we make together, the more comfortable all parties will grow, and the more the communications will reflect this.' While some companies may shun FSC, the environmental groups 'are also free to state a preference for a particular certification, which tends to be FSC. In practical terms, this means a distinction, for example, between stating a preference for one versus taking out attack ads against another.'

Antony Marcil, FSC Canada's executive director, agrees. 'I think if the environmentalists have to choose between large-scale conservation and native rights, they'll choose conservation.'

As for the companies, he says, 'Even if the buyers keep FSC companies at the top of their preferred suppliers' list, I assume the non-FSC companies would gain some advantage over non-agreement companies since there aren't enough FSC products available to satisfy the market. But the First Nations protests could also erase these gains, even if the environmentalists never restart their attack campaigns.'

Christopher Pala is a freelance journalist

If the boreal forest agreement works it should safeguard large swathes of wilderness for future generations. Photo: Chris Pala

Dark nights:
the global effort to tackle light pollution

Artificial lighting is a growing problem globally. Photo: International Dark Sky Association.

The energy, financial and health costs of lighting up our homes and streets could be saved through better lighting and an end to wasteful illuminations, reports Carrie Madren

Darkness reigned at night until 200 years ago, when English inventors discovered how to make electrified carbon glow. The invention of the light bulb loosened the grip of darkness, gradually illuminating our world after sundown.

Now, bright billboards, stadiums, parking lots, roadways and buildings cast a collective glow into our atmosphere, and offer enough ambient light to make land visible from space at night.

But with all of our modern technology allowing us brighter evenings, we pay a price: artificially lightened nights change our environment in many ways, including disrupted ecological dynamics and an obscured landscape.

Living in around-the-clock light can harm our health, too: scientists are associating artificial illumination at night with breast cancer. Diminishing dark skies also means cultural loss - constellations are a part of our heritage, and astronomers depend on darkened skies to study our universe.

In a practical sense, light pollution wastes energy - and fossil fuels - as well as money, including taxpayers' money.

Like global warming, light pollution extends to the far reaches of the globe and affects us all. And, as with our attempts to slow climate change, uniform efforts to illuminate more wisely are a gargantuan undertaking, and one of low priority in many regions. Still, scientists and advocates around the world are wising-up to light pollution and figuring out how to solve this global quandary. With a problem as amorphous as light pollution, can our global village find a way to protect dark skies?

How light is wasted

Satellite maps of the world at night reveal continents outlined in white, with clearly defined, glaring metropolises. Much of Europe, the eastern US and eastern Asia appear thick with lights.

'What you're seeing is light directed upwards, which is foolish because the whole point of light is to help us get around,' says Peter Strasser technical director at the International Dark-Sky Association (IDA), the largest international non-profit that keeps tabs on light intensity. In contrast, wide swathes of Africa and Australia emit nearly no light.

From ground level, city streets are often bright enough for newspapers to be read after midnight. But in regions such as Yellowstone National Park in Wyoming, night brings a rare pitch darkness; lift your eyes and that darkness makes for optimal stargazing.

Most live in darkness

Some two-thirds of the global population and 99 percent of the continental US and European Union live in areas where the night sky is considered polluted by light, according to a 2001 study by Italian astronomist Pierantonio Cinzano of the University of Padova, in his world atlas of sea-level artificial night-sky brightness.

Much like urban river pollution, light pollution's sources are hard to pinpoint. In a classic tragedy-of-the-commons, millions of light bulbs contribute to a region's atmospheric aura.

We light up roads and walkways at night to make our living spaces safer and to advertise our businesses. But too much light escapes to the sky, say dark-sky advocates. The worst culprits are poorly directed and poorly designed streetlights, such as the antique-style acorn lights that direct more light upward than downward.

'It makes no sense to light up the undersides of airplanes when you're trying to light up the street,' says Strasser. Other problem sources are powerful security and stadiums lights, floodlights that illuminate historic buildings and the far-reaching lights of shopping centers.

In addition to wasted light, squandered energy costs us millions. In the US alone, some $1.7 billion is wasted each year by unnecessary, excessive and poorly designed lighting, according to the IDA. Powering wasted light releases 38 million tons of carbon dioxide into the atmosphere each year.

The damage of artificial light

Scientists who study light pollution say that in addition to wasting resources, excess artificial light harms wildlife - and us.

Living things have evolved to take cues from light. Most famously, beachside lights attract newly hatched sea turtles - which by nature travel towards the moon over the water - to our inland human illuminations.

Likewise, bright building lights disorient migrating birds, which then crash into the sides of buildings. The toll is in the millions, but may be closer to one billion bird mortalities each year by collision with buildings in the US alone, according to a 2006 paper by Dr Daniel Klem of Muhlenberg College in Pennsylvania, whose research on the subject spans four decades.

Brighter nights alter ecosystems in ways we're still learning about, too. Light pollution in urban areas reduces algal consumption by zooplankton at night, because zooplankton need darkness to move about and consume surface algae, according to a study by Marianne Moore, associate professor at Wellesley College in Massachusetts. This suppression could contribute to algae blooms, known to worsen water quality.

Breast cancer links

The hazy glow of light pollution harms humans too, by disrupting our circadian systems. 'That's how we evolved: by light and dark,' says Dr Richard Stevens, a professor and cancer epidemiologist at the University of Connecticut Health Center. 'We are designed for 12 hours of dark and 12 hours of light.'

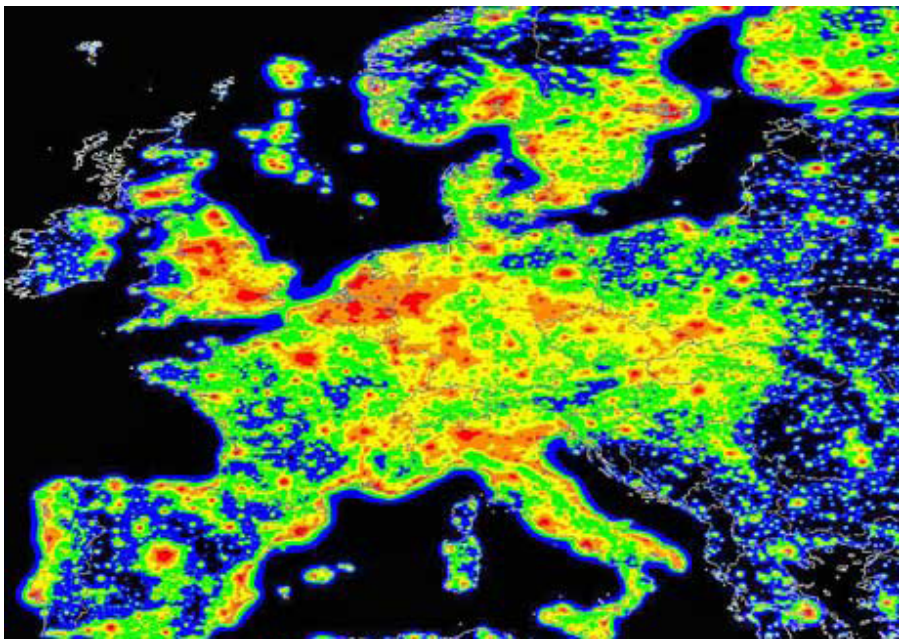
Our ancestors used fire, and then gas lights, which only produced dim light that would be extinguished by bedtime. Now, Stevens says, many of us are living in light throughout the night.

Our bodies produce a hormone in total darkness, melatonin, which helps to regulate the immune system and fight disease. In 2009, Stevens led an ecological study in Israel that revealed a strong correlation between nighttime light levels and incidences of breast cancer. Women living in the brightest areas (defined by the ability to read outdoors at midnight) had a 73 per cent higher risk of developing breast cancer than those living in the darkest areas.

In 2010, Stevens conducted a study that looked at 164 countries and found similar results. Light affects the circadian system through the retina, not the skin, says Stevens, so blind women and women who sleep for a long time seem to be at lower risk.

Psychologically, intrusive lighting can cause poor sleep and annoyance. Light pollution also alters our dark-sky heritage on a global scale, to the point that many urban dwellers have never seen the Milky Way. Even suburban and rural areas are losing starry nights.

The Campaign to Protect Rural England argues that a pitch-dark night filled with stars is among the values that makes the countryside unique from urban areas. Unfortunately, rural England's view of the star-filled sky is fading.



Satellite image of lighting over Europe. Image: P. Cinzano, F. Falchi (University of Padova), C. D. Elvidge (NOAA National Geophysical Data Center, Boulder). Copyright Royal Astronomical Society.

Finding dark-sky places

It wasn't until the 1950s, after World War II, that lighting became a sign of prosperity and progress. That's when uniform streetlights became widespread, bolstering the rise of light pollution.

Now, scientists and advocate groups are figuring out how to rein in our light obsession. Last November, the IDA honored two European parks for world-class stargazing: Galloway Forest Park in southwestern Scotland and Zselic Landscape Protection Area in southwestern Hungary. Two American communities also earned accolades for their darkened skies: Flagstaff, Arizona and Borrego Springs, California. The IDA hopes to recognise some 200 dark-sky places by 2020.

Other dark-sky groups around the globe are finding strength in numbers. In 2007, the Starlight Initiative - consisting of hundreds of scientists, non-governmental organisations, astronomers, councils and more - met in the Canary Islands, Spain, to draft a declaration stating the need to protect the darkness of the night sky as part of our shared global environment.

This year, the 3rd International Symposium for Dark-Sky Parks is being held in mid-September in Croatia.

Ways of cutting light waste

Groups that advocate for greater light control emphasise that they are not against outdoor lighting, but instead support smart, efficient lighting. Builders, engineers, highway administrators, corporations and governments will have to reduce wattages and rethink their approach to outdoor lighting. And since lighting is largely unregulated throughout most of the world, regional lawmakers could institute ordinances that outdate wasteful illuminations and require reasonable lighting.

A few laws are already in effect: In 2000, the Lombardy region of Italy passed a law that new light installations must not direct light above the horizontal. The Czech Republic enacted light pollution laws in 2002 to define light pollution and obligate Czech citizens and organisations to take light-pollution prevention measures.

Slovenia also has serious light pollution legislation, according to Andrej Mohar of Dark-Sky Slovenia. 'We had an eight per cent increase [in light pollution] in the last 15 years,' says Mohar. 'Three years after adoption of our legislation, we can measure 20 per cent less light pollution around Ljubljana, the capital.'

Rising crime fears

Talk of dimming our light pollution makes some uneasy, since we rely on artificial light at night. 'People are protective of light due to safety concerns and fear of crime,' says Emma Marrington, rural policy campaigner for the Campaign to Protect Rural England, so sometimes the mention of reducing light can raise criticism.

A guide by the New York State Energy Research and Development Authority states that 'it is clear that reductions in crime can be achieved by improvements in street lighting'.

However, 'there is a point of diminishing return - you can make a place too bright and if there's a glare then that makes it more difficult for people to see,' says Debra Cohen of Community Oriented Policing Services, an office of the US Department of Justice.

An improperly lit home can actually aid criminals: bright lights create sharp, contrasting shadows or glare where intruders can hide. Lighting can also help criminals see what they are doing and spotlight potential targets or escape routes. Illuminated areas can also attract social activity, especially among young people, creating opportunity for crime.

Dark-sky advocates say that smarter lighting practices will diminish light pollution and increase safety: outdoor security lights should operate on motion sensors at a lower wattage, and only illuminate areas that need to be lit.

Streetlights should be shielded to diffuse glare from the bulb and should only cast light downwards. Signs and advertisements should be lit from the top down rather than bottom up. Stadium and sports lights should be directed down, not up or out. For little-used walkways, short lights with red bulbs can shed light on paths; once eyes adjust to the dark, seeing is easy.

Says Marrington: 'We believe that this problem [light pollution] can be solved with the right amount and type of lighting, where it is needed and when it is needed.'

Carrie Madren is a freelance journalist

The International Dark Sky Association wants to name 200 dark-sky places by 2020…

The pesticides scandal:

Government inaction is destroying lives

The new coalition Government must do what Labour failed to do in 13 years in power and finally introduce the necessary measures to protect people from pesticides, says **Georgina Downs**

The use of pesticides has increased dramatically since the Second World War, becoming one of the dominant factors in agricultural production. But this has been a revolution with devastating consequences.

Supporters of chemicalised farming might claim that pesticides have led to increased yields and the capacity to work land more intensively, yet there can be no doubt that such methods are causing serious damage to the environment, wildlife and, above all, human health.

I have long found it a scandal that the UK Government has, to date, been so unwilling to take action to protect the public, despite all the unarguable evidence of the health risks. Delays, obstruction, lack of urgency and bleats about costs have characterised the official response to the worsening pesticide crisis, largely because of the control that the chemical industry and big agricultural producers have over Whitehall.

But there are at last signs of hope following all my campaigning. New EU laws have recently been passed which should, if implemented correctly by the UK, have a profound effect on the use of pesticides in British farming. As a result of my campaigning in Brussels, the EU legislation contains a number of critical measures for the protection of residents, including a new legal obligation on farmers and other pesticide users to provide residents with information on the pesticides they use; as well as the option for a new legal requirement in the statutory conditions of use for residents to be provided with prior notification before spraying.

Most importantly of all, Article 12 of the new EU directive concerns the prohibition of pesticide use in areas used by the general public or by 'vulnerable groups', a term which is clearly defined in the new EU legislation as including residents exposed to pesticides sprayed in their locality. This is a vital clause.

Agriculture - the 'biggest' villain

Considering that approximately 80 per cent of pesticides used in this country each year is related to agricultural use and that the main poisoning incidents and acute adverse health effects recorded annually in the Government's own monitoring system are from crop-spraying, then the prohibition of the use of pesticides in the locality of homes, schools, children's playgrounds, hospitals and public areas is absolutely crucial for public health protection, especially that of vulnerable groups.

The passage of the EU legislation, combined with my own long fought legal battles against the UK Government regarding the lack of protection for the public from pesticides, particularly rural residents, forced Labour to embark on a major consultation exercise about state policy on pesticide use. This process came to an end just before the General Election and the new Coalition Government is due to set out its policy on pesticides shortly. Despite the critical measures that are included in the new EU laws there is great concern as to how, or even if, the coalition Government will implement them, as the previous Government continued to rely on voluntary measures only in order to maintain the status quo.

The most scandalous aspect of this is that the case for action on health grounds could hardly be more compelling. It is now beyond dispute that pesticides can have a wide range of acute and chronic adverse effects on human health. The European Commission itself, in pressing the case for the new EU legislation, acknowledged that 'long-term exposure to pesticides can lead to serious disturbances to the immune system, sexual disorders, cancers, sterility, birth defects, damage to the nervous system and genetic damage.'

Chronic health impacts

There has been a significant increase in recent years of a number of these chronic health conditions. According to cancer statistics, around 298,000 new cases of cancer (excluding non-melanoma skin cancer) are diagnosed in the UK each year, and more than one in three people will develop some form of cancer during their lifetime. In 2008, there were more than 156,000 cancer deaths in the UK, and one in four (27 per cent) of all deaths in the UK were due to cancer.

Just as worrying is the incidence of Parkinson's disease. As recognised by the European Commission pesticides can damage the brain and central nervous system of humans, which is not surprising considering that many pesticides

are neurotoxic. In March 2009, one reputable study found that exposure to just two pesticides within 500 metres of a resident's home increased the risk of Parkinson's Disease by 75 per cent. According to Parkinson's statistics, 120,000 people live with Parkinson's in the UK, or 1 in 500 people. Every year 10,000 people are diagnosed with the disease in the UK, in which 1 in 20 is under 40 years of age. There is currently no cure for Parkinson's.

The cost to the UK economy of just a few of these chronic health conditions is massive. For example, in 2008 cancer cost £5.13 billion in terms of NHS costs alone, and the total costs to society in England was estimated to be a staggering £18.33 billion, with these costs predicted to increase to £24.72 billion by 2020.

It has been calculated that Parkinson's Disease costs the NHS £384 million per year with 78 per cent of these costs being taken up by hospitalisations, and the total cost in the UK of the disease is estimated to be between £449 million and £3.3 billion annually, depending on the cost model and prevalence rate used. Another neurological condition which has been linked to pesticide exposure, Myalgic Encephalomyelitis (ME) has been estimated to cost the nation £6.4 billion per year. Although there are a number of different causes for these chronic conditions, even if pesticides are only causing a proportion, the costs would still be enormous, particularly when added up with all the health costs of other related conditions, along with all the environmental costs.

For example, the cost of removing pesticides from drinking water alone is estimated to be approx. £140 million per year. It has been estimated to cost approx. a further £4.75 million to monitor pesticides at 2500 surface and groundwater sites. It costs £2 million a year in the UK to check for pesticide residues in food and an estimated £5.4 million for pesticide monitoring in both food and livestock together.

Flawed finances

It is clear that chemical farming is costing the country billions of pounds every year. Yet the former Government's entire costs analysis in relation to the use of pesticides was hopelessly flawed, as in its pesticides policy, the Labour Government never factored in the massive financial and economic burden that the use of pesticides imposes on the country through damage to human health and the environment.

I have recently written to the Prime Minister, the Deputy Prime Minister, the Chancellor, and the DEFRA Secretary of State, to stress the need for tough action on pesticides, as the new coalition Government cannot afford to make the same mistake as the previous Government. The current pesticide policy has very significant and long standing cost implications for the Government, and thus the taxpayer, that totals billions of pounds each year, and which will continue to do so unless a different policy approach is urgently adopted. Obviously it goes without saying that the personal and human costs to those suffering chronic diseases and damage cannot be calculated in financial terms.

Ironically, a stated reason that the former Labour Government gave for repeatedly refusing to introduce mandatory measures for public health protection from pesticides was to do with cost implications on the Government and 'the public purse'. Yet, aside from the critical fact that the existing external costs of pesticide use completely dwarfs any potential costs of introducing new measures, there is an additional serious fundamental flaw in the former Government's continued reliance on this argument.

In the recent Government consultation on pesticides, DEFRA estimated the highest stated cost to the Government from adopting regulatory controls wherever possible, as being £111.51 million.

Spending farce

Yet this is nothing compared to the ridiculous waste of multi billions of pounds of public money during the Labour years, with some of the most farcical being: the reported £200 million of public money spent on doses of the swine flu vaccine never to be used because officials forgot to add a cancel clause to the contract with the pharmaceutical company GlaxoSmithKline; the Welsh language television channel funded with £100 million of public money that showed nearly 200 programmes between February and March 2010 which were watched by no one; in 2009, the Learning and Skills Council gave the go ahead to more college building programmes than they had money for – resulting in dozens of colleges having to write off over £220 million that they had already spent before the mistake was realized; and not to mention of course the reported £5 billion spent by senior civil servants since 2002 on taxpayer funded credit cards, including dining at top restaurants.

Such wasted billions clearly confirm that mandatory control measures on pesticide use could have been introduced many, many, times over by now if public money had been managed responsibly by the former Government, with the priority being given to policy areas that involve public health protection, such as this one.

Following the coalition Government's announcement of the Spending Review that has set departmental budgets for the years 2011-12 to 2014-15, the Government must ensure that the spending cuts due to take place are not used as an excuse for a continuation of the former Government's inaction over pesticides. This is about public health protection and is thus not a policy area that can be sacrificed, or compromised on, in any way.

Considering the massive health and environmental costs of chemical farming it makes clear economic sense to introduce new regulatory controls on pesticides, and to shift policy towards utilizing non-chemical farming methods in order to reduce dependency on pesticides, which is one of the main aims of the new European legislation. Such action would also go some way towards reducing the deficit as it would save the country billions every year.

In any event, if the coalition Government fails to adopt the mandatory measures required by the new EU laws then it would result in non-compliance, which could lead to infraction proceedings being taken against the UK by the European Commission. This could incur significant financial penalties for the UK.

The new coalition Government must now do what Labour failed to do in the entire 13 years they were in power and finally put the protection of the health of UK citizen's first and foremost. In every sense, the Government simply cannot afford not to.

Georgina Downs runs the UK Pesticides Campaign www.pesticidescampaign.co.uk. The long running legal case between Georgina Downs and the UK Government over pesticides is now before the European Court of Human Rights.

Will renewable energy fuel a new generation of eco-shipping?

The Greenheart project is amongst those revolutionising the shipping sector by utilising renewable energy sources to power a new generation of ocean going craft. Illustration: Greenheart project.

B9 Shipping and the Greenheart project are pioneering new, fully sustainable, forms of ship design. Despite industry scepticism the boats - based on wind power and biomethane - could signify a return to the great age of sail, reports **Ewan Kingston**

Shipping will never be green, right? Cargo ships: those fossil-fuel-guzzling hulks, are ubiquitous. The International Maritime Organisation reports that the global shipping industry emits over a billion tonnes of CO2 per year – an output equal to Germany's – and produces large amounts of black carbon and toxic oxides of sulphur to boot. There's still no agreed upon mechanism to render the industry responsible for its greenhouse gas emissions. At the end of their lives, ships are dismantled in dangerous and toxic conditions in the less developed countries.

But shipping doesn't have to be an environmentalist's nightmare. While shipping has a footprint on a par with aviation, it manages to carry carry 90% of the world's total volume of freight. An Ecologist investigation published in 2009 highlighted energy-saving technologies that have the potential to reduce the carbon footprint of conventional shipping by up to three-quarters. Now recent developments in the world of shipping is mean plans for 100% renewably powered ships are drawing close to fruition.

The Greenheart project, for instance, is currently developing plans for a one-container capacity ship that is capable of beach landings, driven entirely by the wind and solar-powered electric motors. The Netherlands-based Atlantis Merchant Shipping Company also plans to build a one-container ship powered only by sails and a small motor boat for in-port maneuvering. B9 Shipping on the other hand, has designed a larger ship to be powered by the wind and biogas. Greenheart and B9 aim to have demonstration vessels in the water within two years, and production could commence immediately after that.

Playboys and sportspeople

A conventional history of sail-power might describe its commercial application withering to nothing around the turn of the century, and the technology being sustained only by enthusiasts, playboys and sportspeople. The reality is somewhat different. Pat Utley, founder of the Tokyo-based Greenheart project points to a wealth of wind-powered trade occurring under the radar. 'Take green shipping: even the name itself is biased because most of what's green has never been labeled green, it's just brown, dusty brown, and it has been practiced for millennia.' Utley shows me a slideshow displaying the wide range of current coastal trading operations under sail, from canoes to dhows. 'Long routes, such as the dhows and junks attract the attention of National Geographic.' But even smaller scale coastal trading using dugouts and smaller vessels is more common. Utley estimates that thousands of tonnes of cargo can pass through a single beach every year.

Utley's project is to link this already existing local maritime system with the larger network of containerised trade in a uniquely green way. The proposed prototype ship has a 26 metre mast, 200-300 square metres of sail, and a ingenious concertina-style array of solar panels that can be stretched out on deck or even over the water, but stowed away when deck space is needed for heavier work. Excess electricity from the solar panels will be channeled into a desalinator to produce drinking water. The whole design is aimed at using technology simple and affordable enough to mean the ships can

be assembled by the very groups they are intended to serve: coastal communities in less developed countries.

The Greenheart ship is intended to have a wide variety of applications, from its central role as a cargo ship to serving as a campaign boat or a fishing vessel, to uses in ecotourism and passenger travel, and even functioning as a stationary desalinator.

A sceptical concern might be that as the Greenheart Project is aiming at linking traditional communities to the wider world of transnational commerce , the fast paced development that means will bring as much harm as it does good. Utley sees things another way. One of the main aims of the Greenheart project is to empower coastal communities, communities which almost inevitably are already linked to the rest of the world by roads. 'People depend on those road systems, but they pay dearly for it,' Utley says. The construction of roads damages delicate tropical soils and the traffic that ply them are energy hogs compared to Greenheart's wind-and-solar powered light trader. Its ability to land on beaches also avoids the need for ports which mar natural coastlines. Ultimately, Utley wants the Greenheart project to be a case of appropriate development: a natural progression in the world of sailing in the developing world. 'We do more for cultural preservation by keeping a useful technology like sailing alive for these communities.' says Utley.

Fossil fuel free

While the vision of the Greenheart project involves small one-container ships capable of beach-landings, B9 Shipping has a different vision. Their prototype, slated for completion in 2012, will be a coastal trader capable of carrying 3000 tonnes. While this is still an order of magnitude away from the giant container ships plying ocean routes today, it represents a significant achievement for what will be a 100 per cent fossil fuel free vessel. The B9 ship, with a hull of recycled steel, is designed to catch the wind at sea with three 50m high masts of square sails. But when the wind isn't blowing, the ship will be powered not by solar power like the Greenheart's ship, but by B9's own biomethane produced from anaerobic digesters and landfills, powering combustion engines.

At first blush, it seems an eminently sensible idea. With the price of fuel forcing container ships to run at speeds slower than the old sailing clippers, and the imperative of environmental sustainability becoming more and more evident, the B9 approach has practical advantages over a fossil fuel based approach. Development Director Diane Gilpin expresses this forcefully: 'We have always delivered business plans that have shown we can be competitive in terms of cargo rates and consistently delivering to schedule. There isn't really any huge design issue. It's all straightforward solutions being brought forward in an imaginative, innovative way.' What's more, the smaller size of the B9 ship proves an advantage when it comes to competing with dirtier land freight options – while exporters might have to wait a considerable time for a large ship to fill with cargo, smaller ships can load and sail much quicker. And it's not as if 3000 tonnes is the upper limit for such a 100 per cent renewably powered vessel.

B9 Managing Director David Surplus tells me that drawings exist for a 9000 tonne vessel, with a 20,000 tonne vessel not an impossibility. Such vessels might ultimately replace the fossil fuel powered fleet we see today: 'We foresee carnage in conventional shipping fleets as they become progressively exposed behind the carbon reduction curve,' says Surplus.

Despite the robustness of the B9 business plan, it hasn't all been plain sailing with regard to the perception in the industry: 'The maritime industry is just not getting it with regards to renewables on ships: you come across some dinosaurs who think you are barking mad – we met someone from the IMO who was really quite abusive.' Gilpin retains a sense of perspective about this however. 'If you are working in this industry where costs are being stressed and all the margins are tight [and] your livelihood depends on [them], it's going to be stressful. So when someone breezes in and talks about a [cargo] ship with sails – they don't have time, because they are so engrossed in their own difficulties.'

Downing Street

Although Gilpin and her associates have been proposing ideas for renewable shipping since the 1980s, recently a lot of powerful people in business and politics have had time for B9's proposals. Gilpin talks of the 'collaborative network', and B9 has indeed gained some valuable allies. The principal designer of the ships is Rob Humphreys, who designed record-breaking circumnavigator Ellen MacArthur's Kingfisher. Respect and assistance has been offered from many quarters, in the form of Rolls Royce engines to the expert assistance of the Met Office in route planning. Last year, B9 representatives visited Downing Street after an invitation from the then Prime Minister. The most recent development in the B9 story has seen a partnership with currently idle Sunderland shipyard Pallion, which will enable 7-10 green B9 ships to be built every year, in a former major shipbuilding centre.

As well as the business side, there's a more human sense of appeal to these renewable shipping projects. Gilpin tries to explain: 'I don't want to sound like Pollyanna – that it's all wonderful – but the nature of these ships lights something in most people... the chairman of the [B9] group works with me on the shipping contract because it's the most exciting.' This sense of excitement and ownership will hopefully extend all the way to the crew. As well as requiring more sophisticated seamanship than a conventional coastal trader, sailing skill will be actively rewarded onboard. As sailors that can harness the free energy of the wind more effectively will save the company in terms of biogas, that bonus will be shared amongst the crew. Celebrating the return of the old ways is also central. 'When we open the shipyard we're going to do it with a party, because the low-carbon future is going to be fun, it's not all about hair shirts and rope sandals.' says Gilpin.

This sense of excitement and joy is one of the other aspects both Greenheart and B9 share. Patrick Utley tells the story of when Greenheart gained its first volunteer. 'We met at a boat show in Tokyo, and he told me he wanted to volunteer. I said "sorry, we don't have any volunteers, it's just me and these drawings", but he just persisted. I don't think it's my charisma... people recognise the wisdom of the project and join on.'

Ewan Kingston is a freelance journalist