

Mining for smartphones: the true cost of tin



→ Tin miner Marhawan and his family take shelter at a mine in District Sungai Liat, Bangka island, Indonesia. Marhawan came to Bangka from a district more than 400 miles away to find work in the tin mines a year ago.



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The UK has more mobile phones than people... but at what cost?

Please join Friends of the Earth's Make It Better campaign. We're calling on Samsung and Apple to help end the devastation on Bangka island and support tough new rules to make companies reveal their impacts.



↓ People gather to watch the search for four miners buried when a tin mine collapsed in Belo Sea Village, Bangka island, Indonesia, August 2012. It was later reported that two workers were found dead, one survived and one was unaccounted for.

Tin mining on Indonesia's Bangka island has shocking environmental and social costs, as this report reveals. As tin is a key component of all mobiles you might be wondering: "Is my new mobile or smartphone bad?"

Our world's natural limits are under dangerous pressure – so we should think about our personal impact; but surely the main responsibility lies with companies to improve the way they produce their goods, so that we can trust the things we buy and use are not hurting people and planet.

There's huge potential for companies to make their products better: they could be rethinking design and production to use fewer natural resources – such as minerals, water, fuel – and ensuring people and the environment are protected throughout the supply chain.

So why isn't this happening now?

Most companies and politicians argue that it's up to shoppers, rather than them, to force market change. They claim that if we educate the consumer to demand more green, ethically-labelled products, companies would make them, slowly phasing out damaging brands as they become less popular.

Our purchasing choices do matter – but they can't create change on the scale or at the speed needed.

It's companies, not customers, who understand the complexities of their operations and are in a position to address how they make products.

Friends of the Earth's investigation looks at the impact of tin mining. We're calling for leading phone manufacturers to take responsibility for problems that may occur in their supply chains. But beyond that, we need to see companies everywhere address the impacts of all their operations.

Strong government action is needed to level the playing field so the best companies' efforts to protect the environment aren't undermined by less scrupulous competitors.

That's why our new Make It Better campaign calls for all large companies to be transparent about their supply chain impacts. To ensure this happens, we want Europe-wide legislation requiring companies to report this information alongside their financial accounts.

This would benefit businesses and investors by helping them identify risks and inefficiencies in the system. It would help governments decide policies to encourage companies to take better care of the environment. And it would set us on course to a world in which we can not only love our favourite things – but love the way they're made.



» IF YOU ONLY READ ONE THING, MAKE IT THIS«

Friends of the Earth's six-month investigation reveals the little-known environmental and social costs behind smartphones and other electronic gadgets. To illustrate the damage that the manufacture of some of our favourite products can have on the environment, our researchers have been to Indonesia to document the devastating impact of mining for tin.

Tin is a vital component in all phones and electronic gadgets, and the Indonesian island of Bangka, along with neighbouring island Belitung, produces almost one-third of the world's supply. On Bangka our investigators interviewed miners, fishermen, expert marine scientists and doctors, and visited fishing communities, working mines and abandoned sites around the island. **That's why Friends of the Earth is calling on market leaders Samsung and Apple to tell us whether their phones contain tin that's linked to the destruction.**

We found shocking evidence of:

- > Silt from tin mining boats choking coral, driving away fish and marine life and ruining fishermen's livelihoods;



- > Forests and farmland destroyed, loss of soil fertility and little or no restoration of mined land;
- > Injuries and fatal accidents when pits collapse.

Back in the UK we traced the supply chains from Bangka's tin mines to high streets around Britain. **Our research shows that the biggest selling smartphone brands, Samsung and Apple, deal with companies that use tin mined in Bangka.** Although Apple and Samsung might not have realised this, or the damage caused by mining in Bangka, it's almost certain that this tin will end up in their smartphones and other electronic products. We chose to focus on phones – smartphones, mobiles or tablets – as just one example of the little-imagined impact our favourite products can have: one in every four phones now made is a smartphone, and that number is set to rise. **Millions of us love our phones – we don't need to know complex details about how they're made but we do want to be sure that people or the planet aren't hurt in the process.**

The problems in Bangka are clearly unacceptable. **That's why Friends of the Earth is calling on market leaders Samsung and Apple to tell us whether their phones contain tin that's linked to the destruction.** As influential brands they have a real opportunity to help end the



← A worker at a tin ore mine in District Sungai Liat, Bangka island.

↘ A tin ore mine in Nudur, Bangka, run by PT Timah mining company, which dominates the tin business on the Indonesian island.

↓ Suge, a tin miner injured when the pit he was working in collapsed.



damage in Indonesia. We're asking them to bring together affected parties in Bangka – miners, farmers, fishermen and government – to agree and implement a plan to halt environmental and human problems caused by tin mining (see page 8).

Stopping tin mining in one place isn't the answer. That could simply shift the problem to another country, as happened in the Democratic Republic of the Congo after the United States passed a law in 2010 (known as the Dodd-Frank Act) to stop manufacturers sourcing minerals from areas of conflict or human rights abuses.

That's why Friends of the Earth is not just highlighting the problems on Bangka. **To prevent problems elsewhere, we're launching our Make**

It Better campaign to ensure all companies come clean about their supply chains and their impact on people and the environment, so we can love our favourite products – and love the way they're made (see page 30).

Make It Better aims to tackle the way that the operations of business can put a dangerous strain on our planet and turn around the suffering this causes so many people. Companies already report on finance; now we're calling for Europe-wide legislation requiring full reporting on the impacts of product supply chains as well.

This kind of non-financial reporting is crucial, as the economy, people and the environment are all bound together; they cannot be thought of separately.

What's in my phone?



↑ A miner displays rocks containing tin he's found. Almost half of all tin mined is turned into solder for the electronics industry. The global demand for smartphones, mobiles and tablets is a major factor.

It's hard to imagine life without mobiles and smartphones. The big problem is that, like so many products, there is no way you can buy a phone, tablet or other electronic gadget with total confidence that it's made without hurting people or the environment

There are already more than 5.6 billion mobiles in the world, and by 2017 mobile phones look set to outnumber people on the planet.

Mobile phones contain hundreds of components and more than 40 different chemical elements. These include copper in the wiring, tin in the solder and gold in the circuit boards, which are dug up in mines around the world.

Friends of the Earth's investigation focuses on a key component in all mobiles – tin.

There are about 2g of tin in every phone, but manufacturers rarely disclose where or how they get their tin. It might be that they don't know the ultimate source themselves. But they aren't obliged to tell us because there are no rules to make publically available the source of a product's raw materials.

Friends of the Earth's investigation with our Indonesian sister group, Walhi, provides shocking evidence that tin mining is causing terrible harm to people on the Indonesian island of Bangka (see page 8-19).

It's not just phones that contain tin. The glue that holds together the resistors, transistors and integrated circuit boards in all electronics devices is a tin-rich solder – an alloy of at least 95 per cent tin plus a little silver and copper. Nearly half of all mined tin is turned into solder for the electronics industry.

How much tin?

Weight of product	Average tablet or Apple iPad: 650g	Laptop: 2.7-3.2kg	32-inch flat-screen TV: 11.3kg	Car: 1,814kg
				
Tin-rich solder	1-3g	2.4-3.4g	5g	15g

What else is in my phone?

Here are a few examples of the materials in your phone and what they're used for.

Tantalum – tiny amounts are used to power the electronics in mobiles, smartphones and other devices. Ore containing tantalum is mainly mined in Australia with some resources in Canada, China, Ethiopia and Mozambique.

Indium's major use is as indium tin oxide (ITO), a very thin, transparent and electrically conductive material used in most flat screens, including smartphones and large TVs. There is currently no viable alternative in phones. Indium is quite rare in the Earth's crust and is mostly obtained as a by-product when refining other metals such as zinc, where it's found at a level of less than 1g for every 10,000 tonnes of zinc ore. Although valuable, there is currently very little recycling from products such as TVs and phones as it's difficult to extract.

Neodymium makes phones' speaker, microphone and vibration possible in the form of small but powerful magnets. It's also an important component of wind turbines and electric cars. A rare earth, it can be expensive and difficult to extract and process. China currently controls 97 per cent production of rare-earth elements. Rare-earth mining and refinement activities produce hundreds of thousands of tonnes of contaminated by-products, including radioactive materials. The largest mine, at Bayan Obo in Mongolia, is so big it could house the whole of Sheffield.

Tungsten, Palladium, Yttrium and five others are all elements extracted from mineral resources on the 2011 British Geological Surveys Risk List. The level of risk is determined by factors affecting supply, including the abundance of the elements in the Earth's crust, the location of current production, recycling rate and substitutability, and the political stability of the producing countries.

Materials in unwanted phones could be reused: the value of just the precious metals in 85 million discarded phones exceeds £150 million.

Devastation on Bangka island



↑ Pools of stagnant water and the cratered landscape of this tin mine have replaced forest and farmland in Tanjung Pesona, District Sungai Liat, Bangka, Indonesia.

The rapid spread of tin mining – on land and at sea – is turning parts of an Indonesian tropical island into a barren, cratered landscape. It's spoiling fresh water supplies, killing coral and wrecking the lives of local communities. A major reason for this is tin, that vital ingredient in the modern-day essential – a smartphone.

Indonesia is the world's biggest exporter of tin. Around 90 per cent of Indonesian tin comes from Bangka and its southerly sister island, Belitung. The clue is in the name: in a local dialect, *bangka* means tin.

Bangka, an Indonesian island just east of Sumatra, is about the size of Yorkshire and has a population close to 1 million people. More than half of the islanders depend on agriculture, fishing or tin mining for a living. But how long can this last? On the one-hour flight from the capital, Jakarta, it's easy to see that away from the coastline vast areas of tropical forest have been ripped out so machines can dig up the tin ore beneath.

Mining ruins the landscape, leaving grey, sandy and acidic sub-soil peppered with craters where once there was lush forest. Despite some efforts there is little effective restoration by the mining companies. Efforts at replanting often fail as even the toughest trees, such as acacia, may struggle to grow on what's left after mining. The companies also say that their efforts are frustrated by individual or small groups of miners reopening old mines after they have left.

In some places, clean drinking water has become much harder to find, and the soil has not just lost fertility but been dug away, making it hard for families to grow their own vegetables. Meanwhile doctors suspect that many reported malaria cases in recent years might be linked to the hundreds of abandoned mines that fill with stagnant water, allowing mosquitoes that carry the malaria parasite to thrive.

The tin boom has led many more men and women to flock from other parts of Indonesia to mine for tin on Bangka and neighbouring Belitung islands. Some will work with the big mining companies, like PT Timah, that operate both on the land and in the shallow waters just off the coast.



↑ Independent miners operate a bamboo raft to dredge for tin ore in the waters off Rajik Village, District Payung area, Bangka, Indonesia.

➤ Suge, an unofficial tin miner, suffered a broken arm and leg when the pit he was working in collapsed. His three friends were killed.

There's also a growing number of people, known locally as informal miners, attracted by the better money they can make from mining compared to working as a labourer or fisherman. Working alone or in small groups, the unofficial miners tend to re-dig pits that have already been mined by the big mining companies. Being an unofficial miner is not illegal, but it is not controlled and has no safety rules or environmental safeguards.

The hunt for tin can be dangerous. It's especially risky if you are using bare hands and pick axes at the base of steep-sided pits that are liable to cave in on anyone below. Bangka police figures show that in 2011 an average of one miner a week died in an accident. This is double the rate of 2010.

There are perils at sea too. Not far from the coast huge factory ships either mechanically dredge the seabed for tin or use giant suction pumps to suck up the tin sand – and anything else on it – from the seabed. After washing the tin, the dredgers spew out plumes of sediment (known as “tailings”), which is clouding the formerly clear sea around Bangka. This is killing fragile coral reefs and the sea grass eaten by turtles, and driving away fish, which is ruining fishermen's livelihoods.

The tailings also damage mangrove forests, destroying precious habitats that are nurseries to many commercially important seafood species. The mangroves also help protect the island from damage caused by tropical storms and big waves.

A growing number of fishermen who find their catches dropping are now working as sea miners. They build homemade rafts and add a diesel-powered pump to suck up the ore, often working four or five to a raft. Hundreds of rafts – a sort of tin flotilla – can be seen working the seabed for tin.

Bangka is at a crossroads. Mining tin for smartphones and other electronic gadgets is destroying forests and farmland, choking coral reefs and devastating communities. If it continues unchecked, how can people living on Bangka ensure their drinking water isn't polluted? How can villagers grow vegetables for their families or market? How can fish catches be revitalised when the coral reefs the fish depend on are dead?

We need tin-buyers and miners to imagine the island's future in a far more sustainable way – not just to make sure there's still tin for our smartphones, but to shake up the way big brands do business worldwide.

→ Miners sift through sand looking for tin ore at a mine in Tanjung Pesona, District Sungai Liat, Bangka, Indonesia.

Mining on the island is dominated by state-owned PT Timah which runs the world's largest tin smelting operation, processing 50,000 tonnes of tin a year.







↑ Waste pouring out of a tin mining ship as it dredges the sea bed off the coast in the District Payung area, Bangka, Indonesia.

State-owned PT Timah runs the world's largest offshore mining fleet of 21 dredgers, which works several kilometres offshore to a depth of about 50m, mining more than 3.5 million tonnes of material a month.

Can anyone mine tin?

For many years the Indonesian state had a monopoly on mining strategic minerals. Tin was categorised as strategic back in 1980. This was reversed in 1998, allowing small-scale tin mining to go ahead. Then in 2009 the Government's new national mining law on minerals and coal allowed practically all areas to be mined, including protected forest and the sea – although in theory sea mining is banned in waters within 2 miles of the shoreline.

National Parks and areas which local planning rules categorise as non-mining zones are off limits. However, most local districts, including Bangka, have yet to issue local planning regulations, which

has allowed tin mining to become widespread and damaging.

The way that tin is currently mined on Bangka is destructive, whether it is done on a large scale by the big mining companies, such as PT Timah, or by the small-scale, unofficial miners who make their livelihoods selling small amounts of tin to the big businesses, often via dealers. PT Timah, and smaller mining companies such as Koba Tin, then sell on all this tin, some of which will almost certainly end up in phones and other electronic goods made by Apple and Samsung.

“The problems tin mining is causing on Bangka make life so much harder. It’s more difficult to find clean water or grow vegetables and the coral reefs are being killed. Many of the miners risk their lives at sea and digging in the pits”

Ratno Budi, Friends of the Earth Indonesia, Walhi, campaigner



↑ Workers rinse mined sand to separate out tin ore at a pit in Tanjung Pesona, District Sungai Liat, Bangka, Indonesia.

➤ Green turtles like this one are endangered. The loss of nesting sites and food supplies like sea grass due to tin mining is a threat.

➔ An unofficial miner pans for tin in a muddy pool at a mine in Tanjung Pesona, District Sungai Liat, Bangka, Indonesia.

Tin mining blues

Tin mining on land:

- > Pollution of drinking water
- > Injuries and fatal accidents when pits collapse
- > Loss of soil fertility
- > Hard to grow crops on areas that have been mined
- > Landscape drastically changed forever
- > Little or no restoration once land mined
- > Dangerous working conditions for many unofficial miners

Tin mining on the sea bed:

- > Silt and sludge killing coral, sea grass and mangroves
- > 60-70 per cent of the coral reef is dead
- > Endangered turtles threatened because of the loss of their beach nesting sites and food sources like sea grass
- > Fish stocks down so fishermen have to travel further for fewer fish
- > Crab and shrimp catch down
- > Endangered Napoleon fish are disappearing from the area
- > Endangered giant clams killed by silt deposits





Riri, self-employed tin miner

It's work: "I mine with my husband. Sometimes there is a lot of tin, sometime less. It's enough income to buy rice, feed my two sons and pay school fees."

Fitriyadi, tin buyer

Middle man: "I don't ask questions, I buy from anyone, especially the small-scale miners. If PT Timah is offering the highest price I will sell on to them via the sub collector. Or I'll sell to the smelter. The price is always changing."

"I don't ask questions, I buy from anyone, especially the small-scale miners."

"In the future it is going to be difficult for our children and grandchildren to live on this land because it has been destroyed by tin mining."

Alim, former tin miner

Life by the tin mines

Survivor: "It happened about 11.30am. I was washing the tin rocks with water when the sides of the pit collapsed. I tried to get out but I was buried. I thought of my little daughter and I crawled up through 5 metres of earth to escape. My three friends were killed."

Suge, self-employed tin miner (pictured left) who broke his arm and leg in a mining accident in August 2012



Alim, former tin miner

Future worries: "As a fisherman my income was small. I saw tin miners earn more than I can fishing, so I switched jobs. I did mining for around three years. At first I felt rich, but as time passed it felt like tin mining wasn't good. Sometimes you dig a hole for two or three days and there's no tin. Then you dig another hole."

"I mostly mined on new land, but this search for a new piece of land is very difficult and there is not necessarily tin in it. Because of the difficulty of finding land I looked for another job, one with more comforts. Now I am a driver, and my income is pretty good. In my opinion international companies that buy tin from Bangka must take responsibility to restore the land in Bangka. Help us rebuild our environment."

Ratno, Friends of the Earth Indonesia, Walhi, campaigner

Eyewitness: "People in villages and the urban areas find it difficult to access clean water now. And fishermen have trouble catching enough fish. In 2011 we came here with the community of Bencah village. At that time we were supporting their campaign to protect their forest. But the community protest was unsuccessful and now PT Timah has staked mining rights on this area."

"Right now in 2012 we can see the forest is gone and the area has been turned into a gigantic tin mine. Companies that buy tin from Bangka Belitung should ensure that the tin they buy does not damage the fishing or farming areas. They must stop the loss of life and do something about the continuous environmental damage."



Rohim, village fisherman

Not so easy: “The amount of tin is decreasing – a sea tin miner might collect 50kg a day. Fishermen cannot cast a net around Rajik village because it has been spoilt by sea mining. We organised a petition to keep PT Timah dredgers out of the bay. We hope if there is environmental damage in the sea mining area that it can be restored just like land mining reclamation.”



Edi, sea tin miner

Better work: “I need the money. I can make 200,000 Indonesian rupiah (£12) a day, but it depends on the price of the tin. If I work as a labourer the wages are very low and it is difficult to buy food.”

(Agricultural labourer’s day rate 70,000 Indonesian rupiah – £4.50).

“I need the money. I can make 200,000 Indonesian rupiah (£12) a day, but it depends on the price of the tin.”

“I used to be a miner, but when I saw the bad impact I stopped and went back to fishing. This beach used to be good before mining, it had no mounds of mud, it was white sand. Because of the dirty water from the sucking ships the fish have gone. There are usually lots of crab, not now. And this year there was no shrimp. The water is full of mud, sludge and sediment: the fish don’t like it and the coral reefs die.”

Azim, fisherman and protestor



Azim, fisherman and protestor

Eyewitness: “I used to be a miner, but when I saw the bad impact I stopped and went back to fishing. This beach used to be good before mining, it had no mounds of mud, it was white sand. Because of the dirty water from the sucking ships the fish have gone. There are usually lots of crab, not now. And this year there was no shrimp.

“The water is full of mud, sludge and sediment: the fish don’t like it and the coral reefs die. Before the giant dredgers and suction ships arrived we fished on bagan (traditional fishing rafts) closer to the shore. Now we are further out our operating costs (and fuel) are higher because it takes an hour to get to the places we fish. When bagan are far away there are bigger waves and bigger risk.”



Mistar, self-employed tin miner

Risking his life: “I work with a friend. We can collect 7kg of tin a day – that’s worth about 490,000 Indonesian rupiahs (£31). I came to Bangka to seek work. I’ve been tin mining for about two years. There has never been an accident here, thank God, but there are frequent accidents. In Jelitik village, about four months ago, five people were buried alive.”

“I work with a friend. We can collect 7kg of tin a day – that’s worth about 490,000 Indonesian rupiahs (£31).”

“The condition of the coral reef is getting worse as mining, both by communities and private companies, becomes more widespread.”

Indra Ambalika, marine scientist

Dr Hendry Jan, Intan Medika Clinic

Medical view: “Ex-mining holes are breeding grounds for mosquitoes. The incidence of malaria is now up to 29.3 per 1,000 people.”

Tono, turtle rescuer

Loss of heritage: “Before the sea mining, in 2004, there were 12 turtle nests. Last year there were only four. This year none. Turtles have beautiful shapes. It breaks our hearts that they are almost extinct here and our children and grandchildren will never be able to know them.”

“International companies that buy tin in Bangka island must be responsible for the environmental damage on Bangka island.”

Indra, marine scientist

Warning: “I am the team leader for the Coral Reef Exploration run by the University of Bangka Belitung since 2007. The condition of the coral reef is getting worse as mining, both by communities and private companies, becomes more widespread.”

“Approximately 60-70 per cent of Bangka’s coral reefs have died. When corals die many sectors are affected, not only fishermen, but also marine tourism. Fish can swim away and turtles move, but giant clam die when covered with sludge. There are no longer Napoleon fish.”

“The coral reefs protect the land – without marine protection land life is increasingly threatened. No big companies using tin have taken responsibility for rehabilitating coral reefs or marine ecosystem on Bangka island.”

Mr SH Mulkan, politician

On-the-fence: “Tin mining is the economic lifeblood of the Bangka Belitung people. It causes environmental damage and there are many ex-mine holes.”

“But the air quality is good, not like polluted Jakarta, and there is no malnutrition, no starvation, no people begging. It’s why mining is a real dilemma here in Indonesia.”



PT Timah, mining giant

World leader: PT Timah, the largely state-owned Indonesian mining company, dominates the tin business on Bangka after moving its head office here in the early 1990s. It runs the world’s largest tin smelting operation, processing 50,000 tonnes of tin a year.

It also has the world’s largest offshore mining fleet of 21 dredgers. The fleet works several kilometres offshore to a depth of about 50m, mining more than 3.5 million tonnes of material a month. The mineral deposits controlled by PT Timah – on and offshore – are known as some of the best in the world.

The company holds tin exploration and mining rights until 2025 for more than 10,000 km² spread across several islands and offshore areas in the Java sea,” reports Dutch company, IHC, which has long supplied it with specialist mining equipment.

PT Timah is on record as saying that it is committed to preserving the harmony of its production processes with the pristine condition of the environment, and that it aims to restore the habitat and biodiversity of former mining areas to their original or near original condition.



“Since the unofficial tin mining began my environment has been destroyed.”

Lee Sin Kun, daily labourer (pictured below)



↑ Unofficial miners in small crews operate a flotilla of homemade tin mining rafts, sucking up the ore with diesel-powered pumps. Friends of the Earth Indonesia (Walhi) estimates about 2,500 such rafts are mining Bangka’s coasts at any time. Mining within two miles of the shore is illegal but these rules are frequently ignored.

➤ Lee Sin Kun, a labourer who says his local environment has been destroyed by tin mining.

Lee Sin Kun and Ernawati, labourers

Lee Sin Kun and his wife Ernawati look exhausted by a life that’s become increasingly hard since unofficial mining spread close to their home. They cannot plant as many vegetables as they’d like because the mining land near their home was not restored after the big mining company moved on – they couldn’t say which company had operated the mine.

The acidic sub-soil exposed by mining is almost impossible to grow crops in – experts say that it can be gradually restored to fertility, but only with a focused, long-term programme. For years Lee Sin Kun and Ernawati have worked as agricultural labourers, paid 70,000 Indonesian rupiah (£4.50) a day – far less than an unofficial miner can make each day (the average find for a team of two working all day is 7kg of tin ore, worth 490,000 IDR (£31). “The owners of the private mining companies don’t care about the environment,” says Lee. “When I first lived here 30 years ago the soil and water condition and everything was good. But since the unofficial tin mining began my environment has been destroyed. In the dry season it is difficult to get water. Our neighbours, 30 or more families, took water from here, but this water cannot be drunk anymore.”

“Before the sea mining, in 2004, there were 12 turtle nests. Last year there were only four. This year none.”

Tono, turtle sanctuary worker

When tin’s your bread and butter

- > Agricultural labourer’s day rate 70,000 IDR (£4.50).
- > Sea tin miner can make 200,000 IDR a day (£12).
- > Schooling isn’t free. Fees are 143,000 IDR a month (£9).
- > 1kg of tin is bought from unofficial miners for about 50,000 Indonesian rupias (£3.25).
- > 7kg is the average find for a team of two working all day.
- > 7kg of tin is worth about 490,000 IDR (£31).
- > Tin dealers clean it up and will sell on at 70,000 IDR/1kg (£4.50).
- > One tin dealer told Friends of the Earth he bought 2.5 tonnes a week, and so was able to sell on to the smelters around 10 tonnes a month.

Why look at Samsung and Apple?

Friends of the Earth believes the world's two biggest phone brands, Samsung and Apple, should ensure that rules to protect people and the environment are enforced across their whole supply chains. Our investigation shows it's almost certain that both companies' products contain tin mined in Bangka – although Apple and Samsung might not have realised this or the damage caused by mining on the island.

Samsung

Samsung is the top-selling smartphone brand in Europe. It offers a wide range of handsets and as a result has a global reach like no other – in 2011 it sold 95 million smartphones – that's nearly one in five of all smartphones sold worldwide (19.5 per cent of the global market share). In fact just one model, the Galaxy S, launched in June 2010, and updated Galaxy S2 and S3, has already sold more than 42 million. Samsung Electronics is South Korea's biggest company and has extended its reach as an Olympic Games 2012 partner and Chelsea football club sponsor.

When Friends of the Earth investigators contacted Samsung Electronics prior to publication to ask if the company sourced tin from Bangka or was aware of the damage tin mining is causing the island's communities and ecosystems, a Samsung spokesperson neither confirmed nor denied this. In a statement, the company said it took the issue of ethical sourcing of minerals very seriously. "Samsung is committed to upholding the highest standards of corporate responsibility, and we continue to evaluate our sourcing policies to ensure they comply with global standards associated with our industry," said a spokesperson. "We will monitor the Bangka Island situation to determine if an investigation into whether tin in our supply chain is being sourced from the region is required."

Despite Samsung's recent patent rows with Apple (leading to a fine of US\$1.05 billion) it has an intricate relationship with Apple, supplying micro-processors, flat screens and memory chips to Apple's iPod, iPad and iPhone! Chips and microprocessors contain tin wire and tin solder. Samsung has already shown it can improve production to protect people and the planet when it chooses to. For example it has reduced greenhouse gas emissions by 40 per cent since 2008 and phased out two hazardous substances from all its mobile phones and MP3 players since April 2011.

Samsung could make a huge difference if it took responsibility for the impacts of its supply chain.

Where's the tin from, Samsung?

During Friends of the Earth's research Samsung was identified as a buyer or user of Indonesian tin via the supply chain of PT Timah.



“We’re thrilled with record sales of 17 million iPads in the 2012 June quarter.”

Tim Cook, Apple CEO

Apple

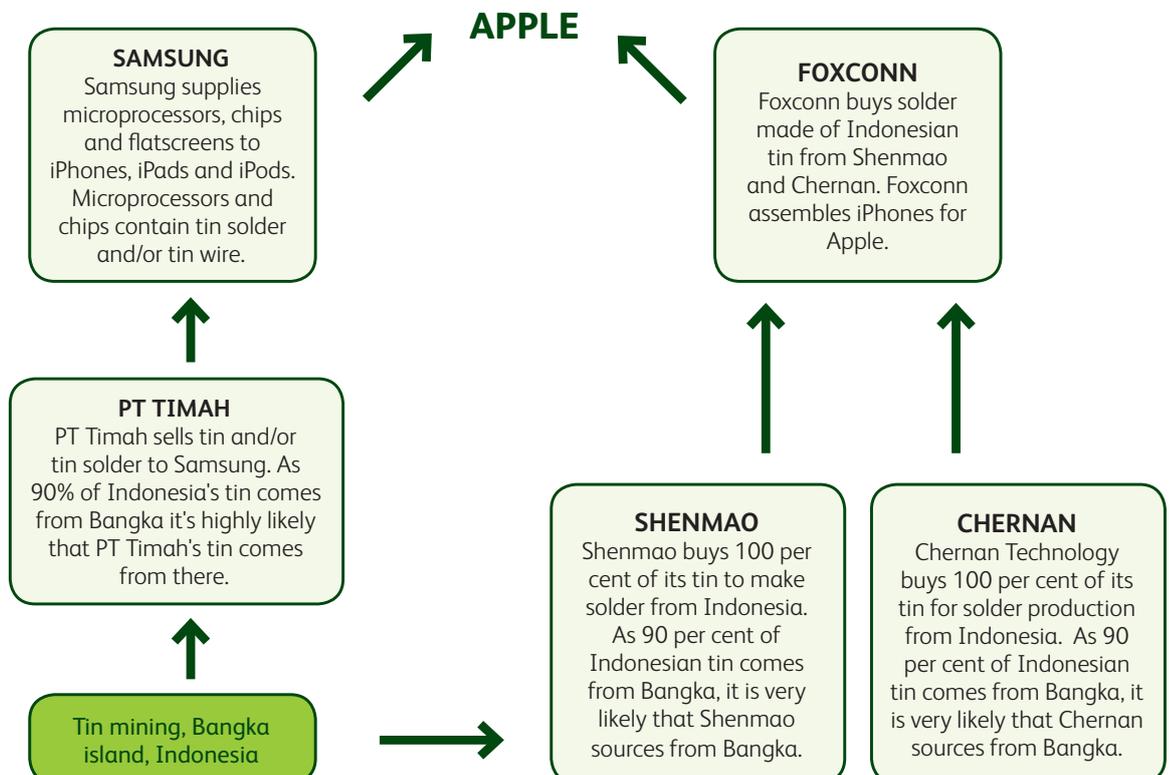
Apple is the pioneer of iconic products such as the iMac, iPad and iPhone. Based in California, Apple has 70,000 employees worldwide and reached a stock value high of US\$623 billion in August 2012 – making it the biggest company in US history.

Apple’s reputation stems from its design values. For example although more powerful, today’s iMac is designed with 50 per cent less material and generates 50 per cent fewer emissions than the first-generation model. But this attention to detail doesn’t yet appear to include the supply chain impacts of the product. As Dr Craig Jones, from resource efficiency company Sustain, puts it, “Apple is predicted to sell 17 million iPhone5s over the next year (2013) and adding up the extra carbon per handset this would result in 3.4 million tonnes of CO2e (carbon dioxide equivalent) more being released into the atmosphere than the model it’s replacing. That’s a lot of additional carbon at a time when we are trying to reduce global CO2e emissions.”

Apple says that it takes “responsibility for minimising the environmental impact of our operations and products. We require our suppliers to comply with local laws and regulations and use environmentally responsible manufacturing processes wherever Apple products are made.”

When Apple was linked to tin mining in Bangka island by *Business Week* in August 2012, it declined to comment on the identities of any of the tin refiners in its supply chain or their locations.ⁱⁱ When asked by Friends of the Earth researchers before publication if the company sourced tin from Bangka or was aware of the damage tin mining is causing the island’s communities and ecosystems, a spokesperson for Apple Europe neither confirmed nor denied this. However, he told us that “Apple was one of the first major electronics companies to completely map its supply chain in order to trace the materials used in our products back to their source” and directed us to a table listing Apple suppliers that use tin, tantalum, tungsten or gold to manufacture components for Apple products and the smelters they source from. However this table, in Apple’s 2012 Supplier Responsibility Progress report,ⁱⁱⁱ does not name a single supplier, giving only the total number of suppliers and smelters. When pressed for more information, he referred us back to the same table.

In this report, Apple requires suppliers to only use materials that have been procured through a conflict-free process and from sources that adhere to its standards of human rights and environmental protection. The company says its commitment to social responsibility extends to the source of raw materials used in the manufacturing of its products.





↑ Miners working at a tin ore mine in Tanjung Pesona, District Sungai Liat, Bangka, Indonesia. The country is the world's largest exporter of tin, and 90 per cent of it is from Bangka-Belitung province.

→ Rohim, a fisherman from Rajik Village in Bangka's Payung District, who helped organise a petition with other fishermen to keep mining dredgers out of the bay and protect their livelihoods.

Where's the tin from, Apple?

Friends of the Earth's research has identified middle companies Samsung and Foxconn in Apple's supply chains; these middle companies' suppliers include PT Timah, Shenmao and Chernan which each use very substantial quantities of Indonesian tin as the chart on page 21 illustrates. Tin from Indonesia almost certainly ends up in Apple's products.

What can Samsung and Apple do next?

We know from experience that when companies have to report on the human and environmental impacts of their products, fewer problems in the production process go undetected. New rules obliging companies to account for their impacts would be an incentive to improve production. But many companies – even those which are trusted brands – won't disclose the full environmental and social costs of their products until they're made to.

That's why Friends of the Earth is challenging Samsung and Apple to tell us if their phones contain tin that's linked to the destruction of forests and coral reefs in Bangka.

As major users of tin and hugely influential brands that deal with companies buying tin from Bangka-Belitung province, we're also calling on these smartphone giants to:

- > Bring together affected parties in Bangka to agree and implement a plan to halt environmental and human problems caused by tin mining.
- > Back new rules for all companies to come clean about how they do business (see page 26).

We don't have all the answers for Bangka. But as a crucial first step Friends of the Earth and our colleagues in Friends of the Earth Indonesia, Walhi, want Samsung and Apple to bring together all the affected parties to agree and implement a plan to halt environmental and human problems caused by mining. Finding a solution will need to involve miners, fishermen, government and other community groups. Friends of the Earth believes mining firms shouldn't be allowed to operate without community consent, cleaning up properly afterwards and avoiding operating in precious ecosystems and habitats.

To help prevent these sorts of problems happening elsewhere in the world and to ensure that companies make our favourite products in a way that's within the limits of our planet's ability to support us, we're asking Samsung and Apple to support Europe-wide legislation requiring full reporting on product supply chain impacts.





↑ Experts say smarter design could lead to greener phones that can charge in 30 seconds and be taken apart in minutes for easy repair.

Design solutions

What will the next generation of phones be like? Tim Cooper, Professor of Sustainable Design and Consumption at Nottingham Trent University, looks at just some of the ways phone manufacturers could reduce the impact of their products on the environment – from design innovation and technological advances to improved production processes. We're not asking for the impossible – today's slim handsets are a long way from the brick-like models of the 1980s and likely to be very different from the phones of the future.

Reinventing phones

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Mobile phone design is constantly evolving. Although mobile phones with reduced environmental impacts have been developed,

progress has been inadequate and advances in greener models are often not integrated across a company's entire range. Here are 10 steps towards greener phones.

1 Promote longevity

Increasing product lifetimes should be a priority, as proposed in the Government's Waste Policy Review.^{iv} Mobile phones currently have short lifetimes, typically 18 months in the UK. One Swiss study concluded that extending service life from one year to four years would decrease environmental impacts by about 40 per cent.^v

2 Choose better materials

Appropriate materials are essential for sustainability. Alternatives exist to the fossil fuel-based plastic normally used for mobile phone casing: recycled plastic, polylactic acid plastic (PLA) derived from corn starch or glucose (which is renewable and biodegradable), metal (durable, but heavier) or even bamboo (to be used in the new ADzero phone). While there have been examples of greener materials being used – the Nokia 3110 Evolve was made from 50 per cent renewable

70 per cent of buyers already have compatible chargers for the 30 million new phones sold annually.

materials, the plastic in Motorola's Renew W233 from recycled water bottles – use of recycled plastic or PLA plastic should by now be the norm.

3 Design for ease of repair or upgrade

All mobile phones should be designed for ease of repair or upgrade – this is currently not the case. Adhesives, for example, hinder disassembly. The iPhone has been notorious for use of non-replaceable batteries and special screws that prevent users from opening them.^{vi} Alternatives are possible. One of Nokia's concept phones has a modular camera that could be upgraded if technology improved and only one screw was required to open it for repair or recycling. Another is designed to be taken apart in two minutes.^{vii}

4 Phones that use less energy

Further steps could be taken to reduce the energy impact of mobile phones. More effective batteries and chargers are important. The new organic radical battery (ORB) does not use heavy metals and can charge in just 30 seconds, saving hours of energy use; there is speculation that it will be used in the next iPhone.^{viii} Software tweaks have been introduced to reduce the power consumption of the Sony Ericsson Elm, such as a reducing the time it takes to open apps.^{ix}

5 Sort out the accessories

Packaging, manuals, chargers and other accessories could be improved. For example, supplying a new charger with each phone is wasteful: 70 per cent of buyers already have compatible chargers for the 30 million new phones sold annually.^x While progress toward a unified phone charger appears to have stalled, HTC recently announced plans to sell O2 mobile phones without chargers.^{xi}

6 Apps to encourage green behaviour

The potential for add-on technologies that contribute to sustainability, as proposed in the Dutch initiative Our Mobile Generation backed by Vodaphone, needs to be explored.^{xii} The Sony Elm, for example, has a "Walk Mate" Eco App which works out how much walking the owner has done and the carbon saved compared with driving.

7 New business strategies

Too many companies are locked into a business model in which profitability depends on maximising sales, which in saturated markets might encourage short life-spans of products.^{xiii} Different business models need further exploration.^{xiv} Companies need means of generating revenue other than selling new products. Leasing, refurbishment for resale and raising the quality and profile of after-sales services are all possibilities. Marketing

strategies shape people's expectations of product lifetimes. The current norm is for mobile phones to be sold on two-year contracts. Moving to a three-year renewal norm would slow down replacement, leading to an increase in average lifetimes of up to 50 per cent.

8 Increase recovery rates

Mobile phones need to be developed within what's known as a circular economy, ideally based on the "closed-loop" principle of reusing all materials from discarded products in the manufacture of the same type of product. The Ellen Macarthur Foundation has argued that the collection of mobile phones ought to increase from its current level of 15 to 50 per cent.^{xv} It suggests that the cost of remanufacturing mobile phones (preferable to recycling) could be halved per device if the industry made changes such as making phones easier to take apart and offering incentives to return phones.^{xvi}

9 Increased recycling

The vast majority of discarded phones are still functional. Once phones are beyond refurbishment and reuse, recycling is necessary, although in recent years it has become less profitable.^{xvii} Design could play a part. All mobile phones should in future be made of recyclable materials. The Nokia 5 Year Phone was made of 85 per cent recyclable components, using a single colour for plastic so that it was easier to identify and recycle.

10 Be open about how products are made

We need companies to be more open about the materials they use and how easy it is to repair, upgrade and recycle a phone. More environmental information should be available to the public, communicated through company reports and information at the point of sale.

Not sure what to do with your phone?

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All phone stores offer take-back options, and there are dozens of companies that will buy your old mobile. Some sites, such as www.shpforcharity.co.uk, let you donate to a charity of your choice at the same time. Every hour more than 1,000 mobile phones are replaced. And it's estimated that 85 million phones are lying in drawers, unused in homes – that's a huge amount of material that could be reused.

The bigger picture

How transparent supply chains could improve the impact of European businesses on people and the planet.

The problem of tin mining on Bangka isn't an isolated horror story. It's only one example of the sort of poor business practices across different sectors all around the world. Many shoppers think it's their responsibility to reduce the environmental impact of the things they buy and use, and go out of their way to take great care choosing, reusing, recycling and so on. But as *Mining For Smartphones: the True Cost of Tin* reveals, it's just not possible always to know which brands are contributing towards environmental damage, let alone taking steps to reduce the environmental impact of their products. The good news is that a shift in attitude by business, enforced through government regulation, could make ethical shopping less of a minefield.

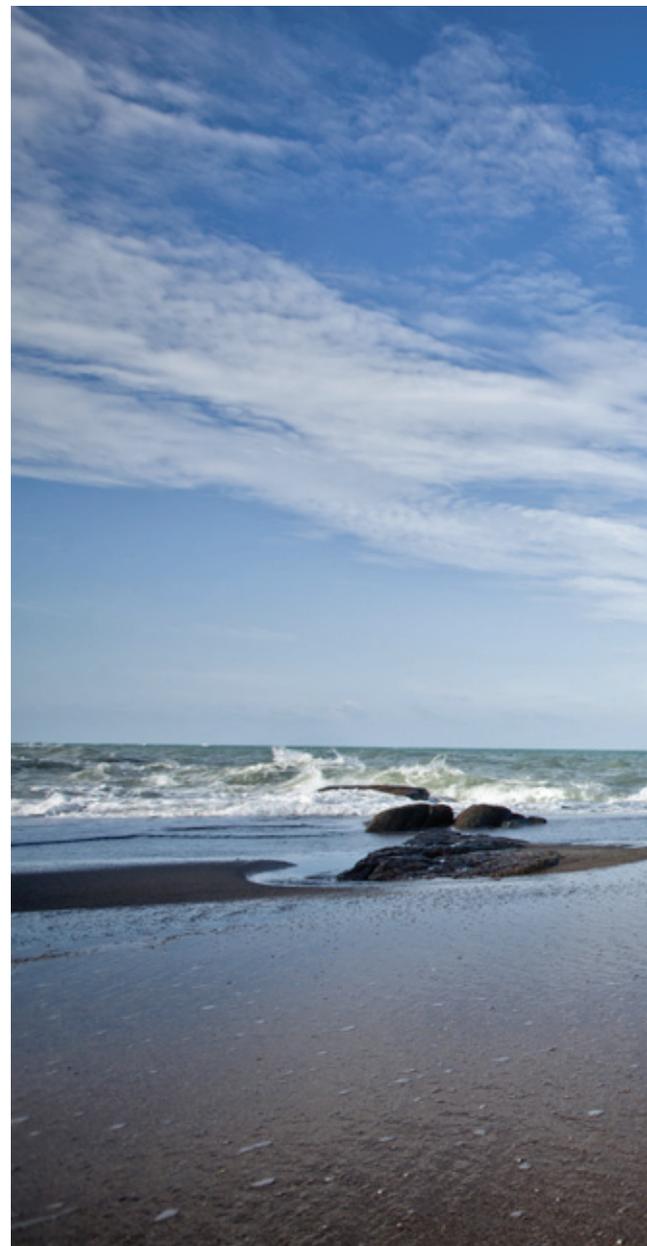
Europe is the biggest net importer of natural resources and is dependent on secure and constant sources of minerals, metals, energy, feed, fuel and fibre. But we're using too much, too fast. WWF research shows we're using 50 per cent more of the Earth's natural resources a year than the planet can safely provide.

Being open and transparent about operations has big economic benefits.

- > A 2007 study by Goldman Sachs found that companies considered leaders in environmental, social and governance policies also lead in stock market performance.
- > A report by German investment managers West LB found that producing a corporate sustainability report is one the most important factors contributing to long-term financial viability of a company.
- > A 2011 report by Business in the Community on the business case for responsible business found: "Companies that consistently manage and measure their responsible business activities outperformed their FTSE 350 peers on total shareholder return (TSR) in seven out of the last eight years."^{xviii}

Already the best businesses recognise that a shortage of resources is a serious threat to growth and profitability. They are introducing closed-loop practices to cut down waste generated during manufacture and at the end of the product's life. This benefits businesses too: M&S's plans to become the "world's most sustainable retailer" has seen it make £185m in net benefits over five

Nine out of 10 EU citizens believe that Europe could be more efficient in its use of resources



Right now one of the most important changes is for companies to disclose much more information about their business operations. Friends of the Earth wants to see regulations so that companies must account for the full environmental impact of their supply chains, including using four key measurements that show how much land, water, materials and carbon have been used to make a product.

↓ Friends of the Earth wants companies to look at the bigger picture and take responsibility for the impact of their operations all the way along the supply chain. Economic growth, the wellbeing of people and our environment are all fundamentally connected.



years. It has made changes so that 28 per cent less energy is used per square foot of retail space – which saves the company money too.

Soft drinks manufacturer Britvic has seen profits grow as it rolls out more efficient chiller units and a commitment to cutting water use by 20 per cent by 2020 (compared to 2007).

Environmental problems can't be solved in isolation – the answers are social and economic. Right now one of the most important changes is for companies to disclose much more information about their business operations. Friends of the Earth wants to see regulations for companies to account for the full environmental impact of their supply chains, including using four key measurements that show how much land, water, materials and carbon have been used to make a product.

A standard system obliging large companies to report on their environmental and social impacts would help them identify and deal with risks and inefficiencies in the system. That would also benefit investors looking for more certainty about how their money is likely to fare. And it would help governments identify policies to encourage companies to be more resource efficient and take better care of the environment.

Over time, when the right alternatives are in place, economic incentives could play an important role. According to Professor Tim Cooper, “progress towards sustainability in production and consumption requires the right price signals. The most effective means to this end would be for taxation to reflect a product's environmental impact.” He suggests a revenue-neutral scheme (not requiring any overall change in the level of tax) that would shift taxation from labour to energy and raw materials.

“Activities such as redesign, refurbishment and upgrading, being labour-intensive, would benefit from lower employment taxes (such as employers' national insurance contributions), while raising the cost of energy and primary materials through higher taxes would provide an incentive to resource efficiency practices such as recovery, the reuse of products and components, and recycling,” he argues.

Achieve this, and in 10 years Britain and Europe could be firmly on the road to a new kind of future – one that isn't just conserving the beauty of our fragile planet, but has let us rethink how we live in order to sustain our only home.

Benefits of a transparent supply chain

A transparent supply chain allows interconnected businesses to report on the human, social and environmental costs of what they do.

If enough standardised information is provided the end retailers, often very well-known global brands, could insist their suppliers work towards improvements by a certain date.

No longer can there be the excuse from the boardroom that “we didn’t know”. It’s vital that the amount of land, water, materials and carbon emissions that are used in making products is revealed in an improved supply chain report.

The best businesses can use their global expertise and well-trained staff to help the companies they work with to meet these requirements.

- > **Water:** It takes 3,900 litres of water to make a single T-shirt - that’s the equivalent of filling 15,600 cups of tea.
- > **Materials:** There is more gold in a tonne of mobile phones than there is in a tonne of mined rock from a gold mine, and it’s far easier to extract it from a phone than from a mine.
- > **Carbon/climate:** The carbon footprint of a pint of milk is 72g – that’s about the same amount of carbon emissions released during a 2 mile car journey.

Smartphone footprint

- > Samsung sold around 95 million smartphones in 2011 – producing these used up enough water to fill the Royal Albert Hall 500 times and an area of land more than twice the size of the whole of Birmingham.
- > Apple sold around 93 million smartphones in 2011 – producing these used enough water to fill Wembley Stadium more than 80 times and an area of land more than three times the size of Glasgow.

Why aren’t natural resources on my receipt?

It takes an area of land equivalent to one and a half times the size of Europe (640 million hectares) to make all the products in Europe. Even items like a T-shirt or the milk for a cup of tea can have a huge footprint. Did you know:

- > **Land:** The top 10 phone manufacturers sold around 454 million smartphones in 2011. Producing these gadgets uses up an area of land more than twice the size of New York.

What about labelling?

Labelling is useful when you’re trying to identify healthy food or items that respect the rights of the people who produce them.

However, labelling isn’t the answer when it comes to listing complicated supply-chain information. As for showing how much of the Earth’s resources have gone into a particular product, such as fresh water or the land needed for raw materials – it’s hard for the shopper to draw anything meaningful from such figures. And when it comes to items with many components (such as mobile

phones) it would be difficult to squeeze all the relevant information on to a label. Shoppers are already bombarded by information, prices and special offers. What would make life easier is the confidence that everything on sale is produced in a way that doesn’t irreparably damage the planet we depend on.

Right now the people who can do this are the manufacturers. If they really don’t know the details of their supply chain, maybe it’s time they found out.

→ Workers at a tin mine in Tanjung Pesona, District Sungai Liat, Bangka.



BERSAMA SAMA MELAKUKAKAN
Mendukung
ZAMAN
KORPRIKORPRI
DHE MICK



The Make It Better campaign

Please join our Make It Better campaign calling for new laws for business.

Some products put an unacceptable burden on the planet. Who would have guessed that mining tin, which might end up as a 7g component in a smartphone could cause such a chain of human and environmental suffering on a far-away island?

Mining For Smartphones: the True Cost of Tin reveals the devastation tin mining is causing in Bangka, Indonesia, whether that tin ends up in phones, electronic gadgets or other items. To help prevent problems like Bangka happening, we need new laws obliging companies in Europe to report on the human and environmental impact of their operations.

Our new Make It Better campaign is far bigger than just sorting out bad choices that might be made by the best-known phone brands. It aims to tackle the way business puts a dangerous strain on our planet and turn around the suffering this causes so many people. Companies already report on finance. But non-financial reporting is crucial too, because economy, people and environment are all bound together; they cannot be thought of separately. Just look at Bangka.

Friends of the Earth is part of the European Coalition for Corporate Justice (ECCJ), which is

working to bring these new laws about through the European Parliament as part of its reform of the EU Accounting Directives.

Q: Why will new laws making companies report on human and environmental impacts of their business make a difference?

This extra non-financial reporting would be better for investors, stakeholders and businesses because it will make it easier to assess company sustainability, identify problems and risks, and then deal with them.

“The strong business case for comprehensive and comparable non-financial reporting is now widely recognised. The Commission’s renewed EU strategy 2011-14 for Corporate Social Responsibility makes reference to the benefits of reporting for businesses, including increased competitiveness, improving business credentials, and ensuring a level playing field for businesses operating across Europe. Transparency and accountability on financial and non-financial impacts are key to restoring a level of stability and predictability to financial markets, as well as shareholder and stakeholder trust in business, which together are the foundation of a sound economic recovery.”

(ECCJ Position Paper, EU legislation on non-financial reporting by companies)

“Companies have to take responsibility for their impacts, and that includes making sure the products they make are designed so that once they’re done with, we can reuse those materials again.”

Friends of the Earth campaigner, Julian Kirby, after visiting Bangka in August 2012 as part of our research team



The strong business case for comprehensive and comparable non-financial reporting is now widely recognised.

Q: How detailed would new company law need to be?

Friends of the Earth and our allies in the ECCJ are calling for new regulations to ensure companies report on human rights and environmental impacts. The new reporting criteria should include naming suppliers, reporting on key impacts and measuring the four footprints of a business at company level; and inclusion of human rights. Key impacts, for example, might include how much land a company uses for its operations, which could contribute to pressure on farmland available to grow food or loss of natural habitats like forests. It's crucial that non-direct impacts are included because businesses have many suppliers. A phone brand may not seem to be affecting biodiversity adversely, but some of the companies it deals with may well be having devastating impacts on people and planet, as this report details on Bangka island.

Q: Why four measurements to help improve Europe's resource efficiency?

Friends of the Earth, working with Sustainable Europe Research Institute in Vienna, has focused on four new indicators for the EU to measure and reduce its resource use. These figures need to include the resources used within the EU and the

production of imported goods. Here's how:

- > Land: the total area used in hectares;
- > Materials: the total tonnage used, divided into biological and mineral materials;
- > Water: water footprint, measured in litres;
- > Climate: carbon footprint, including the carbon emissions associated with imported products.

If all companies had a transparent supply chain, which included these four indicators in their annual reports, it would help to ensure that business practices like tin mining in Bangka island would not be so harmful for people and planet.

Q: How can I help bring about this new law and help people on Bangka island?

Please join Friends of the Earth's Make It Better campaign. We're calling on Samsung and Apple to help end the devastation on Bangka island and support tough new rules to make companies reveal their impacts.

www.foe.co.uk/makeitbetter

[#makeitbetter](https://twitter.com/makeitbetter)

www.facebook.com/wwwfoecouk

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Content for 'What else is in my phone?' on page 7 is from Sheffield Hallam's University's What's In My Stuff? team, Dr Hywel Jones (material scientist), Dr Maria Hanson (silversmith and artist) and Dr Karen Vernon-Parry (material scientist), funded by EPSRC and Harsco Metals and an Engineering For Life Project. www.whatsinmystuff.org

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For more than 40 years we've seen that the wellbeing of people and planet go hand in hand – and it's been the inspiration for our campaigns. Together with thousands of people like you we've secured safer food and water, defended wildlife and natural habitats, championed the move to clean energy and acted to keep our climate stable. Be a Friend of the Earth – see things differently. For further information visit www.foe.co.uk