Nokia due diligence report: summary

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September 2010

1. Introduction

IUCN is exploring opportunities for engaging with Nokia (hereafter referred to as “Nokia” or “the company”) on issues. IUCN China undertook a due diligence on Nokia in 2008, ahead of engaging with the company on a watershed management programme in Miyun County. The present report extends on this existing due diligence, specifically looking at: environmental impacts of mobile devices and accessories; health risks associated with mobile devices; industry and government initiatives, regulations, and commitments for reducing the environmental impact of mobile devices; and Nokia’s work to reduce the environmental impacts of its mobile phones, operations, and supply chain. It also updates the reputational analysis of Nokia in the media.

2. Environmental impact of mobile devices and accessories

2.1. Overview

Various studies, including several conducted by or in cooperation with Nokia, have investigated the environmental impact of mobile phones over their lifecycle. A 2007 report[1] from the European Commission’s Integrated Product Policy (IPP) Pilot Project on Mobile Phones concludes that the component manufacture phase and use phase have the biggest environmental impacts, and that the most important environmental issue for all lifecycle phases is energy consumption — with one analysis finding that carbon emissions account for 94% of the Ecological Footprint of a mobile phone[2]. Nokia’s own Life Cycle Assessment, which reports

2.2.

2.2.1. Components

A mobile phone is made of 500–1,000 components, most of which are made of a large number of materials, including metals, plastics, glass, and ceramics. The basic components are:

Handset: case, display or screen with glass cover, keypad, antenna

Printed circuit board: integrated chips, resistors, capacitors, and wires

Battery

Microphone

Speaker.

2.2.2. Materials

A typical mobile phone contains:[5]

Plastics (40%)

Glass and ceramics (15%)

Copper and compounds (15%)

Nickel and compounds (10%)

Potassium hydroxide (5%)

Cobalt (4%)

Lithium (4%)

Carbon (4%)

Aluminium (3%)

Steel, ferrous metal (3%)

Tin (1%)

Bromine, cadmium, chromium, lead, manganese, silver, tantalum, titanium, tungsten, zinc (minor constituents; <1%)

Antimony, arsenic, barium, beryllium, bismuth, calcium, fluorine, gallium, gold, magnesium, palladium, ruthenium, strontium, sulphur, yttrium, zirconium (microconstituents; <0.1%)4timony3%)5-.1%ndA-6(iles(1)-6(,)5.1(ve)2(ste

2.2.3. Toxic substances

Toxic substances and chemicals present in mobile devices include, or have included in the past:

- Heavy metals (e.g., lead, mercury, cadmium, chromium, and beryllium)
- Brominated flame retardants
- Antimony
- Phthalates

Polyvinyl chloride (PVC; not hazardous in itself, but releases dioxins and furans when burned

Nokia has reportedly said that bromine is responsible for most of the embedded toxicity in a mobile phone[6] (see also section 5.3 for substances no longer present in Nokia mobile phones).

2.3. Impact of different lifecycle phases on biodiversity

The main lifecycle phases of mobile devices and accessories are:

- Extraction and processing of raw materials
- Component manufacture
- Transport of components to an assembly plant
- Product assembly
- Transport of the final product to a sales outlet
- Use
- End-of-life.

This section summarizes the environmental impact of these phases.

2.3.1. Extraction and processing of raw materials

Most raw materials for electronic products are obtained through extractive activities such as mining. Mining operations account for around 6% of the Ecological Footprint of a mobile phone[7], with mining for gold reportedly accounting for most of the impacts during this lifecycle phase[8]. Many coltan (ore containing tantalum) mines in the Democratic Republic of Congo are located in Kahuzi Biega National Park; mining in the country has been associated with serious ecosystem degradation as well as militia activity and human rights abuse[9].

The main impacts of extractive activities on biodiversity are:[10]

Habitat loss

Through removal of habitat and geological features by extractive activities, as well as storage of large

57% of total energy use, and 78% of total greenhouse gas emissions, over the lifecycle of a typical Nokia mobile device [11].

Increased access to previously undeveloped and remote areas
Through roads or other infrastructure built for mining and other extractive operations, which can facilitate further damaging activities including small-scale mining, hunting, logging, and fishing.

Some of the plastics used to manufacture Nokia products are derived from biomaterials produced from agricultural crops. Impacts of agriculture on biodiversity include: [12,13,14]

Habitat loss
Through clearing of natural habitats for farming land, and especially for intensive monoculture, as well as erosion and salinization.

Climate change
Through the release of greenhouse gases from fertilizers, land burning, agricultural residues, and ploughing.

Hydrological changes
Through excessive water use and freshwater withdrawal for irrigation.

Water and soil pollution
Through the use of pesticides and fertilizers.

Genetic erosion of crop species
Through the replacement of traditional and local species and varieties with more universally farmed varieties.

Most of these impacts are at a local scale, occurring at and around mining or agricultural operations. The major exception is climate change, which has a regional and global impact on biodiversity and ecosystems.

2.3.2. Component manufacture

The component manufacture phase has a large environmental impact, primarily from energy consumption by manufacturing processes. Component manufacturing processes also use large amounts of chemicals and water. The components with the highest environmental impacts are printed circuit boards (also called printed wiring boards), integrated circuits, and liquid crystal displays (LCD)[15]; one study reportedly concluded that 40–50% of the environmental impacts over the entire lifecycle of a mobile phone occur from manufacturing printed circuit boards and integrated circuits[16]. The main impacts of these component manufacturing processes on biodiversity are:[17,18]

Climate change
Through the use of fossil-fuel-based energy for manufacturing processes. The raw materials and component manufacture phases together account for 57% of total energy use, and 78% of total greenhouse gas emissions, over the lifecycle of a typical Nokia mobile device [19].

Air, water, and soil pollution
Through the release of toxic or harmful chemicals or their breakdown products (such as solvents, photo-initiator chemicals, flame retardants, phthalates, heavy metals, and nonyl phenols) during manufacturing processes and/or from manufacturing waste. In a 2007 report[20], Greenpeace concluded that commonly used wastewater treatment processes are unable to deal with many of the chemicals used in component manufacturing processes, including certain brominated flame-retardants and heavy metals.

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[11] http://www.nokia.com/environment/devices-and-services/creating-our-products/environmental-impact
[12] http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm
[13] http://assets.panda.org/downloads/agwaterusefinalreport.pdf
[14] http://cmsdata.iucn.org/downloads/agriculturalecosystems_2.pdf
[15] http://ec.europa.eu/environment/ipp/mobile.htm, European Commission IPP Pilot Project on Mobile Phones first stage final report
[16] http://www.secret-life.org/cellphones/cell_environment.php
[17] http://www.greenpeace.org/international/Global/international/planet-2/report/2007/2/cutting-edge-contamination-a.pdf
[18] http://ec.europa.eu/environment/ipp/mobile.htm, IPP Pilot Project on Mobile Phones first stage final report
[19] http://www.nokia.com/environment/devices-and-services/creating-our-products/environmental-impact
[20] http://www.greenpeace.org/international/Global/international/planet-2/report/2007/2/cutting-edge-contamination-a.pdf

km[29]. Another calculation states that the energy required to transmit mobile phone calls across the network is about three times that required to manufacture and charge the phone for a typical 2-year lifetime, and that the emissions from 1 hour of mobile phone talk-time per day for a year are equivalent to the emissions from flying from London to New York[30]. *Changes to wildlife behaviour and reproduction*
Through exposure to electromagnetic radiation from base stations (suggested for house sparrows[31]

Export of e-waste (including mobile devices and accessories) from developed countries to developing countries

3.1.1. Policies

Nokia Code of Conduct
The *Nokia Code of Conduct*

3.1.3. Performance highlights

At the end of 2009, 92% of direct suppliers' sites — which accounted for more than 98% of hardware purchasing expenditure during the year — were certified to ISO 14001.

In 2009, 93% of commodity suppliers had company-level reduction targets for energy, carbon dioxide (equivalent), water, and waste in place. Such suppliers have the highest environmental impact from a lifecycle analysis perspective, and represent 70% of Nokia's overall hardware expenditure.

From July 2009, Nokia began replacing its previous supplier self-assessment system with that developed by GeSI and EICC (see section 4.1.6).

3.2. Raw materials

3.2.1. Strategy

Nokia's main objective is to know all the substances in its products, not just those that raise concerns, and that all substances are safe for people and the environment when used in the proper way

Meeting health and environmental regulatory requirements is a basic requirement, but the company aspires to go beyond legislation and compliance

Nokia follows the precautionary principle, which may lead it to voluntarily take steps, e.g. to substitute substances of concern with safer alternatives, where feasible alternatives are available

Nokia aspires to proactively drive the development and efficient use of more sustainable materials.

Nokia does not source or buy metals directly, and points out there are typically four to eight supplier layers between Nokia and any mining activities. Nokia says it is very concerned about poor practices at some mine operations and is actively working to tackle these issues, through:

Increasing supply chain transparency of these materials

Understanding the commitments of each supply chain tier

Working at an industry level (through the Global e-Sustainability Initiative and the Electronics Industry Citizenship Coalition extractives working group) and with stakeholders

Working with suppliers to understand how it can promote standards and use alternative new substances, such as biomaterials.

3.2.2. Targets

The *Nokia Substance Aeatr(o)-3(e)3.2-3(e)33(e)3.2 wro(s)7(t)-5.2(epgTw9ec.0008)-7(n)-6(e).1(1)]TJ 0 -1.8 TD-.004Tc-.005Tw[(op)-5(era*

3.2.3. Performance highlights

The 5140i was the first EU RoHS compliant mobile phone in the market, and all new mobile devices have complied with the Directive from 2006

All new mobile devices and chargers have been free of PVC from 2006, and of brominated and chlorinated compounds and antimony trioxide from 2010

Mobile devices and accessories do not contain substances included in the current EU candidate list of Substances of Very High Concern

First mobile phone manufacturer with full material declaration for mobile devices

Work and management practices

Reduce work-related travel and commuting by increasing remote work and remote working possibilities and reduce office space to gain savings in energy consumption and CO_2 emissions.

Offer employees the possibility to offset their air travel CO_2 emissions

Utilize energy-saving technologies in offices and in office equipment/hardware.

Participation in external initiatives

Continue to investigate opportunities to join further voluntary initiatives promoting energy efficiency across the industry

Provide solutions and influence policy makers to realise the role and potential of ICT in reducing economies overall energy consumption when addressing climate change policies.

3.3.3. External targets.

WWF's Climate Savers Program

In addition to the commitments mentioned above (section 5.4.2), under this programme Nokia committed to:

Use green electricity for 25% of total Nokia electricity consumption for the period 2007–2009, with an aim to increase it to 50% in 2010.

European Commission IPP Pilot Project on Mobile Phones

Under voluntary agreements made in stage 5 of the project[46], Nokia committed to:

Introduce an environmental index for product energy efficiency by 31 October 2008

Add a visual reminder on phone screens to unplug the charger from 2008, with all new product lines/families

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3.3.4. Performance highlights

Products and services

Reduced the average no-load energy consumption of chargers by over 80% over the past decade, and of best-in-class chargers by over 95%

Says it is on track to meet its 2010 target of reducing no-load charger consumption by 50% from 2006 levels

Based on the IPP Pilot Project on Mobile Phones voluntary agreement (section 4.1.3), Nokia together with other manufacturers created and began using a Mobile Device Charger Energy Rating at the end of 2008

All new Nokia chargers meet, or go beyond, the highest criteria of voluntary agreements such as the EU

3.4.2. Performance highlights

Products

Started a pilot that gave customers the option of buying mobile devices without chargers (N79 in Nokia online stores in UK, Spain, Italy and France)

Reputation

3.7. Overview

Nokia appears to have a good reputation, . The Nokia entry on Wikipedia does not mention any controversies, the company has been named as Dow Jones Sustainability Index World Technology Supersector Leader for the last two years, and it was ranked top in each of Greenpeace's quarterly greener electronics rankings in 2009.

4. Methodology

Except where indicated, the information on Nokia in this report was taken from the Nokia global website[64] and the *Nokia Sustainability Report 2009*[65].

Internet searches

The following search engines were queried (English results only) over the period of 30 September–1 October 2010:

Google
Google News

The following search terms were used:
Nokia; Nokia environment; Nokia controversy; Nokia biodiversity

5. Conclusion /Summary

The materials used in Nokia products and processes must be safe to people and the environment. Meeting health and environment regulatory requirements is a priority and a basic requirement for them. Nokia is an industry leader in substance management. They promote innovative and sustainable material choices and work on this in close collaboration with suppliers. (e.g. their use of bio plastics in their covers since 2007). Other recent product launches (The Nokia C7 and the Nokia C6-01) both introduce innovations in sustainable use of materials. (bio paints). Packaging is 100 % recyclable. All of the materials in Nokia devices can be used again to make new products or generate energy, so nothing is wasted.

Nokia is growing rapidly and has identified a need to work with environmental organisation like IUCN to further their ambition in environmentally sound developments. One main component of this is to match their vast media / customer channels to communicating environmental issues. We are developing a “frame” partnership with

following on from a similar report for the Miyun watershed funding. Both reports present a generally positive view of the potential engagement between IUCN and Nokia. The report also serves as a benchmark for identifying further areas of collaboration.