

Towards green electronics

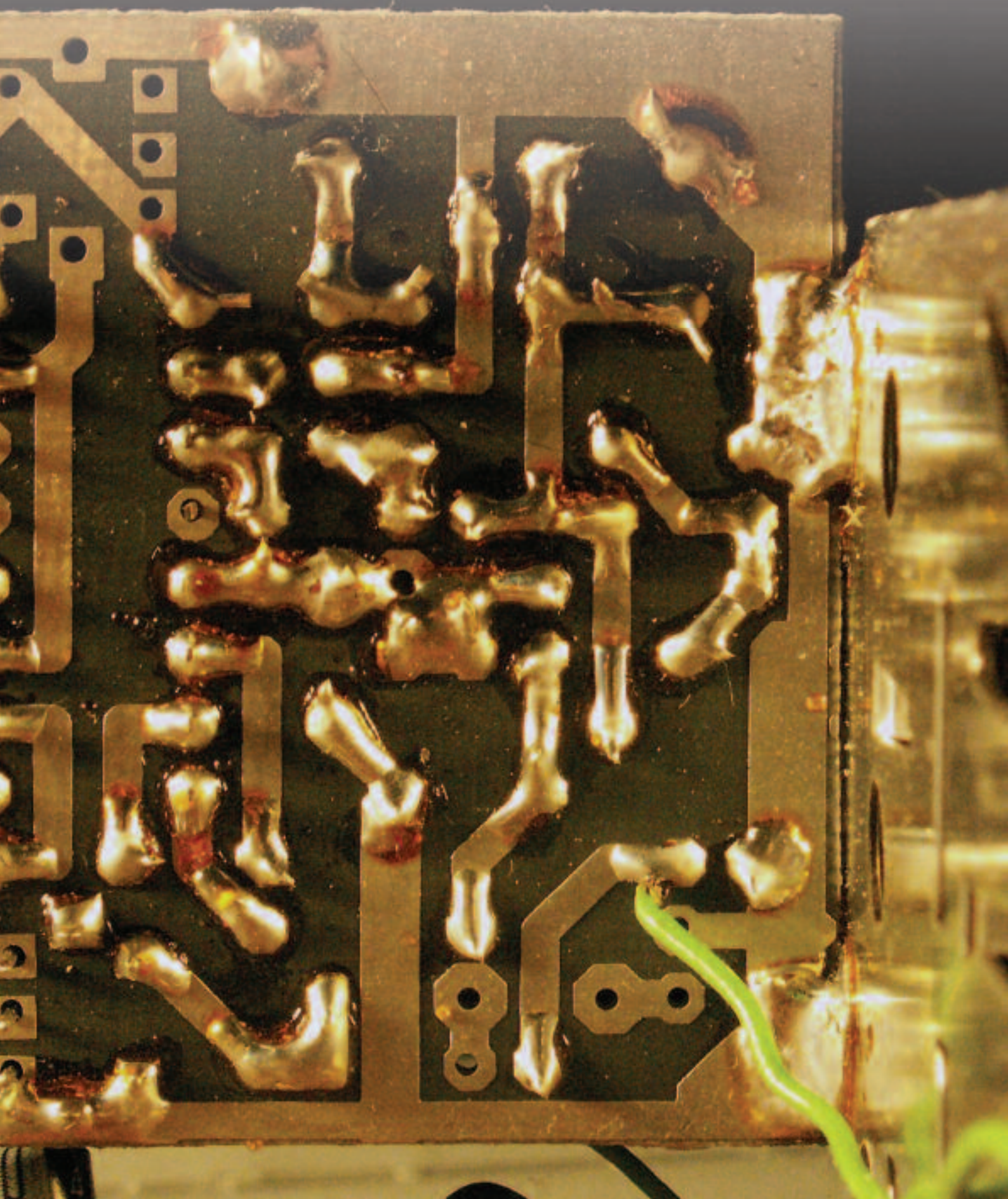
Getting greener, but not there yet



**GREEN
ELECTRONICS
SURVEY #3**

JANUARY 2011

GREENPEACE



Contents

Introduction	4
Survey criteria	7
Main findings	11
Summary of results	13
Observations	17
The way forward	21
Annex 1	25
Detailed scores	31

For further information, contact:
enquiries@int.greenpeace.org

Published in January 2011 by
Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands
Tel: +31 20 7182000
Fax: +31 20 7182002

JN340

Introduction

Greenpeace congratulates the electronics industry on making progress the many technical hurdles it has been facing - but we also show that the industry hasn't finished finding green solutions just yet.

In June 2010, we invited 21 leading electronics companies to participate in our third Green Electronics Survey. The companies were asked to submit their greenest products from across six categories. Eighteen companies rose to the challenge, sharing their most prized environmentally-friendly products with us as we assessed the greenest electronics products that will be available on the market in early 2011.

Green Electronics Campaign and the Guide to Greener Electronics

Greenpeace launched the Green Electronics campaign in 2005 to empower electronic consumers to demand greener products and the electronics industry to take responsibly for the impacts of its own products' lifecycles. Through our 'Guide to Greener Electronics'¹, we rank 18 leading electronics manufacturers on three criteria; removing toxic substances, responsible take-back of their end-of-life products and energy efficiency. Initially this quarterly publication focused on leading computer and mobile phone producers and their policies and practices on just two of these criteria; toxic chemicals and take-back. Since then the Guide has expanded to include producers of televisions and games consoles. The fruits of this campaign are an increase in e-waste recycling policies and programmes and stricter chemical management by both governments and companies, as well as greener products in the hands of consumers.

As companies have made increasingly stronger commitments to these three criteria, Greenpeace has sought to assess the tangible outcomes; the actual products coming into the global marketplace. Using information submitted by companies in late 2007, we published the first edition of our Green Products Survey² in March 2008, during the international electronics fair CEBIT, held in Hanover, Germany. The report was met with enthusiasm from the industry and consumers alike, and so we released a second edition in January 2009³ during the annual CES electronics fair in Las Vegas, USA. Unlike the ranking of manufacturers in the 'Guide to Greener Electronics' described above, which focuses on overall corporate policies and practices, these surveys consisted of an in-depth evaluation of the products that the manufacturers themselves considered to be their greenest.

The first edition revealed that none of the surveyed products could claim the title of being truly green, with only a few products barely scoring 5 out of 10 points. The second product survey reflected the progress of the companies who chose to participate. Progress was particularly noticeable in the designing-out of toxic chemicals from products; more scores were above the highest score of 5/10 from the previous edition, and the gaps between company's scores shrank. These changes revealed the more competitive environment between the brands that had emerged. Yet, despite a notably improved performance in the monitors category, it was evident that progress was still needed within the industry. As a result Greenpeace advocated for further efforts in all products categories before a 'truly green' consumer product could emerge on the market. Since this last survey, the industry has shown considerable progress in delivering greener products, and therefore we decided that a third edition of the product survey was necessary.

¹ <http://www.greenpeace.org/international/en/campaigns/toxics/electronics/Guide-to-Greener-Electronics/>

² <http://www.greenpeace.org/international/press/releases/cebit-talks-green-but-the-ind/>

³ <http://www.greenpeace.org/usa/en/media-center/reports/green-electronics-the-search/>

Further room for improvement:

While Greenpeace applauds the progress that has been made, there are many hurdles the industry has yet to overcome. Throughout a product's lifecycle - from material extraction to production, and from consumer use to disposal - electronic products have the potential to impact human health and the environment - including through the release of dangerous substances - and energy consumption.

Over the course of our Green Electronics campaign, we have shown how workers at the disposal end of an electronic products' life are being exposed to a toxic cocktail of hazardous chemicals. Without the complete elimination of these substances from electronic products, and strong regulation that bans the export of hazardous waste from developed to developing nations, these workers will suffer at the hands of the industry. Likewise, at the manufacturing stage, the cheapest labour available is often used. This includes the extraction of precious metals for use in the products, in areas where little-to-no protection is given for the health and well-being of the workers involved. Given the environmental and social risks associated with irresponsible sourcing and disposal of electronics, Greenpeace asks each company to adhere to a progressive precautionary principle and support policies that create incentives for the safest possible recycling of obsolete products in every country that its products are sold. As we face the greatest environmental crisis of our time - climate change - the electronics industry must be at the forefront of finding the solutions necessary to lower our individual taxation on the planet as well as its own. It is in these areas that the electronics industry has shown the least amount of progress.

What this third edition of the Green Electronics Survey proves, however, is that this is an incredibly competitive, innovative, and solutions-based industry, capable of creating the changes necessary to guarantee a sustainable lifecycle for each product manufactured. From our first Guide to Greener Electronics in 2006 to this third Survey in 2011, Greenpeace has seen the industry's ability to consistently put greener products on the market. We believe the industry has the ability to overcome these existing challenges.

Participating Companies in this survey



Sony Ericsson

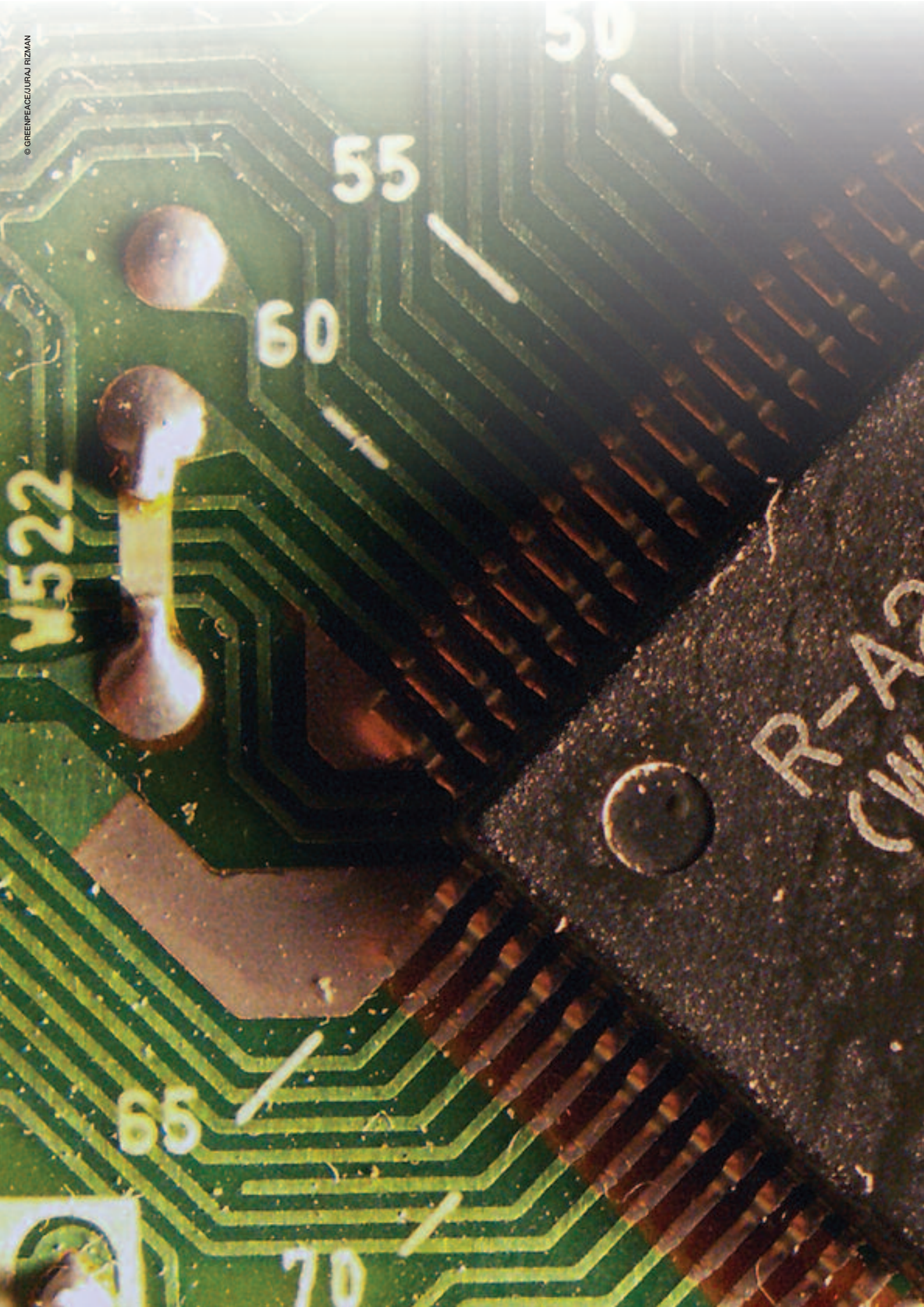


All but three companies participated in the previous survey. The newcomers include the global brand Asus, which had declined our past invitations and is not one of the 18 global companies ranked in the Greenpeace Guide, and the two Indian computer manufacturers, HCL and Wipro, which are assessed, in addition to those 18 brands, in the version of the Greenpeace Guide published by Greenpeace India.

Unfortunately, as in the earlier surveys, a number of invited companies declined the opportunity to showcase the environmental performance of their products. The companies that were unwilling to take part in the survey were Apple and

Philips. We have, however, assessed the newly-released Philips' Econova TV and Apple's Macbook Pro MC374 in order to see how they would have performed.

This year, netbook computers were included as a new product category in addition to desktop and notebook computers, mobile phones and smartphones, LCD and plasma screen televisions and LCD computer monitors (the latter two having been added in the 2nd survey). In total, we received 53 products from 18 companies (not including Philips and Apple). Eventually, 44 products are featured in this report (including Econova TV and MacBook Pro).



Survey criteria

In June 2010, Greenpeace asked 21 companies to submit the greenest products that would be on the market by November 1, 2010. Eighteen companies submitted products.

The leading manufacturers of desktop computers, notebooks, netbooks, computer monitors, mobile phones, smartphones as well as televisions were directly invited to submit their greenest products via an assessment form that was provided. In addition, the form was published on the Greenpeace website and other forums to offer smaller manufacturers the opportunity to participate. For the first time two major Indian computer manufacturers have also taken part in the survey. In another first for this survey, companies were provided with a document detailing most of the methodologies used for the scoring. This was done not only to ensure that the companies could select their highest performing products, but also to increase the transparency of the process.

The principles behind this year's survey are very similar to those in previous years, but slight adjustments have been made to our criteria. Each company was allowed to submit three products per product category, which we then assessed and scored against the criteria. If a company submitted more than one product in a category we chose the highest-scoring device for inclusion in the report. Once the assessments were complete, companies were invited to review them to ensure accurate product information.

The products submitted were assessed against four broad groups of criteria:

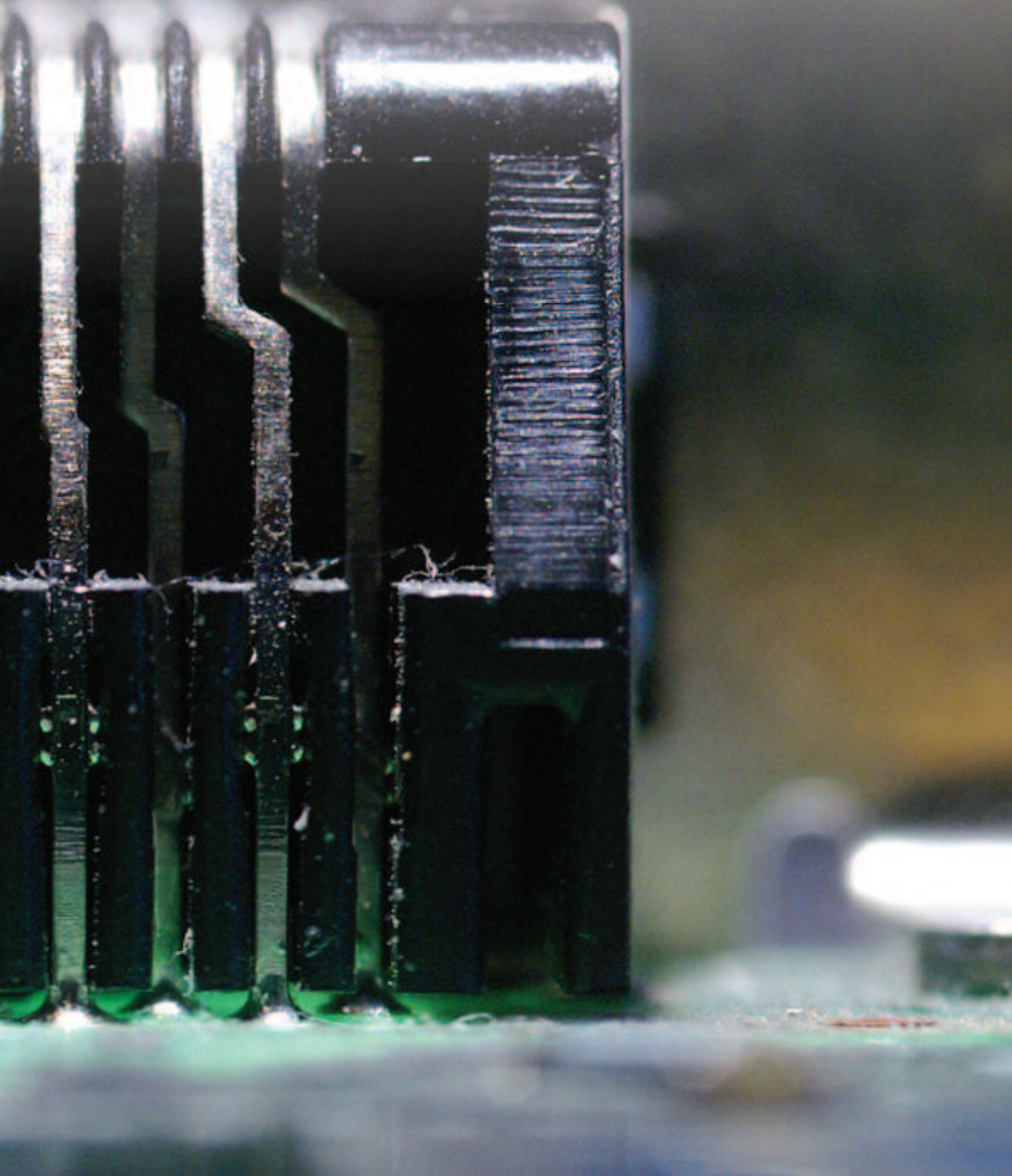
- **Use of hazardous chemical substances**, including polyvinyl chloride (PVC), brominated flame retardants (BFRs), antimony and its compounds, phthalates, beryllium and its compounds and a number of other chemicals. The use of exemptions to the EU RoHS (Restriction of Hazardous Substances) directive⁴ was also taken into account (see Annex 1).
- **Power consumption of the products.** Products were assessed by comparing them with the Energy Star standards of the US Environmental Protection Agency. The more a product exceeded the standards, the more points were awarded. It has to be noted that, because of new Energy Star standards, the results cannot be compared to previous Greenpeace surveys.
- **Product lifecycle** including criteria such as the percentage of recycled plastic used in the product, the length of warranty and the availability of replacement parts after production ceases. Products that were more upgradeable or have good product/battery price ratios were also awarded, as were take-back programmes for products when they are disposed of by the user.
- **Innovation and marketing** resulted in points awarded for comprehensive data for the energy taken to produce a product (from mining to shipping to retailers), the visibility of the product on company websites as well as other special innovations and features a product might possess.

It is very important to recognise that a number of the criteria are specific to the product categories and that it is not possible to compare products across different categories. The exception to this is the chemical section, which does allow for comparison between the product categories as the scoring methodology is the same for them all, and also allows for comparison across the three surveys as the scoring has remained unchanged throughout.

4 In the EU, from July 2006, six substances are banned or restricted in products under the RoHS (Restriction of Hazardous Substances) Directive. Eleven exemptions are allowed for some specifically listed applications.

Products submitted by each company:

	Notebooks	Desktops	Netbooks	Smartphones	Mobile phones	Monitors	TVs	Total
Acer	✓		✓			✓		3
Asus	✓	✓	✓			✓		4
Dell	✓	✓	✓	✓		✓		5
Fujitsu		✓				✓		2
HCL	✓							1
HP (incl. Palm)	✓	✓	✓	✓		✓		5
Lenovo						✓		1
LG Electronics					✓			1
Motorola					✓			1
Nokia				✓	✓			2
Panasonic	✓						✓	2
RIM				✓				1
Samsung	✓		✓	✓	✓	✓	✓	6
Sharp							✓	1
Sony	✓						✓	2
Sony Ericsson				✓	✓			2
Toshiba	✓							1
Wipro	✓	✓						2
Total	10	5	5	6	5	7	4	42



Main findings

In our assessment of the products submitted we found a general improvement in green features compared to the previous two surveys in 2008 and 2009.

There are three main findings:

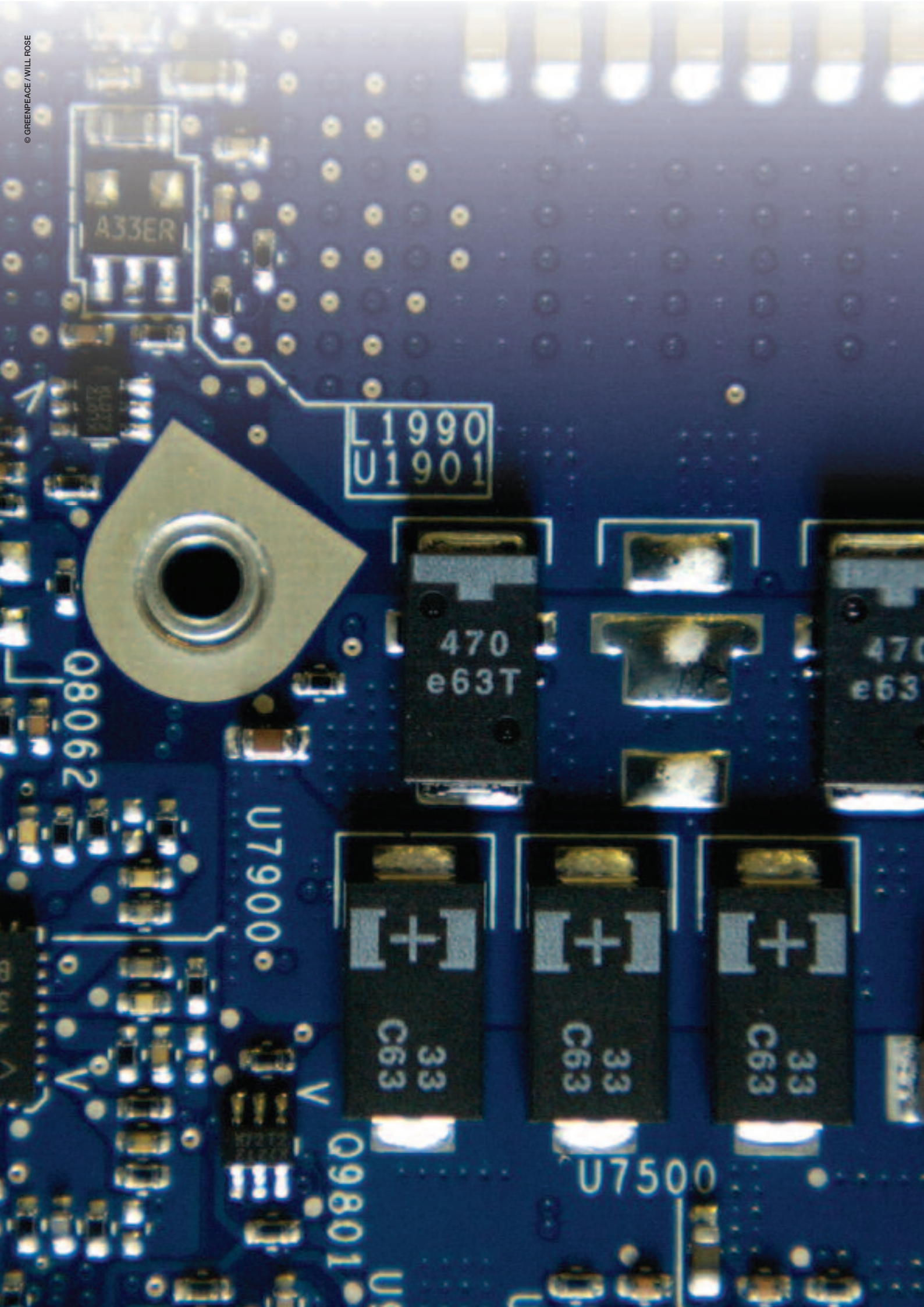
Significant reductions in the use of hazardous chemicals. More products than ever before are PVC-free and BFR-free. The use of phthalates, as well as beryllium and antimony and their associated compounds, are being eliminated in every product category. Although the previous survey showed that the use of RoHS exemptions could be drastically reduced, we have yet to see this progress in the industry.

Exceeding energy efficiency standards. Almost all products meet or exceed the current Energy Star standards established by the US EPA. Electronics companies seem to put much more effort in improving the energy efficiency of their products rather than assessing thoroughly (and reducing) the 'embedded energy' – that is, the energy spent during the production of each product.

Product lifecycle responsibility must improve.

Lifecycle management is still the weakest point of electronic products, with very little use of recycled plastic, a variety of take-back practices (generally improving) and little marketing efforts to prevent fast obsolescence of products.

We did find that companies are becoming more transparent in the amount and type of product information they provide to customers, often listing product's chemical make-up and performance details.



L1990
U1901

470
e63T

470
e63

Q8062

U7900

+

33
C63

+

33
C63

+

33
C63

U7500

Q9801

Summary of results

Desktop computers

The clear winner in this category is the PVC and BFR-free Hewlett Packard 6005 Pro. HP regains the top spot after dropping to fourth place in the second survey. Fujitsu's Esprimo 9900 follows in second place, less than half a point behind the winner. Very close behind are the Dell Optiplex 980 and the CS6110 by Asus, a new entrant to the survey. In fifth place is another first-time participant, the Indian company Wipro, which has also produced a PVC and BFR-free model. This is the first time that PVC and BFR-free models have been submitted to the survey, clearly showing the progress that has been made in the management of hazardous chemicals by participating companies.

Note that the 'possible product' is a fictional product that combined the best features of all submitted products within each category. Its overall score has been calculated using the best score in each criterion.

Rank	Model	Points
1	HP Compaq 6005 Pro Ultra-slim	6.06
2	Fujitsu Esprimo E9900	5.65
3	Dell Optiplex 980	5.41
4	Asus CS6110	5.37
5	Wipro WSG59755W7	5.02
Possible product		8.23

Notebook computers

This time around, a large number of notebooks have been submitted to the survey. The UL30A, which was submitted by first-time participant Asus, takes the first place. The Panasonic CF-9K and the Samsung NP-SF410 follow in second and third place. Toshiba, whose product won the category in the previous survey, provides the fourth best notebook.

While no completely PVC or BFR-free products were submitted by the participating companies, the newly-released Apple MacBook Pro is entirely free of these chemicals. Unfortunately, Apple did not wish to participate in this survey. Therefore, due to the lack of information provided by the company, the product could not be ranked against all criteria, and has therefore not been included in the table below (its score details are available in Annex 2 Table 2). Had Apple provided all the data that was required, its notebook would have probably been a real challenge to the Asus model.

Rank	Model	Points
1	Asus UL30A	5.59
2	Panasonic CF-F9KWHZZPM	4.72
3	Samsung NP-SF410	4.67
4	Toshiba Portege R700	4.65
5	Dell Latitude Z	4.47
6	HP EliteBook 2540p	4.41
7	Sony VPCS12V9E/B	4.28
8	HCL Series 54	4.04
9	Acer TravelMate 8572	4.03
10	Wipro WNB7PAC3700K	3.51
Possible product		8.39

Netbook computers

The scores in the newly-added netbook category have generally been disappointingly low, with only one product scoring more than 5 points. A 'possible product' combining the best features of all the netbooks assessed could claim a much better score, showing that a significant improvement is technically within reach.

The category winner is the Acer TM8172, followed by the Asus 1015PED and the Samsung NP-230.

Rank	Model	Points
1	Acer TM8172	5.08
2	Asus 1015PED	4.83
3	Samsung NP-N230	4.58
4	HP Mini 5103	3.84
5	Dell Latitude 2110	3.70
Possible product		6.63

Monitors

The monitor category has a clear winner with the Asus VW 247H-HF, making Asus the only company to win in two categories. In second place is Dell's PVC and BFR-free G2410H, which is a strong improvement over Dell's fifth-placed model in 2009. Lenovo, the company whose product won this category in the previous survey, achieved a good third place with the ThinkVision L2251x. While last time around only one of the assessed monitors was free of PVC and BFRs, this time five of the seven products that made it into the final ranking were free of these chemicals. All but one product scored more than 5 points and the scores of the top three products are also relatively close to the 'possible product'.

Rank	Model	Points
1	Asus VW-247H-HF	7.50
2	Dell G2410H	7.06
3	Lenovo ThinkVision L2251x	7.04
4	HP Compaq LE19f	6.54
5	Fujitsu P23T-6 IPS	6.00
6	Acer C233HL	5.38
7	Samsung PX2370	4.38
Possible product		8.60

Mobile phones

This year's mobile phone line-up was dominated by Samsung's Blue Earth, which scored particularly well in the energy efficiency category. The Sony Ericsson Elm J10i made it to second place due to its strong performance in the chemicals section, and the LG Electronics GD510 was not far behind in third place. In the chemicals category all the products submitted are PVC and BFR-free, while in 2009 only the winning Samsung product achieved this.

Rank	Model	Points
1	Samsung GT-S7550(Blue Earth)	7.03
2	Sony Ericsson Elm J10i	6.59
3	LG Electronics GD510	6.16
4	Nokia X3-02	5.42
5	Motorola A45 Eco	4.68
Possible product		8.18

Televisions

Sharp once again provided the strongest television model in the survey. Its LC-52SE1 model was far superior when it came to the chemicals criteria, and also won the energy section by a large margin. The Panasonic and Sony models were very close together but well behind the winner. Samsung did not repeat its good placing from the mobile and smartphone categories in this category due to its continued use of PVC and BFRs in the UE46C6000 television, although it performed well in the lifecycle section.

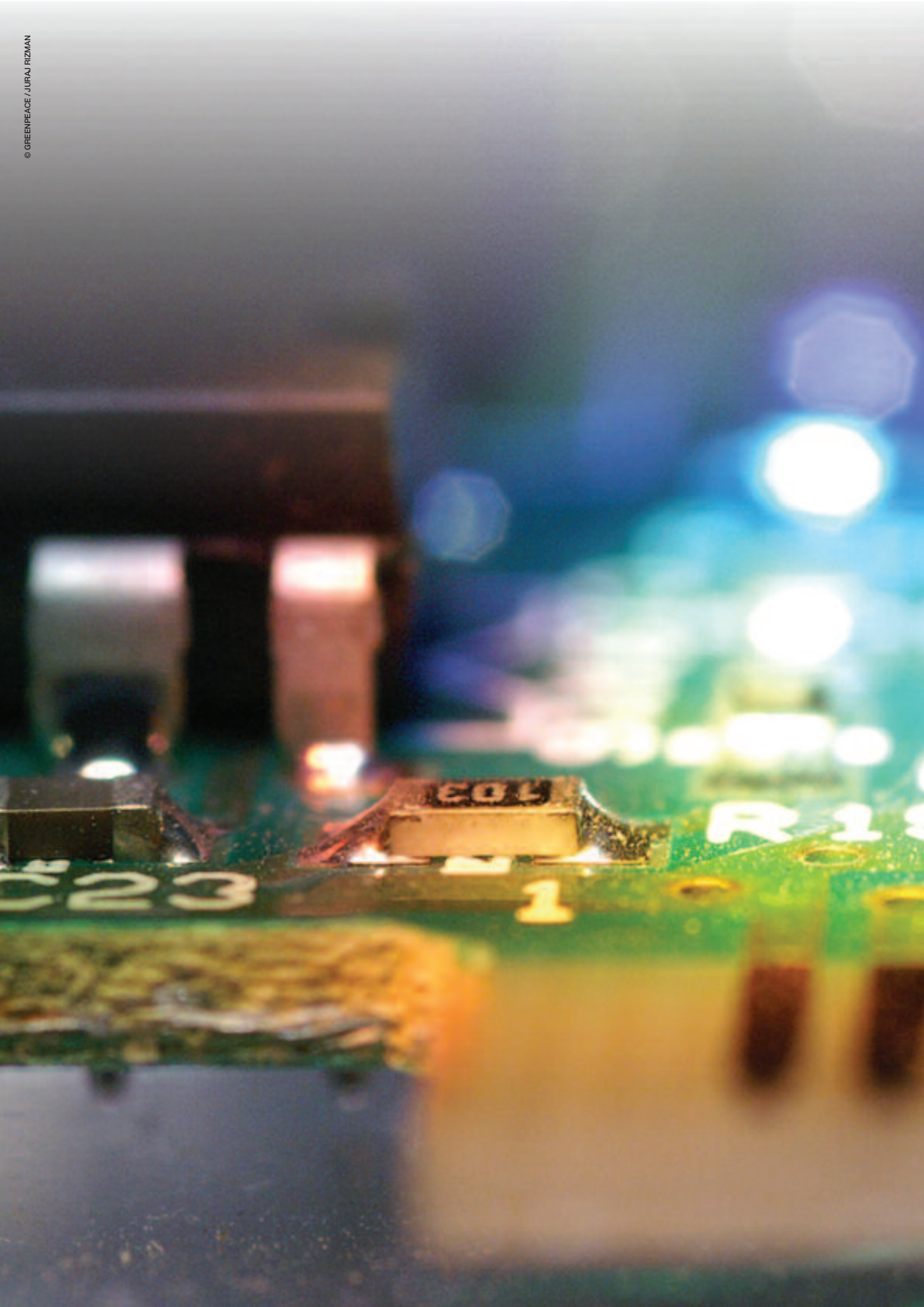
Philips did not wish to participate in the survey. However, the Philips Econova 42 is the only PVC and BFR-free product in this category, and the first-ever available on the market. Due to lack of information provided by the company, the product could not be ranked against all criteria, and has therefore not been included in the table below (its score details are available in Annex 2 Table 7). Had Philips provided all the data that was required, the Econova would have stood a good chance to achieve a top placing.

Rank	Model	Points
1	Sharp LC-52SE1	6.46
2	Panasonic TC-42LD24	5.18
3	Sony KDL-32EX710	5.07
4	Samsung UE46C6000	4.43
	Possible product	7.68

Smartphones

Sony Ericsson improved on its second place in the mobile phone category by taking the top spot for its Aspen smartphone, which led both the chemicals and lifecycle sections. Nokia, which had the winning product for this category in 2009, was the only other manufacturer that achieved well over five points with its N8-00. This was also the product with the most energy-efficient charger. The Samsung Wave and the HP Palm Pixi Plus both scored significantly fewer points but still notably more than the Blackberry Pearl and the Dell Aero.

Rank	Model	Points
1	Sony Ericsson Aspen (M1i)	6.21
2	Nokia N8-00	5.70
3	Samsung GT-S8500(Wave)	4.83
4	HP Palm Pixi Plus	4.71
5	Blackberry Pearl 3G - 9100/9105	3.40
6	Dell Aero	3.19
	Possible product	7.92



Observations

Although it is not possible to make direct comparison between the scores awarded in the two previous surveys with this one, as the scoring methodology changed significantly, it is obvious that enormous progress has been achieved by the industry as a whole since our last report at CES 2009.

For monitors already performing well last year, it is worth noting that five out of seven scored at least 6 points including three above 7 points. Three out of five mobile phones scored over 6 points, with one above 7 points. The three remaining categories show room for improvement. Only one notebook out of ten, and one netbook out of five, score above 5 points. Smartphones/PDAs are not improving as quickly as their mobile phone cousins, with only three out of six scoring more than 5 points.

For all product categories except notebooks, a greater dispersion of scores within categories is noticeable compared to the previous survey. This means that, within any one product category, manufacturers have a wider range of achievements; competition leads to a collective improvement but at various paces. For each category, we scored a 'possible product', - a fictional product combining all the best features of the assessed products. In all cases, with the exception of netbooks, the 'possible product' had high scores above 7 or even 8 points.

Depending of the product category, the best scoring product represents between 67% (notebooks) and 87% (monitors) of the points achievable by a 'possible product' of the same category. This means that the best scoring notebook includes fewer of all the available green features for notebooks, while the best scoring monitor has less to learn from its competitors. The latter situation is similar for the best TV (84%) and mobile phone (86%). The best scoring netbook, smartphone and desktop computer are around 75% of their respective 'possible products' scores. When looking at the lowest scoring products from the current survey, for most categories they embody around 50 to 60% of their respective 'possible products' scores, with the noticeable exceptions of the lowest scoring notebook and smartphone both around 40% only – a clear appeal for the producers of those products to keep up with the green race or run the risk of getting left behind.

Eliminating hazardous substances

Although Greenpeace has previously served several penalty points in the Guide for Greener Electronics for companies backtracking on their commitments to eliminate PVC and BFRs, there is a clear shift on this issue within the industry. The use of PVC and BFRs is on its way out, as is shown by the performances in this area of the survey.

All mobile phones in the survey are PVC-free - only 80% were in 2008. So, too, are four smartphones out of six (50% in 2008), five monitors out of seven (one out of seven in 2008), two TVs out of five (none in 2008) and two desktops out of five (none in 2008). Although none of the submitted notebooks and netbooks was totally PVC-free, seven notebooks and two netbooks have only one part left to clean up; the power supply components. As Apple's MacBook managed to eliminate these last uses of PVC and become the first 100% PVC-free notebook computer, there is no longer a technical hurdle for the rest of the industry to overcome.

For BFRs, overall performance is a little behind that for PVC. Products that are 100% BFR-free include all of the submitted mobile phones, five monitors out of seven (one out of seven in 2008), two desktops out of five (none in 2008 - and, interestingly, these are the same products which are 100% PVC-free as well), three smartphones out of six (none in 2008), one TV out of five (none in 2008), thanks to the addition of Philips' Econova (also PVC-free) and two notebooks out of eleven (none in 2008). For notebooks, it is worth noticing that this was achieved by Apple's MacBook again but also by Wipro, an Indian brand. The rest of the notebooks are lagging behind in this respect, with only Acer having just one part left to clean up (oddly, the housing, so not a difficult task). No netbook was 100% BFR-free, but two out of five also have only one remaining part containing BFRs.

Despite the progress made on eliminating PVC and BFRs, other toxic chemicals are still present in many electronic products. Beryllium and its compounds and phthalates have mostly been eliminated in mobile phones, smartphones and monitors, although for other product categories, their elimination is still the exception. The elimination of antimony and its compounds is not as pronounced, and its use can be found across all product categories.

The RoHS (Restriction of Hazardous Substances) Directive is a key European directive that is helping to eliminate toxic chemicals from consumer electronic products, including certain toxic metals and certain BFRs. Some temporary exemptions allow the use of RoHS regulated substances for specific uses where substitution is not currently possible. There is no firm trend observable regarding the use of RoHS exemptions by the producers of the products assessed in this survey. Generally, brands seem to repeat their performance in the last survey for the same product line although sometimes a slight increase

or decrease in the number of exemptions used can be found. Although our two previous surveys identified that the use of exemptions could potentially be reduced to only two or three for all product categories, there seems to have been no significant effort made by any one brand or by the industry as a whole in working towards overcoming the need to make use of RoHS exemptions. While RoHS exemptions should be viewed as temporary loopholes giving the industry sufficient time to find solutions to comply with the regulation, it appears that they are instead regarded as acceptable elements of product design.

Other positive steps taken in the field of chemicals include the elimination of arsenic in screen glass and a reduction in mercury due to the increasing use of LED displays. These steps were already identified in the last survey but - disappointingly - haven't yet become common practice in all the relevant product categories.

Energy Star standards

With the strengthening of new Energy Star standards and significant change in the scoring methodology in this latest survey, a direct comparison of scores between all three product surveys to date is not possible.

In this survey, the vast majority of products match or exceed the respective Energy Star standards. For desktops, monitors, mobile phones and TVs, the 'possible product' could get the maximum score of 30 points in the energy section. The best-scoring product in each category is also very close to the score of its respective 'possible product', in particular for desktops, mobile phones, TVs and netbooks. On the contrary, the laggards in each category scored far worse, despite being technically capable of much better, particularly in the notebooks (29% of the points obtainable by a 'possible' notebook), mobile phones (17%) and smartphones (13%).

There seems to be a shared recognition in the industry of the need to provide consumers with information on energy features, power-saving and the links to climate change from the product's use. Although not strictly similar in its items, our methodology to score this across the seven product categories allows comparison between their respective performances. The average level of information is clearly highest for the mobile phone category (average of 5.5 points out of 6 allocated to this issue); it is followed by TVs (4.3) and smartphones (4.25) while other categories stand between 3.4 and 3.8 points. Yet for all categories except mobile phones and netbooks there was a great dispersion of scores, showing again a wide range of achievement between 3 and 6 points. Mobiles phones were all between 5 and 6 points while netbooks were packed between 2 and 4 points.

Lifecycle management

The use of post-consumer recycled plastic is not yet standard practice for notebook and netbook computers and smartphones. This holds true for even post-industrial recycled plastic. No firm trend can be set for TVs, which looked promising last year. Three product categories are clearly leading the way on this matter: monitors, desktop computers and mobile phones. Efforts were already acknowledged for monitors in the previous survey; they are new for the two other categories and seem to focus on post-consumer recycled plastic, which we applaud. In the mobile phone category, Sony Ericsson even reaches the top score of 7 points, which rewards a product containing at least 50% of post-industrial recycled plastic per weight of plastic; its Elm phone beats this bar by 10%.

The minimum warranties offered across the industry never go beyond three years, a standard shared by all desktops submitted this year and a majority of computer monitors. It is of huge concern that the majority of notebooks, netbooks and TVs do not offer more than a one-year contract, lining up with both phone categories in this respect. Among the latter, it is also disappointing to see Nokia step back from the two-year warranty offers acknowledged in the previous survey.

The availability of replacement parts allows all product categories, with the exception of phones, to improve their scores in this lifecycle set of criteria. For phones, the reduced availability over time is certainly linked to the short lifespan of these mobile devices and to their scheme of technical evolution.

Energy during production

Companies must track and disclose the amount of energy used during production of electronic devices. Although more companies are investing in this area, it is still largely insufficient. Improvements needed include expanding the data collected to include all steps of production from supply chain to post-assembly shipping of products. Figures must also be product-specific and the disclosure of information must be more complete. Only three companies have a more advanced collection of data; Apple, and to a lesser extent, Motorola and Nokia.

Visibility

The prominence of these greener products on the respective websites of their manufacturers has improved for all categories except for TVs, which scored the best in the last edition. There is room for improvement in showcasing these greener products and to ensure that greener products are not just useful talking points for green marketing campaigns, but part of the company's standard operating practice.



The way forward

The present survey showcases some of the greenest products available on the market in the second half of 2010.

Greenpeace's product survey highlights important information for consumers and electronic manufacturers alike. By reviewing all three product surveys, consumers are able to witness the progress made by the IT industry over the past three years and therefore the type of progress they should expect and demand in the future. This is a highly competitive industry and Greenpeace's Green Electronics campaign has been able to harness this competition towards achieving greater sustainability. In addition, the survey allows manufacturers themselves to better understand what is possible by seeing how their greenest product compares to others on the market. Lawmakers must view this information as a call to level the playing field by enacting strong regulation that holds manufacturers accountable for the impacts of the products they produce.

Here we set out a number of considerations for these stakeholders as a way forward.

Design out toxic chemicals

Halogen-free products now! PVC and BFR-free could already become a standard for some product categories, especially phones and monitors. RIM, Dell and HP should seriously consider this when designing their next smartphones, as should Fujitsu and Samsung for their future monitors. For desktop computers, halogen-free is also within reach for all willing manufacturers, as demonstrated by the global giant HP and the small local Wipro. Philips and Apple have overcome the last technical difficulties for televisions and notebooks. It is of great concern that current netbook design has not similarly progressed and manufacturers are not learning the lessons from notebooks to produce more environmentally-friendly products.

Beryllium and antimony compounds: go ask Asus! Phthalates, beryllium compounds and antimony compounds as groups are being addressed in all product categories. Asus is the only manufacturer offering elimination of both beryllium and antimony compounds over four different product categories (all types of computers and monitors). Other manufacturers have something to learn from Asus. More widespread initiatives on mercury-free displays and arsenic-free glass should also be adopted by all relevant players.

Go beyond RoHS exemptions. In order to level the playing field, lawmakers should close down the exemption path wherever the industry has already overcome the technical barriers to eliminate hazardous substances. The industry would benefit from sharing best practices to make this necessary shift. Greenpeace has compiled a long list of products offering alternatives for each of the RoHS exemptions

(see <http://www.greenpeace.org/raw/content/international/assets/binaries/ngo-rohs-submission.pdf>)

There must also be clear deadlines for finding solutions for any remaining technical challenges. Best practice sharing forums such as INEMI⁶ should be proactive in addressing exemptions where technical solutions do not exist.

Strengthen the RoHS list. RoHS currently regulates only a limited list of six hazardous chemicals, while the list of products or components that avoid the use of additional hazardous chemicals (PVC, BFRs, antimony, phthalates and beryllium), as seen in this survey, continues to grow. More and more often producers and their component and material suppliers are designing new models in anticipation of these chemicals being included in a revised RoHS Directive. It is imperative to strengthen the list of hazardous chemicals regulated by RoHS, so that it reflects the market's readiness to comply and levels the playing field for the industry leaders. It must avoid forcing innovative companies to roll back on their less-toxic products due to unfair competition from less-innovative producer with 'cheap and dirty' products in the future.

Energy efficient products, produced efficiently!

Beyond Energy Star. Preventing climate change is a global priority and Energy Star (see Annex 1 for more details) provides a well-recognised benchmark for energy efficiency. Our survey shows that the technology exists to surpass the current standards for the devices submitted by participating companies. These standards should therefore be considered as the minimum baseline below which a company should not market a product. Yet, not all companies have put the same efforts to provide their consumers with outstanding energy efficiency by exceeding Energy Star. Given the growing world energy consumption related to the use of electronics, Greenpeace calls for more ambitious and verified standards that are revised regularly once the industry is able to exceed them. In addition, Energy Star has been the subject of controversy in the past for lax certification as found in a US Government Accountability Office investigation in March 2010⁶. We again urge legislators to set minimum efficiency standards, similar to the California TV standards⁷ that come into effect on 11 January 2010 and efficiency standards for appliances in the EU and US, in order to get the worst, least energy-efficient products off the market as soon as possible.

Energy embedded in products. There is an urgent need to work towards an industry-wide standard of lifecycle analysis that encompasses the use of energy (and natural resources) across the entire chain of production – from mining, manufacture and distribution to consumption and end-of-life treatment. In the meantime, companies must develop their own analysis that covers the entire product lifecycle. Without knowing and tracking what resources and how much energy it takes to make a product, it is hard to determine how significant, systematic changes can be made. With respect to tackling climate change, it is also essential to have a fair disclosure of total energy used during the manufacture of products – by fair, meaning that every company can be judged on the same stages of production and not according to where it sets its own boundaries for responsibility; once the carbon footprint of the manufacturing process has been established, it is also important to consider the carbon footprint incurred by the mining of raw resources, for example.

⁶ <http://www.gao.gov/products/GAO-10-470>

⁷ http://www.energy.ca.gov/appliances/tv_faqs.html

⁸ <http://www.gsmworld.com/newsroom/press-releases/2009/2548.htm>

⁹ http://ec.europa.eu/unitedkingdom/press/press_releases/2009/pr0970_en.htm

¹⁰ <http://www.storyofstuff.org/electronics.php>

Sustainable product lifecycle

Less recyclability claims, more actual recycling! As found in previous surveys, there appears to be no common industry practice when calculating recyclability rates. This year, we decided not to score on recyclability as we did in the previous surveys; we noticed that the high recyclability claims made by companies were not matching common recycling practices. Focussing instead on the use of post-consumer recycled plastic, we found a less glorious picture of what the industry is doing on this issue. However, a few companies have pioneered this level of action on recycling, a must in regards to saving resources and reducing embedded energy. The whole industry must see the use of recycled materials as a priority. Besides, in the context of European WEEE revision, making recyclability fit with recycling practices, manufacturers need to more clearly internalise their own waste treatment costs, ensure better communication with recyclers to both improve feedback to product designers and also improve separation and recycling technologies and build capacity among the organisations and companies in charge of collection and recycling. Solutions to recycling these products also lie in the elimination of hazardous substances such as BFRs that impair the ability to recycle materials.

Extend the lifecycle of products. To design truly ecologically-sound products, companies need to shift away from products designed with a limited lifespan (planned obsolescence) and towards longer operating upgradeable goods, with warranty periods significantly above minimum legal standards and with long-term availability of components. Many other initiatives could contribute towards this objective, from the standardisation of peripherals and chargers to allowing or offering repair services, easing and organising safe re-use of second-hand products. For instance, in February 2009, 17 manufacturers⁸ announced they would work collectively to produce a global universal charger and in June 2009, the European Commission⁹ obtained a commitment from ten mobile phone major manufacturers to work collectively at designing an EU specific universal charger to be released in 2010. Refurbishment initiatives should also be promoted in developed countries, where recycling is too focused on metal recovery after shredding the whole device and condemning most of it to combustion. This need for the industry to move away from 'design for the dump' to 'design to last' is cleverly explained in The Story of Stuff Project's latest short film, *The Story of Electronics*¹⁰.

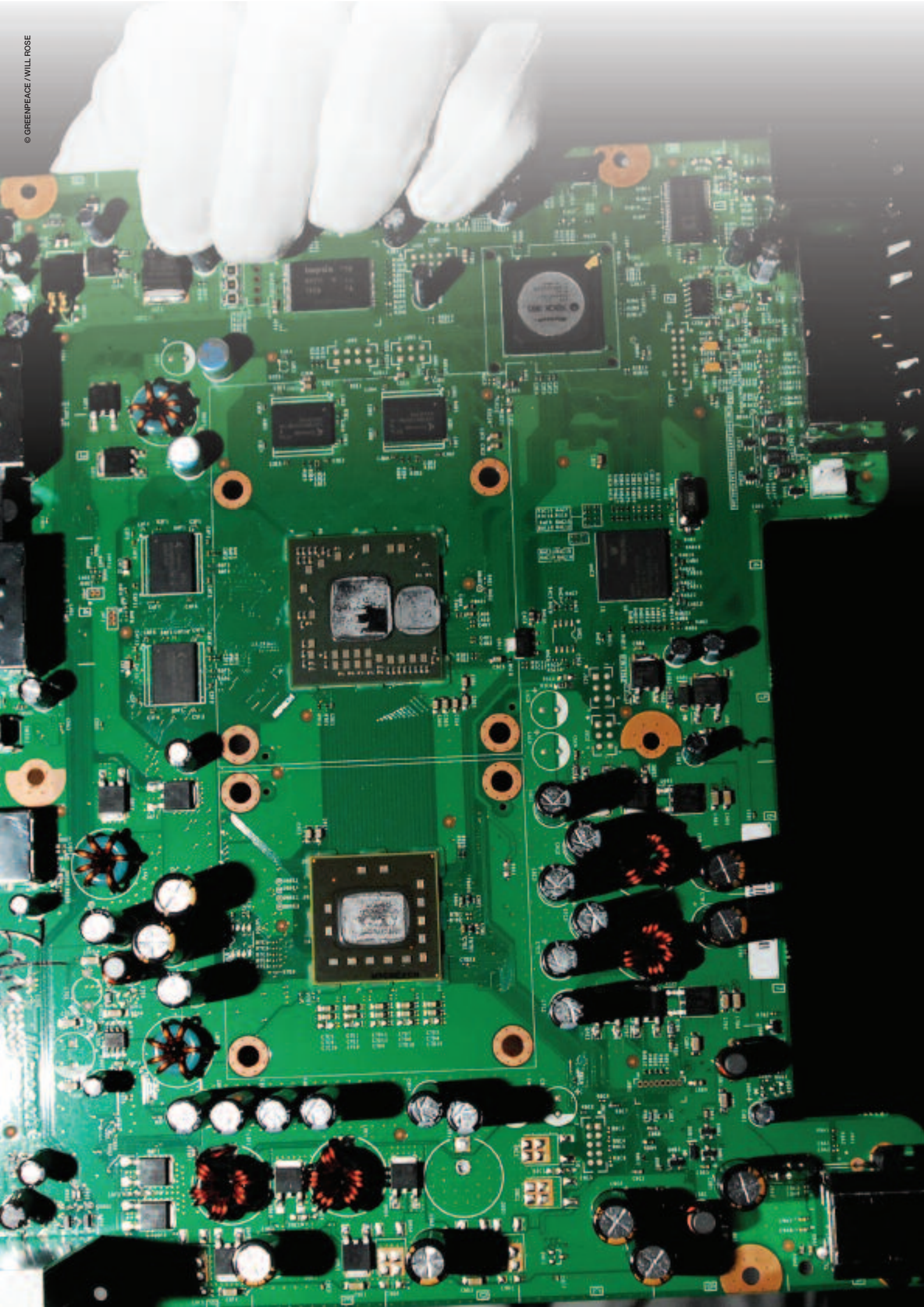
Reconsider business models. Move from products to services. The products evaluated in this survey are physically sold to customers in a traditional manner. However, as already seen long ago in the photocopier business, the leasing of products (big-size peripherals or others) instead of selling them is another valid way to amend business models in the direction of dematerialisation. Moving to new, service-based business models might enable manufacturers to design ultra-slim devices backed up by shared and efficiently used central infrastructure, reducing today's huge redundancies in computing and storage capacity in private ICT devices.

Innovations

It should be noted that the desktops included in this survey are standard desktop computers and that there are new technologies available that in some cases allow the use of products with significantly fewer environmental impacts. For example, offices with powerful servers and even homes with one standard desktop can run thin clients on their networks. Thin clients draw processing power from the server or another desktop and thereby reduce the need for many standalone desktops. Often, thin clients do not need to have their own motherboard or memory and use less power and materials than ordinary desktops. Lessening the environmental impact of electronic products isn't just about substitution; it's about rethinking the product itself.

In 2009, Greenpeace launched the Cool It Challenge, which calls on leading IT companies to be champions of the fight to stop climate change. The Climate Group's SMART 2020 report illustrates the potential of the IT sector to direct its notoriously rapid technological innovation toward solutions that cut emissions and improve efficiency across the economy. IT technologies empower consumers to measure energy use and emissions in real time, which will ultimately help consumers reduce their energy usage. In addition, consumer electronics products have the ability to lessen our impact on the environment through dematerialisation, where our gadgets replace natural resource rich products like books and newspapers by using digital media. Without the release of practical case studies and energy calculations that clearly show our energy savings by companies, the increase of these products will likely only increase our environmental footprint.

¹¹ <http://www.smart2020.org/>



Annex 1

Scoring methodology

Products were assessed against four sets of criteria that include some of the most important issues when it comes to manufacturing green consumer electronics products. A maximum of 100 points was available, which was then adjusted to a score on a 10-point scale for comparison purposes. In addition to a number of criteria which are applicable across all product categories, each product category included criteria specific to consumer use and environmental issues of that product category,

A 'possible product' score, per product category, was also created using the top-scoring answers from each criteria question. These best practice scores demonstrate that it is technically possible to make products that are significantly greener than those currently on the market. While very similar, the scoring for this survey cannot be compared exactly to the previous scoring that took place in the surveys published in March 2008 and January 2009. This is due to using updated international standards in areas such as energy efficiency, and also due to other changes in the scoring to allow for innovations and product development.

Use of hazardous chemical substances

(30 out of a total of 100 that each product can achieve)

RoHS exemptions

The EU Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) regulates the use in electronic products of certain critical chemicals namely lead, mercury, cadmium, hexavalent chromium and the brominated flame retardants PBBs and PBDEs (though not other BFRs). Since all products are expected to follow current legislation, they were not awarded points for merely being RoHS compliant. However, RoHS allows products to still be in compliance if they use the restricted chemicals in specific listed applications, though only where substitution is deemed not currently possible, or the substitute would be more harmful. Companies were asked to provide the exemptions being used in each product. The fewer exemptions reported for a product, the more points were awarded.

PVC and BFRs

Points were awarded for products free of all PVC plastics and/or free of all BFRs. Significant progress has been made by companies to phase out the use of PVC. In the case of some external cables, approval is still needed for the use of non-PVC alternatives. Five points were given for a PVC-free product. If the product still uses PVC, the total available points dropped from 5 to 3. Points were then deducted according to the number of major components still containing PVC. A similar rule was applied for BFRs: 5 points for a BFR-free product, 3 points for a partially BFR-free product plus additional deductions per component still containing BFRs. The components included:

For PVC:

- External cabling and wires
- Internal cabling and wires (including ribbon cables)
- Housing
- Packaging
- Plastic coated/encased electrical connectors

For BFRs:

- Laminates of printed wiring boards, including flexible circuit boards.
- Battery, including casing and components
- Housing (including for periphery equipment, e.g. transformer)
- Fan and fan housing (if applicable)
- Ribbon cables
- Electrical insulation sheets
- Plastic coated/encased electrical connectors

Phthalates, beryllium and antimony and their compounds

These hazardous chemicals are not currently restricted under the RoHS Directive but should still be avoided in products due to their toxicity. Three points were awarded for each of these chemical groups not used in the product.

For details of the environmental and human health impacts of the chemicals mentioned here, see the Greenpeace report *Toxic Tech – The dangerous chemicals in electronic products*, available at: <http://www.greenpeace.org/international/PageFiles/24478/toxic-tech-chemicals-in-elec.pdf>

Some product categories such as mobile phones score generally higher than others. This is partly explained by the higher complexity and greater number of parts in products such as notebooks or desktops.

Energy use and power-saving

(30 out of a total of 100 a product can achieve)

Consumer electronics play a significant and growing part in an individual's carbon footprint. Using energy efficient products reduces CO₂ emissions and thereby the impact on the climate. Lower energy products also lead to lower household energy bills.

Energy Star assessment

Energy Star is the energy efficiency rating of the US Environmental Protection Agency and the US Department of Energy. This certification has become a globally-accepted standard and sets benchmarks for a number of products. If these benchmarks are met or exceeded, products can be labelled as Energy Star compliant. For the Greenpeace survey, points were awarded according to the percentage by which devices exceeded Energy Star minimum requirements. It is important to note that Energy Star regularly adjusts its criteria as the overall performance of products improves. Most of the Energy Star standards for this survey have changed compared to the previous one, and because of this, the performance of products in this category cannot be compared with that of the previous survey. The detailed requirement for Energy Star qualifying products can be found on the Energy Star website at www.energystar.gov

In desktops, notebooks and netbooks Energy Star now uses a typical energy consumption (TEC), which is calculated through a formula for sleep, idle and off-mode consumption. The Greenpeace survey gives maximum points for products that exceed the Energy Star TEC requirements by 50%. In addition, the efficiency of the external or internal power supplies of computers is also scored. In cases where desktops use external power supplies, the scoring methods for external supplies for laptops has been used.

For mobile phones and smartphones points were awarded according to the extent to which the external power supplies exceed Energy Star in both active mode (charging) and off-mode.

New Energy Star criteria also exist for TVs and computer displays. TVs are compared to the maximum on-mode and also the off-mode power consumption. For monitors, on the other hand, the off-mode, average on-mode and sleep-mode energy consumption are taken into account.

In addition to the 24 points available through the various Energy Star standards, each product could score up to six further points via the so called 'energy matrix'. This consists of a number of criteria (some are specific to the product category) that help reduce energy consumption or help consumers make informed choices about how much energy a product uses. The matrix includes criteria such as the existence of online environmental datasheets that show power consumption, the presence of calculators that compare different models by the same company, additional power saving hardware or software and clear communication by the companies that products with lower consumption help reduce the impact on the climate.

Product lifecycle

(30 out of the total of 100 points a product can achieve)

Consumer electronics are known for their short and continuously diminishing lifecycles that are increasing the burden on the environment. A longer warranty period, designing products that can be upgraded rather than replaced and making spare parts available long after the production of the device has been discontinued all help to encourage consumers to keep using the products longer. Most of the criteria included in this part of the survey have remained unchanged from the previous survey.

Upgradeability

Products were given points for the extent to which they are upgradeable by the user, with clear directions on how to upgrade parts being given in the user manual. For computers and notebooks, upgradeable parts included the system memory, the hard drive, the graphics card (GPU), the processor (CPU) and the optical drive (CD/DVD). Parts that are usually replaced rather than upgraded (such as fans in computers, for example) were not included. For netbooks, which are generally not using that many parts and are thus less upgradeable, the price ratio of a replacement battery compared with the price of product itself, as well as the battery life, have also been taken into account.

For mobile phones and PDAs, upgradeable parts included the battery and memory cards. In addition, points have been allocated according to the price of the battery compared with the price of the device itself. This was done because the battery usually needs earlier replacement and expensive batteries are an incentive for the consumer to discard the product rather than to simply replace the battery. The smaller the percentage the battery price is of the total price of the device, the more points awarded.

Monitors are not usually upgradeable. Instead, the manufacturer's replacement policy for monitors showing pixel defects have been analysed and points have been awarded by comparing the company policy with the ISO standard. Note that, under this standard, the amount of acceptable defect pixels per class are also dependent on the overall number of pixels of the screen. Thus a screen with more pixels would be allowed more defects.

TVs are not upgradeable, so no points could be awarded. Instead, the overall score for a TV's product lifecycle criterion was adjusted by a factor of 1.25 to remain consistent with a total of 30 points for this set of criteria.

For netbooks, the battery life using Mobile Mark 07 was also taken into account. While this test is not necessarily regarded as an indication of the battery life under normal working conditions, it does allow for relative comparisons between the products.

Warranty

Points were awarded according to the number of years for which products are under manufacturer warranty on the global market. The longer the warranty time given by the manufacturer, the less likely it is that the consumer will have to replace a device before it is outdated. In general, with the possible exception of desktop computers and monitors, companies have again missed out on a number of points by restricting the warranty to one year only.

Availability of spare parts

Similarly to the scoring for warranty, products were awarded points for every year that a consumer is able to obtain spare parts for a product after production has ceased. The longer these spare parts are available the less likely it is that the consumer will dispose of a product rather than repair it.

Recycled plastic content

Using parts from recycled plastics in consumer products is on the increase and can significantly reduce the amount of new plastic produced. In this survey, points were awarded by comparing the weight of the recycled plastic with the overall weight of plastics used in the product. In addition, preference was given to products that use a large amount of post-consumer recycled plastic compared to post industrial recycled plastic. The latter is usually derived from scraps in the production of a product. The increased demand for post-consumer plastic on the other hand drives the waste collection of these plastics via take-back practices and encourages toxic elimination in design, in turn making plastics more easily recyclable. Additionally, recycling saves the energy embodied in materials, reducing the impacts on greenhouse gas emissions and climate change.

Take-back

For this survey, the take-back policies of the companies were taken into account by using the points they score under this criterion in the 16th edition of the Greenpeace Guide to Greener Electronics (referred to as the Green Guide in the following tables), released on 26 October 2010¹². The better the take-back programme, which must be cost-free to the consumer or last owner, the more points awarded.

¹² <http://www.greenpeace.org/international/Global/international/publications/toxics/2010/version16/Ranking%20tables%20Oct%202010-All%20companies.pdf>

Innovation and marketing

(10 out of the total of 100 points a product can achieve)

Energy during production

The energy used to manufacture a product is as important to investigate as the energy it takes to power a device during consumer use. Reducing energy during production plays an important role in reducing the impact on natural resources and the climate.

Unfortunately, there is no existing global standard that allows for comparing products under this category. Therefore, points were awarded to products for which companies have an energy lifecycle analysis that takes into account a significant part of the production chain of that particular product model. Activities that should be included when calculating the energy taken to make a product include the extraction and refining of natural resources, production of materials (e.g. plastics), the manufacturing of parts provided by suppliers, the manufacturing of parts by the brand owner, the shipping of parts to the assembly facility, the assembly itself and the distribution of the products to importers and wholesalers. Points were awarded for each of the major stages included in the assessment. However, companies that only calculate the energy of the final assembly stage of production were not awarded any points.

An additional point could be earned for companies that publish the greenhouse gas emissions of their entire supply chain either in their own publication or through the Carbon Disclosure Project.

Other innovation and features

Green innovations going beyond common practices were awarded with additional points. These included, for example, arsenic-free glass, waterborne paint, solar panels, avoiding volatile organic compounds or producing products that are extremely durable.

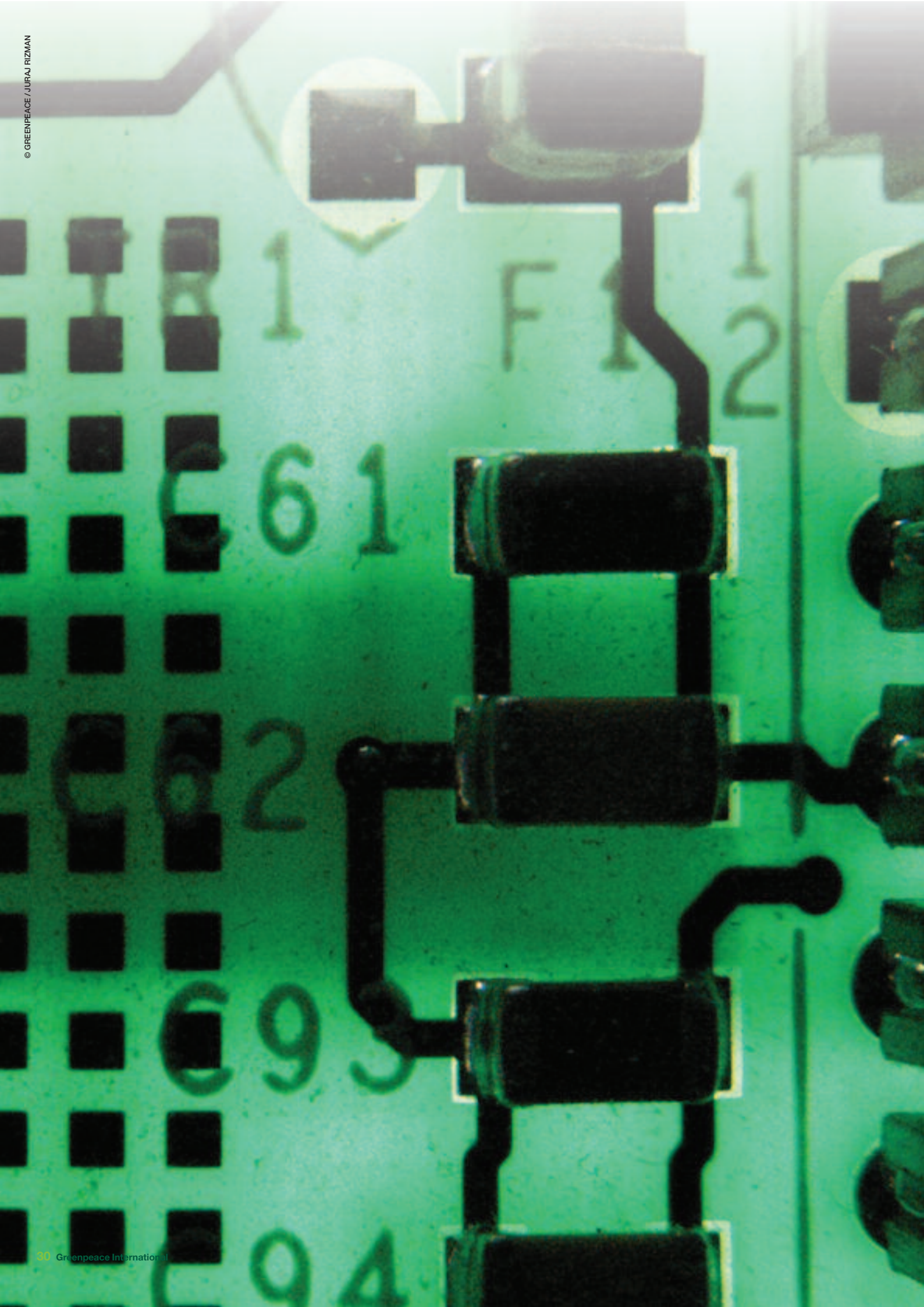
In addition, a small number of companies provided us with confidential information to back up their claims, which could also earn them additional points point as we encourage companies to provide as much proof as possible of the claims they are making.

Moreover, companies that have an independent third party verify the absence of hazardous substances were also awarded.

Visibility and promotion

Electronics companies spend huge amounts of money advertising and promoting their products. The more visible green products are, the more likely they are going to be purchased by consumers. To determine this visibility, the number of website manipulations (such as the number of clicks or dropdown menus) required to reach the specifications of a product was assessed. The less website navigation needed, the more points were awarded. The average from a number of major websites visited was used and it is possible that the sites accessed for this assessment have since changed.

Due to the number of factors taken into account in this section the detailed results have not been displayed in the detailed scoring sheets below.



Detailed scores

		HP Compaq 6005 Pro Ultra-slim	Fujitsu Esprimo E9900	Dell Optiplex 980	Asus CS6110	Wipro WSG59755W7
Criteria	MaxPoints	Results Points	Results Points	Results Points	Results Points	Results Points
Chemicals						
Market		Global	Europe	Global	Asia	India
Totally PVC-free	5	YES 5.0	NO 0.0	NO 0.0	NO 0.0	YES 5.0
PVC-containing parts	3	n/a n/a	3 1.8	2 2.4	3 1.8	n/a n/a
Totally BFR-free	5	YES 5.0	NO 0.0	NO 0.0	NO 0.0	YES 5.0
BFR-containing parts	3	n/a n/a	3 1.8	3 1.8	4 1.2	n/a n/a
Antimony-free	3	NO 0.0	NO 0.0	NO 0.0	YES 3.0	NO 0.0
Phthalate-free	3	NO 0.0	NO 0.0	NO 0.0	NO 0.0	NO 0.0
Beryllium-free	3	NO 0.0	YES 3.0	NO 0.0	YES 3.0	NO 0.0
RoHS exemptions used	11	3 8.0	7 4.0	6 5.0	3 8.0	6 5.0
Subtotal	30	18.0	10.6	9.2	17.0	15.0
Energy use						
n/a Energy Star category	n/a	B n/a	B n/a	D n/a	C n/a	B n/a
Off-mode energy use (Watts)	n/a	1.0 n/a	1.2 n/a	1.9 n/a	0.6 n/a	0.8 n/a
Sleep-mode energy use (Watts)	n/a	3.1 n/a	2.0 n/a	3.0 n/a	1.9 n/a	1.7 n/a
Idle-mode energy use (Watts)	n/a	23.0 n/a	31.0 n/a	57.7 n/a	28.4 n/a	37.4 n/a
ETEC better than Energy Star (%)	16	61.48% 16.0	49.42% 15.8	33.24% 10.6	62.39% 16.0	40.58% 13.0
Efficiency at 50% better than Energy Star (%pts)	4	0.0 %* 0.0	4.0 % 3.0	5.0 % 4.0	1.5 %* 2.0	0.0 % 0.0
Efficiency at 20% better than Energy Star (%pts)	4	0.18W* 2.0	4.0 % 3.0	5.0 % 4.0	0.31W* 3.0	0.0 % 0.0
Greenpeace energy matrix	6	n/a 4.0	n/a 6.0	n/a 4.0	n/a 3.0	n/a 2.0
Subtotal	30	22.0	27.8	22.6	24.0	15.0
Lifecycle						
Manufacturer warranty (yrs)	7	3 5.0	3 5.0	3 5.0	3 5.0	3 5.0
Replacement parts available (yrs)	7	5 5.0	5 5.0	5 5.0	3 3.0	5 5.0
Take-back programme	3	Green Guide 1.0	Green Guide 1.0	Green Guide 2.0	Green Guide 0.0	Green Guide 3.0
Recycled plastic weight (%)	7	5.80% n/a	0% n/a	25% n/a	10% n/a	25% n/a
Post-consumer/Post-industrial (%)		100/0 1.0	0/0 0.0	100/0 2.5**	0/100 2.0	93/7 5.0
Upgradeable parts	6	4 4.8	4 4.8	5 6	0*** 0	0*** 0
Subtotal	30	16.8	15.8	20.5	10.0	18.0
Other						
Energy during production	4	n/a 1.0	n/a 0.5	n/a 0.0	n/a 0.5	n/a 0.0
Other innovations and features	3	n/a 0.5	n/a 0.0	n/a 0.0	n/a 1.0	n/a 0.0
Visibility	3	n/a 2.3	n/a 1.8	n/a 1.8	n/a 1.2	n/a 2.3
Subtotal	10	3.8	2.3	1.8	2.7	2.3
Total adjusted	10	6.06	5.65	5.41	5.37	5.02

Possible Desktop	
Results	Points
Global	
YES	5.0
n/a	n/a
YES	5.0
n/a	n/a
YES	3.0
NO	0.0
YES	3.0
3	8.0
	24.0
n/a	n/a
n/a	n/a
n/a	n/a
n/a	n/a
62.39%	16.0
5.0 %	4.0
5.0 %	4.0
n/a	6.0
	30.0
3	5.0
5	5.0
Green Guide	3.0
25%	n/a
100/0	5.0
5	6
	24.0
n/a	1.0
n/a	1.0
n/a	2.3
	4.3
	8.23

Desktops

The submissions in the desktop category were all relatively close together.

The desktop category was led by HP, with its 6005 Ultrastim desktop, which scored highest particularly in the chemicals section. The HP product was the only one that achieved more than 6 points. It is followed by the Fujitsu Esprimo, which scored particularly well in the energy category but lost crucial points to HP in the management of chemicals.

In third place is the Dell Optiplex 980. It does very well in the lifecycle category but lags behind in the elimination of hazardous chemicals and to a lesser extent in the energy category. Dell's product could have scored even higher if the company did not provide recycled plastic only in those models that are purchased in what the company is calling an 'EcoKit', excluding this important feature from all desktops and all Dell costumers.

Asus submitted a desktop that only just missed out on third place but was held down by providing replacement parts for only three years after the production of the product ceases.

While the desktop submitted by Indian company Wipro lagged a little behind, it still received over 5 points, and together with the HP product is the only desktop that is PVC and BFR-free. None of the desktops in previous surveys were PVC or BFR-free. The Wipro product also scored highest in regards to the use of recycled plastic.

When combining the features of all the products that have been assessed in this survey it would now be possible to produce a desktop that achieves 8.23 points.

**These desktops use external power supplies. The calculations for the notebook external power supplies have been applied.*

***Only half the points were given since recycled plastic is only used in the models with the optional 'Ecokit'*

****Wipro and Asus do not provide consumers with instruction on upgrading for this product. Therefore no points were given even though the product could be upgraded.*

Notebooks (overleaf p30)

The notebook category was very crowded this year, with submissions from ten different companies. The clear winner in this category is the UL30A by Asus, a company that in previous years has chosen not to take part in this survey. This product scored particularly well in the energy section and was only beaten by a very small margin in the chemicals section by Indian company HCL. However, with 5.59 points the product is well behind the 8.39 points that should now be technically possible when combining the top scores for all areas into one product.

The field behind Asus is very tight, with the next six notebooks within a range of less than 0.5 points. They included the notebooks by Panasonic, Samsung, Toshiba, Dell, HP and Sony.

HCL, Acer and Wipro make up the bottom of the list.

Panasonic with its CF-F9 model, which is in second place, has scored extra points for making an extremely rugged product, while third-placed Samsung NP-SF410 scored very well in the area of energy efficiency.

Apple is a company that has continually declined to take part in this survey. This is a pity, since its MacBook Pro MC374 would actually score quite well (especially being the only product that is PVC and BFR-free), even when only the data that could be found from public sources is included. Had Apple provided all the data that was required, its notebook would have probably been a real challenge to the Asus model.

Attention should also be drawn to the fact that Asus, Toshiba and Apple have all implemented lifecycle analysis tools that allow them to calculate the energy spent for each model, from the mining of resources all the way to the assembly and shipping of the product. A number of models such as the Toshiba, Dell and Apple products also received points for using arsenic-free display glass.

** Apple did not take part in this survey and entries in red mark those where there is some uncertainty as to the accuracy of the information found or where no information could be found at all.*

***Wipro does not provide consumers with instruction on upgrading but encourages them to use Wipro service centres. Therefore no points were given even though the product could be upgraded.*

		Asus UL30A		Panasonic CF-F9KWHZZPM		Samsung NP-SF410		Toshiba Portege R700		Dell Latitude Z	
Criteria	Maximum Points	Results	Points	Results	Points	Results	Points	Results	Points	Results	Points
Chemicals											
Market		Europe/NA/Asia/Pac		North America		Global		Global		Global	
Totally PVC-free	5	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
PVC-containing parts	3	3	1.8	1	3.0	2	2.4	1	3.0	2	2.4
Totally BFR-free	5	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
BFR-containing parts	3	4	1.2	5	0.6	4	1.2	5	0.6	2	2.4
Antimony-free	3	YES	3.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
Phthalate-free	3	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
Beryllium-free	3	YES	3.0	NO	0.0	NO	0.0	YES	3.0	NO	0.0
RoHS exemptions used	11	3	8.0	3	8.0	4	7.0	3	8.0	6	5.0
Subtotal	30		17.0		11.6		10.6		14.6		9.8
Energy use											
Energy Star category	n/a	A	n/a	A	n/a	B	n/a	A	n/a	A	n/a
Off-mode energy use (Watts)	n/a	0.42	n/a	0.58	n/a	0.49	n/a	0.23	n/a	0.98	n/a
Sleep-mode energy use (Watts)	n/a	1.26	n/a	1.01	n/a	0.95	n/a	0.88	n/a	1.91	n/a
Idle-mode energy use (Watts)	n/a	4.96	n/a	9.75	n/a	8.47	n/a	9.2	n/a	8.6	n/a
ETEC better than Energy Star (%)	16	59.12%	16.0	26.11%	8.4	54.17%	16.0	37.12%	11.9	31.57%	10.1
EPS active-mode better than Energy Star (% pts)	4	2.6 %	2.0	1.8 %	2.0	1.05%	1.0	0.7 %	1.0	1.0 %	1.0
EPS no-load better than Energy Star (Watts)	4	0.07	1.0	0.25	3.0	0.29	3.0	0.31	3.0	0.07	1.0
Greenpeace energy matrix	6	n/a	5.0	n/a	3.0	n/a	2.0	n/a	4.0	n/a	4.0
Subtotal	30		24.0		16.4		22.0		19.9		16.1
Lifecycle											
Manufacturer warranty (yrs)	7	2	3.0	3	5.0	1	1.0	1	1.0	3	5.0
Replacement parts available (yrs)	7	5	5.0	7	7.0	4	4.0	5	5.0	5	5.0
Take-back programme	3	Green Guide	0.0	Green Guide	2.0	Green Guide	1.0	Green Guide	1.0	Green Guide	2.0
Recycled plastic weight (% of total)	7	0.0%	n/a	0.0%	n/a	15.0%	n/a	0.1%	n/a	0.0%	n/a
Post-consumer/Post-industrial		0/0	0.0	0/0	0.0	0/100	2.0	100/0	0.0	0/0	0.0
Upgradeable parts	6	2	2.4	1	1.2	3	3.6	1	1.2	3	3.6
Subtotal	23		10.4		15.2		11.6		8.2		15.6
Other											
Energy during production	4	n/a	1.5	n/a	1.5	n/a	0.0	n/a	2	n/a	1.0
Other innovations and features	3	n/a	1.5	n/a	1.0	n/a	1.0	n/a	0.5	n/a	0.5
Visibility	3	n/a	1.5	n/a	1.5	n/a	1.5	n/a	1.4	n/a	1.7
Subtotal	10		4.5		4.0		2.5		3.9		3.2
Total adjusted	10		5.59		4.72		4.67		4.65		4.47

HP EliteBook 2540p		Sony VPCS12V9E/B		HCL Series 54		Acer TravelMate 8572		Wipro WNB7PAC3700K		Apple MacBook Pro MC374*		Possible Notebook	
Results Points		Results Points		Results Points		Results Points		Results Points		Results Points		Results Points	
Global		Europe		India		Global		Global		Global		Global	
NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0	YES	5.0	YES	5.0
1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	n/a	n/a	n/a	n/a
NO	0.0	NO	0.0	NO	0.0	NO	0.0	YES	5.0	YES	5.0	YES	5.0
2	2.4	3	1.8	3	1.8	1	3.0	n/a	n/a	n/a	n/a	0	n/a
NO	0.0	NO	0.0	YES	3.0	NO	0.0	NO	0.0	n/a	n/a	YES	3.0
NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0	n/a	n/a	NO	0.0
NO	0.0	NO	0.0	YES	3.0	NO	0.0	NO	0.0	n/a	n/a	YES	3.0
4	7.0	4	7.0	4	7.0	7	4.0	6	5.0	n/a	n/a	3	8.0
12.4		11.8		17.8		10.0		13.0		10.0		24.0	
3	n/a	B	n/a	A	n/a	A	n/a	A	n/a	A	n/a	n/a	n/a
0.84	n/a	0.90	n/a	0.41	n/a	0.62	n/a	0.37	n/a	0.37	n/a	n/a	n/a
1.143	n/a	1.44	n/a	1.13	n/a	1.19	n/a	0.64	n/a	1.30	n/a	n/a	n/a
11.49	n/a	12.75	n/a	12.26	n/a	8.87	n/a	11.50	n/a	6.80	n/a	n/a	n/a
10.98%	3.5	26.58%	8.5	11.59%	3.7	30.97	9.9	18.18%	5.8	47.62%	15.2	59.12%	16.0
0 %	0.0	2.9 %	2.0	0.0 %	0.0	3.7 %	3.0	0.1 %	1.0	0.7 %	1.0	3.7 %	3.0
0.26	3.0	0.19	2.0	0.36	4.0	0.38	4.0	0	0.0	0.26	3.0	0.38	4.0
n/a	5.5	internal	3.5	n/a	2.5	n/a	3.0	n/a	1.5	n/a	3.5	n/a	5.5
12.0		16.0		10.2		19.9		8.3		22.7		28.5	
3	5.0	2	3.0	1	1.0	1	1.0	1	1.0	1	1.0	3	5.0
5	5.0	6	6.0	4	4.0	3	3.0	3	3.0	n/a	n/a	7	7.0
Green Guide	1.0	Green Guide	0.0	Green Guide	3.0	Green Guide	0.0	Green Guide	3.0	Green Guide	2.0	Green Guide	3.0
10.8%	n/a	1.1%	n/a	0.0%	n/a	0.0%	n/a	25.0%	n/a	0.0%	n/a	25.0%	n/a
100/0	3.0	0/100	0.0	0/0	0.0	0/0	0.0	93/7	5.0	0/0	0.0	93/7	5.0
2	2.4	1	1.2	2	2.4	3	3.6	0**	0	2	2.4	3	3.6
16.4		10.2		10.4		7.6		12.0		5.4		23.6	
n/a	1	n/a	2.0	n/a	0.0	n/a	0	n/a	0.0	n/a	4.0	n/a	4.0
n/a	0.0	n/a	1.0	n/a	0.5	n/a	1.0	n/a	0.0	n/a	0.5	n/a	1.5
n/a	2.3	n/a	1.8	n/a	1.5	n/a	1.8	n/a	1.8	n/a	1.8	n/a	2.3
3.3		4.8		2.0		2.8		1.8		6.3		7.8	
4.41		4.28		4.04		4.03		3.51		4.44		8.39	

		Acer TM8172		Asus1015PED		Samsung NP-N230		HP Mini 5103 ES		Dell Latitude 2110	
Criteria	Maximum Points	Results	Points	Results	Points	Results	Points	Results	Points	Results	Points
Chemicals											
Market		Global		Global		Global		Global		Global	
Totally PVC-free	5	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
PVC-containing parts	3	1	3.0	3	1.8	2	2.4	1	3.0	2	2.4
Totally BFR-free	5	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
BFR-containing parts	3	1	3.0	4	1.2	4	1.2	1	3.0	3	1.8
Antimony-free	3	NO	0.0	YES	3.0	NO	0.0	NO	0.0	NO	0.0
Phthalate-free	3	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
Beryllium-free	3	NO	0.0	YES	3.0	NO	0.0	NO	0.0	NO	0.0
RoHS exemptions used	11	3	8.0	3	8.0	4	7.0	4	7.0	6	5.0
Subtotal	30	14.0		17.0		10.6		13.0		9.2	
Energy use											
Energy Star category	n/a	A	n/a	A	n/a	A	n/a	A	n/a	A	n/a
Off-mode energy use (Watts)	n/a	0.54	n/a	0.51	n/a	0.47	n/a	0.86	n/a	0.9	n/a
Sleep-mode energy use (Watts)	n/a	0.63	n/a	0.838	n/a	0.7	n/a	1.00	n/a	1.07	n/a
Idle-mode energy use (Watts)	n/a	6.18	n/a	9.27	n/a	7.07	n/a	9.34	n/a	9.8	n/a
ETEC better than Energy Star (%)	16	50.92%	16.0	30.56%	9.8	45.84%	14.7	25.15%	8.1	24.47%	7.8
EPS active mode better than Energy Star (% pts)	4	3.0 %	3.0	2.4 %	2.0	2.0%	2.0	0.0 %	0.0	0.0 %	0.0
EPS better than Energy Star (Watts)	4	0.21	3.0	0.07	1.0	0.1	2.0	10.00%	2.0	0.21	3.0
Greenpeace energy matrix	6	n/a	3.0	n/a	4.0	n/a	2.0	n/a	4.0	n/a	4.0
Subtotal	30	25.0		16.8		20.7		14.1		14.8	
Lifecycle											
Manufacturer warranty (yrs)	7	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
Replacement parts available (yrs)	7	3	3.0	5	5.0	4	4.0	5	5.0	5	5.0
Take-back programme	3	Green Guide	0.0	Green Guide	0.0	Green Guide	1.0	Green Guide	1.0	Green Guide	2.0
Recycled plastic weight %	n/a	0%	n/a	0%	n/a	15%	n/a	0%	n/a	0%	n/a
Post-consumer/Post-industrial	7	0/0	0.0	0/0	0.0	0/100	2.0	0/0	0.0	0/0	0.0
Upgradeable parts	1	Batt Mem	1.0	Batt Mem	1.0	Batt Mem	1.0	Batt Mem	1.0	Batt Mem	1.0
Battery/product price ratio	2.5	10%	2.0	23%	0.5	23%	0.5	28%	0.0	25%	0.5
Battery life	2.5	8 hrs	1.5	10hr 45min	2.5	11 hrs	2.5	10.15 hrs	2.5	4hrs 54min	0.0
Subtotal	30	8.5		10.0		12.0		8.0		9.5	
Other											
Energy during production	4	n/a	0.0	n/a	1.5	n/a	0.0	n/a	1.0	n/a	1.0
Other innovations and features	3	n/a	1.5	n/a	1.5	n/a	1.0	n/a	0.5	n/a	1.0
Visibility	3	n/a	1.8	n/a	1.5	n/a	1.5	n/a	1.8	n/a	1.5
Subtotal	10	3.3		4.5		2.5		3.3		3.5	
Total adjusted	10.00	5.08		4.83		4.58		3.84		3.70	

Possible Netbook

Results Points

Global	
NO	0.0
1	3.0
NO	0.0
1	3.0
YES	3.0
NO	0.0
YES	3.0
3	8.0
	20.0

n/a	n/a
n/a	n/a
n/a	n/a
n/a	n/a
50.92%	16.0
3.0 %	3.0
n/a	3.0
n/a	4.0
	26.0

1	1.0
5	5.0
Green Guide	2.0
15%	n/a
0/100	2.0
Batt Mem	1.0
10%	2.0
11 hrs	2.5
	15.5

n/a	1.5
n/a	1.5
n/a	1.8
	4.8
	6.63

Netbooks

This is the first time that netbooks were included in the Greenpeace electronics survey. Overall, the results in the netbook category were somewhat disappointing, partly since no company submitted a product that was either PVC or BFR free. The Acer TM8172 achieved the highest score of all products in this category with a total of 5.08 points. This is mainly due to the high scores in the energy efficiency section, where it is far ahead of the other contenders.

In regards to chemicals, the Asus 1015PED which, according to the company is free of antimony and beryllium, scored the highest and as a result gained second place. Asus once again scored points for its Lifecycle Analysis tool specific to this product. Not far behind is the Samsung model which is the only product submitted that uses recycled plastics. The HP Mini and the Dell Latitude 2110 are the bottom of the field, reaching just over half of the points that are technically possible in this survey when combining the best scores of all the product submitted.

Some additional points were awarded, for example for the user replaceable hard drive of the HP Mini and the free-fall hard drive protection of the Dell model.

		Asus VW-247H-HF		Dell G2410H		Lenovo ThinkVision L2251x		HP Compaq LE19f		Fujitsu P23T-6 IPS	
Criteria	Maximum Points	Results	Points	Results	Points	Results	Points	Results	Points	Results	Points
Chemicals											
Market		Global		Global		Global		NA/SA/ Asia/Pac		Europe	
Totally PVC-free	5	YES	5.0	YES	5.0	YES	5.0	YES	5.0	NO	0.0
PVC-containing parts	3	0	n/a	0	n/a	0	n/a	0	n/a	3	1.8
Totally BFR-free	5	YES	5.0	YES	5.0	YES	5.0	YES	5.0	NO	0.0
BFR-containing parts	3	0	n/a	0	n/a	0	n/a	0	n/a	3	1.8
Antimony-free	3	YES	3.0	NO	0.0	YES	3.0	NO	0.0	YES	3.0
Phthalate-free	3	YES	3.0	YES	3.0	YES	3.0	NO	0.0	NO	0.0
Beryllium-free	3	YES	3.0	YES	3.0	YES	3.0	NO	0.0	YES	3.0
RoHS exemptions used	11	2	9.0	4	7.0	3	8.0	3	8.0	2	9.0
Subtotal	30	28.0		23.0		27.0		18.0		18.6	
Energy use											
Screen diagonal (inch)	n/a	23.6	n/a	24	n/a	21.995	n/a	19	n/a	23	n/a
Maximum on-power or average ABC power (Watts)	n/a	16.2	n/a	18.9	n/a	21.7	n/a	15.0	n/a	30.0	n/a
Maximum on-mode/average on-mode (ABC) better than Energy Star (%)	12	51.65%	12.0	44.35%	10.6	30.20%	7.3	33.18%	8.0	8.85%	2.1
Sleep-mode better than Energy Star (%)	6	93.3%	6.0	94.5%	6.0	73.0%	6.0	78.0%	6.0	0 Watt	6.0
Off-mode better than Energy Star (%)	6	88.50%	6.0	89.00%	6.0	52.00%	6.0	64.00%	6.0	0 Watt	6.0
Greenpeace energy matrix	6	n/a	2.5	n/a	4.0	n/a	4.0	n/a	3.5	n/a	6.0
Subtotal	30	26.5		26.6		23.3		23.5		20.1	
Lifecycle											
Manufacturer warranty (yrs)	7	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0
Replacement parts available (yrs)	7	5	5.0	5	5.0	3	3.0	5	5.0	5	5.0
Take-back programme	3	Green Guide	0.0	Green Guide	2.0	Green Guide	2.0	Green Guide	1.0	Green Guide	1.0
Recycled plastic weight %	n/a	18.55%	n/a	13%	n/a	42%	n/a	12.70%	n/a	20%	n/a
Post-consumer/Post-industrial	7	100/0	3.0	25/75	2.0	76/24	5.0	100/0	3.0	undefined	2.0
Pixel policy period (months)	n/a	12 - 36	n/a	36	n/a	36	n/a	36	n/a	d	n/a
Pixel policy (bright/dark/ combined sub-pixel)	6	3/6/6	3.0	1/1/7	5.5	2/5/5	2.0	1/1/6	5.5	36	5.5
Subtotal	30	16.0		19.5		17.0		19.5		1/2/6	18.5
Other											
Energy during production	4	n/a	0.5	n/a	0.0	n/a	0.0	n/a	1	n/a	0.0
Other special features	3	n/a	1.5	n/a	0.0	n/a	1.0	n/a	1.0	n/a	1.0
Visibility	3	n/a	2.5	n/a	1.5	n/a	2.1	n/a	2.4	n/a	1.8
Subtotal	10	4.5		1.5		3.1		4.4		n/a	2.8
Total adjusted	10	7.50		7.06		7.04		6.54		6.00	

Acer C233HL		Samsung PX2370		Possible mobile phone	
Results	Points	Results	Points	Results	Points
Global		Global		Global	
YES	5.0	NO	0.0	YES	5.0
0	n/a	2	2.4	0	n/a
YES	5.0	NO	0.0	YES	5.0
0	n/a	3	1.8	0	n/a
NO	0.0	NO	0.0	YES	3.0
YES	3.0	NO	0.0	YES	3.0
YES	3.0	NO	0.0	YES	3.0
4	7.0	6	5.0	2	9.0
23.0		9.2		28.0	
23		23		n/a	
22.8		25.0		n/a	
31.25%	7.5	24.40%	5.9	51.65%	12.0
75.5%	6.0	83.0%	6.0	95.0%	6.0
72.00%	6.0	76.00%	6.0	0 Watt	6.0
n/a	2.0	n/a	3.0	n/a	6.0
21.5		20.9		30.0	
2		1		3	
3		5		5	
Green Guide	0.0	Green Guide	1.0	Green Guide	2.0
0.00%	n/a	25%	n/a	42%	n/a
0/0	0.0	0/100	4.0	76/24	5.0
12	n/a	6	n/a	36	n/a
3/6/6	2*	3/5/6	2*	1/1/6	5.5
6.0		11.0		22.5	
n/a		n/a		n/a	
n/a		n/a		n/a	
n/a		n/a		n/a	
3.3		2.7		5.5	
5.38		4.38		8.60	

Monitors

The computer displays were a very high-scoring category this year, with the winning product coming very close to the points that would be achievable by combining the best scores for each criterion. As was the case in the notebooks category, the winning product came from Asus, which submitted the VW-247H-HF model. In the chemicals section this product reached the highest-ever score of any product submitted to the Greenpeace electronics survey. With 28 out of 30 points it only just missed out from a full score due to the use of two RoHS exemptions. Asus was also awarded with special points for having a very useful and extensive online energy calculator for its monitor products.

Not far behind, in second place is the Dell G2410H which scored highest in energy efficiency and also in the lifecycle section (together with the HP model in fourth place). Third place went to the Lenovo L2251x which was beaten by the Dell by the smallest of margins and did extremely well in the use of recycled plastics. Of the weight of all plastics in this product, 42% comes from recycled sources and three quarters of that is post-consumer recycled plastic.

The Fujitsu P23T-6 IPS reached fourth place and together with the Samsung PX 2370 in sixth and last place they are the only products that are not PVC and BFR-free. The Fujitsu model, however, scored special points for a new innovation which results in zero Watt energy use in standby and off-mode without the need for a hard off switch. While Samsung is to be commended for submitting products in most categories in this survey, this model unfortunately lags far behind the winner. In fifth place is the Acer C233HL, which is notably the only monitor submitted that does not use any recycled plastic, and thus scores quite low in the lifecycle section.

With four out of six products free of PVC and BFRs, it is clear that a lot of progress has been made in recent years on the elimination of these chemicals. In the previous survey only one product was free of these harmful chemical substances in this category.

** A point was deducted for companies that have a replacement policy that applies to less than 36 months.*

		Samsung GT-S7550 (Blue Earth)	Sony Ericsson Elm J10i	LG GD510	Nokia X3-02	Motorola A45 Eco
Criteria	Maximum Points	Results Points	Results Points	Results Points	Results Points	Results Points
Chemicals						
Market		Global	Global	Global	Eur./SA/Asia Pac/Afr.	Americas
Totally PVC-free	5	YES 5.0	YES 5.0	YES 5.0	YES 5.0	YES 5.0
PVC-containing parts	3	0 n/a	0 n/a	0 n/a	0 n/a	0 n/a
Totally BFR-free	5	YES 5.0	YES 5.0	YES 5.0	YES 5.0	YES 5.0
BFR-containing parts	3	0 n/a	0 n/a	0 n/a	YES n/a	0 n/a
Antimony-free	3	NO 0.0	NO 0.0	NO 0.0	NO 0.0	NO 0.0
Phthalate-free	3	YES 3.0	YES 3.0	NO 0.0	YES 3.0	YES 3.0
Beryllium-free	3	NO 0.0	YES 3.0	NO 0.0	YES 3.0	NO 0.0
RoHS exemptions used	11	2 9.0	3 8.0	2 9.0	6 5.0	3 8.0
Subtotal	30	22.0	24.0	19.0	21.0	21.0
Energy use						
Active mode better than Energy Star (% points)	16	10.5 % 16.0	3.31 % 6.6	8.36 % 16.0	2.70 % 5.4	0.00 % 0.0
No-load EPS better than Energy Star (Watts)	8	0.28 8.0	0.27 7.0	0.27 7.0	0.27 7.0	0 0.0
Greenpeace energy matrix	6	n/a 5.5	n/a 5.0	n/a 6.0	n/a 6.0	n/a 5.0
Subtotal	30	29.5	18.6	29.0	18.4	5.0
Lifecycle						
Manufacturer warranty (yrs)	7	1 1.0	1 1.0	1 1.0	1 1.0	1 1.0
Replacement parts available (yrs)	7	3 3.0	3 3.0	3 3.0	2 2.0	1 1.0
Take-back programme	3	Green Guide 1.0	Green Guide 1.0	Green Guide 1.0	Green Guide 3.0	Green Guide 2.0
Recycled plastic weight (% of total)	n/a	37.20% n/a	60.00% n/a	0.00% n/a	0.00% n/a	25.00% n/a
Post-consumer/Post-industrial	7	100/0 5.0	100/0 7.0	0/0 0.0	0/0 0.0	100/0 5.0
Upgradeable parts	2	Batt Mem 2.0	Batt Mem 2.0	Batt Mem 2.0	Batt Mem 2.0	Batt Mem 2.0
Battery/handset price ratio	4	13% 2.0	15% 2.0	12% 2.0	19% 1.0	7% 3.0
Subtotal	30	14.0	16.0	9.0	9.0	14.0
Other						
Energy during production	4	n/a 0	n/a 2.5	n/a 2	n/a 3	n/a 3
Other innovations and features	3	n/a 3	n/a 3	n/a 0.5	n/a 1	n/a 2
Visibility	3	n/a 1.8	n/a 1.8	n/a 2.1	n/a 1.8	n/a 1.8
Subtotal	10	4.8	7.30	4.60	5.80	6.80
Total adjusted	10.00	7.03	6.59	6.16	5.42	4.68

Possible mobile phone	
Results	Points
Global	
YES	5.0
0	n/a
YES	5.0
0	n/a
NO	0.0
YES	3.0
YES	3.0
2	9.0
	25.0
10.5 %	16.0
0.28	8.0
n/a	6.0
	30.0
1	1.0
3	3.0
Green Guide	3.0
60.00%	n/a
100/0	7.0
Batt Mem	2.0
7%	3.0
	19.0
n/a	3
n/a	3
n/a	1.8
	7.8
	8.18

Mobile phones

The mobile phone category has a clear winner; the Samsung Blue Earth model, which scores extremely highly in the energy efficiency section with only half a point below the maximum points. It should be noted that there was some discussion about whether this phone should have been qualified as a smartphone but Samsung argues that, because there is no applications market for this phone and operating system, it should be regarded as a mobile phone despite having some smartphone features such as Wifi and GPS. The product also received innovation points for having a solar panel as the back cover for charging the phone. Overall, the Blue Earth received 7.03 points compared to the 8.18 points of the fictional phone that combines all the best scores.

The second-placed Elm J10i by Sony Ericsson is not too far behind, and the top features that stand out are that 60% of the plastic is from recycled sources (by weight) and Sony Ericsson provided extremely detailed internal company information to back its claims up. Special points were awarded for supplying this confidential information. The Elm also scored highest in the lifecycle category.

The LG GD510 is the first PVC and BFR-free phone product submitted by LG, and lands in third place. It is noteworthy that all mobile phones submitted to this survey are free of these chemicals.

Surprisingly, the bottom two places were filled by the Nokia X3-02 and the MotorolaA54 eco. While both scored well in the chemicals category, the Nokia phone struggled in the lifecycle category. The Motorola phone, on the other hand, suffered from using a charger that does not have the same energy efficiency as the other products submitted. It has, however, the best ratio between the handset price and the replacement battery.

		Sony Ericsson Aspen (M1i)		Nokia N8-00		Samsung GT-S8500(Wave)		HP Palm Pixi Plus		Blackberry Pearl 3G - 9100/9105	
Criteria	Maximum Points	Results	Points	Results	Points	Results	Points	Results	Points	Results	Points
Chemicals											
Market		Global		Global		Global		Europe, NA		Global	
Totally PVC-free	5	YES	5.0	YES	5.0	YES	5.0	YES	5.0	NO	0.0
PVC-containing parts	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1	3.0
Totally BFR-free	5	YES	5.0	YES	5.0	YES	5.0	NO	0.0	NO	0.0
BFR-containing parts	3	0	n/a	0	n/a	0	n/a	2	2.4	3	1.8
Antimony-free	3	NO	0.0	NO	0.0	NO	0.0	NO	0.0	NO	0.0
Phthalate-free	3	YES	3.0	YES	3.0	YES	3.0	NO	0.0	NO	0.0
Beryllium-free	3	YES	3.0	YES	3.0	NO	0.0	NO	0.0	NO	0.0
RoHS exemptions used	11	3	8.0	6	5.0	3	8.0	4	7.0	3	8.0
Subtotal	30		24.0		21.0		21.0		14.4		12.8
Energy use											
EPS active mode better than Energy Star (% pts)	16	2.65 %	5.3	3.50 %	7.0	2.50 %	5.0	4.93 %	9.9	2.29 %	4.6
No-load EPS better than Energy Star (Watts)	8 6	0.27	7.0	0.27	7.0	0.15	3.0	0.12	3.0	0.15	3.0
Greenpeace energy matrix	30	n/a	5.5	n/a	6.0	n/a	5.5	n/a	3.0	n/a	2.5
Subtotal			17.8		20.0		13.5		15.9		10.1
Lifecycle											
Manufacturer warranty (yrs)	7	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
Replacement parts available (yrs)	7	3	3.0	2	2.0	3	3.0	7	7.0	3	3.0
Take-back programme	3	Green Guide	1.0	Green Guide	3.0	Green Guide	1.0	Green Guide	1.0	Green Guide	0.0
Recycled plastic weight (% of total)	n/a	30.00%	n/a	0.00%	n/a	0.00%	n/a	0.00%	n/a	0.00%	n/a
Post-consumer/Post-industrial	7	100/0	5.0	0/0	0.0	0/0	0.0	0/0	0.0	0/0	0.0
Upgradeable parts	2	Batt Mem	2.0	Memory	1.0	Batt Mem	2.0	Batt Mem	1.0	Batt Mem	2.0
Battery/handset price ratio	4	18.00%	1.0	8.00%	3.0	9.50%	3.0	14.60%	2.0	9.20%	3.0
Subtotal	30		13.0		10.0		10.0		12.0		9.0
Other											
Energy during production	4.0	n/a	2.5	n/a	3.0	n/a	0.0	n/a	1.0	n/a	0.0
Other innovations and features	3	n/a	3.0	n/a	1.0	n/a	2.0	n/a	1.5	n/a	0.0
Visibility	3	n/a	1.8	n/a	2.0	n/a	1.8	n/a	2.3	n/a	2.1
Subtotal	10		7.3		6.0		3.8		4.8		2.1
Total adjusted	10.00		6.21		5.70		4.83		4.71		3.40

Dell Aero		Possible smartphone	
Results Points		Results Points	
NA/Asia		Global	
NO	0.0	YES	5.0
1	3.0	n/a	n/a
NO	0.0	YES	5.0
1	3.0	0	n/a
YES	3.0	YES	3.0
NO	0.0	YES	3.0
YES	3.0	YES	3.0
6	5.0	3	8.0
	17.0		27.0
0.03 %	0.1	4.93 %	9.9
0.0	0.0	0.27	7.0
n/a	3.0	n/a	6.0
	3.1		22.9
1	1.0	1	1.0
2	2.0	7	7.0
Green Guide	2.0	Green Guide	3.0
23.80%	n/a	30.00%	n/a
0/100	2.0	100/0	5.0
Batt Mem	2.0	Batt Mem	2.0
16.60%	1.0	8.00%	3.0
	10.0		21.0
n/a	0.0	n/a	3.0
n/a	0.0	n/a	3.0
n/a	1.8	n/a	2.3
	1.8		8.3
	3.19		7.92

Smartphones

While Sony Ericsson just missed out on winning the mobile phone category, its smartphone is at the top of the list. The Aspen (M1i) scored highest not only in the chemicals and lifecycle sections, like the mobile phone it also received special points for the amount of additional confidential information that was supplied. The Aspen also has the highest amount of recycled plastic of any of the submitted smartphones.

The second place went to Nokia, whose N8-00 model dominated the energy efficiency section and also had the lowest handset/battery price ratio. Third and fourth place went to Samsung's Wave and the HP Palm Pixi Plus, with the Pixi nearly making up in lifecycle and energy points what it had lost to the Wave in the chemicals section. The Palm model was submitted by Hewlett Packard since the company took over the handheld manufacturer in April 2010. Samsung also submitted information that went beyond what has been asked for but not to the same extent as Sony Ericsson.

The last two places are occupied by the Blackberry Pearl and the Dell Aero. Both received low scores for not eliminating PVC or BFR free. The Aero scored very low in energy efficiency. This is the first time that Dell submitted or produced a smartphone and there is a lot of room for improvement.

Additional innovation points were awarded for using waterborne paint which reduced volatile organic compounds (Sony Ericsson) and for Samsung's Super AMOLED display.

		Sharp LC-52SE1*		Panasonic TC-42LD24		Sony KDL-32EX710		Samsung UE46C6000		Philips Econova 42PFL6805**	
Criteria	Maximum Points	Results	Points	Results	Points	Results	Points	Results	Points	Results	Points
Chemicals											
Market		Japan		North America		North America		Europe		Europe	
Totally PVC-free	5	YES	5.0	NO	0.0	NO	0.0	NO	0.0	YES	5.0
PVC-containing parts	3	n/a	n/a	1	3.0	3	1.8	2	2.4	n/a	n/a
Totally BFR-free	5	NO	0.0	NO	0.0	NO	0.0	NO	0.0	YES	5.0
BFR-containing parts	3	1	3.0	3	1.8	3	1.8	1	3.0	n/a	n/a
Antimony-free	3	NO	0.0	NO	0.0	NO	0.0	NO	0.0	n/a	n/a
Phthalate-free	3	YES	3.0	NO	0.0	NO	0.0	NO	0.0	n/a	n/a
Beryllium-free	3	YES	3.0	NO	0.0	NO	0.0	NO	0.0	n/a	n/a
RoHS exemptions used	11	5	6.0	3	8.0	4	7.0	6	5.0	n/a	n/a
Subtotal	30		20.0		12.8		10.6		10.4		10.0
Energy use											
Area (square inch)	n/a	1157	n/a	754	n/a	425	n/a	904	n/a	754.0	n/a
Maximum on-mode (Watts)	n/a	81	n/a	n/a	n/a	n/a	n/a	n/a	n/a	58.1	n/a
Pa1_broadcast (ABC) (Watts)	n/a	n/a	n/a	74	n/a	48	n/a	119.44	n/a	n/a	n/a
Maximum on-mode or Pa1 better than Energy Star (%)	16	50.56%	16.0	35.92%	11.5	36.84%	11.8	10.52%	3.4	49.69%	15.9
Sleep-mode better than Energy Star (%)	8	90%	8.0	70%	8.0	88%	8.0	93%	8.0	93%	8.0
Greenpeace energy matrix	6	n/a	4.0	n/a	3.0	n/a	5.0	n/a	3.5	n/a	6.0
Subtotal	30		28.0		22.5		24.8		14.9		29.9
Lifecycle											
Manufacturer warranty (yrs)	7	1	1.0	1	1.0	1	1.0	1	1.0	1.0	1.0
Replacement parts available (yrs)	7	8	7.0	8	7.0	8	7.0	7	7.0	n/a	n/a
Take-back programme	3	Green Guide	1.0	Green Guide	2.0	Green Guide	0.0	Green Guide	1.0	Green Guide	0.0
Recycled plastic weight (% of total)	n/a	0.55%	n/a	0-1.3%	n/a	13.00%	n/a	25.00%	n/a	0.00%	n/a
Post-consumer/Post-industrial	7	100/0	0.0	100/0	0.0	0/100	1.0	0/100	4.0	0/0	0.0
Adjusted subtotal	30 (adjusted)		11.3		12.5		11.3		16.3		1.3
Other											
Energy during production	4	n/a	2	n/a	1.5	n/a	2	n/a	0	n/a	0
Other innovations and features	3	n/a	1.5	n/a	1.0	n/a	0.5	n/a	1.5	n/a	1.5
Visibility	3	n/a	1.8	n/a	1.5	n/a	1.5	n/a	1.2	n/a	1.2
Subtotal	10		5.3		4.0		4.0		2.7		2.7
Total adjusted	10		6.46		5.18		5.07		4.43		4.39

Possible TV	
Results	Points
Global	
YES	5.0
n/a	n/a
YES	5.0
n/a	n/a
NO	0.0
YES	3.0
YES	3.0
3	8.0
	24.0
n/a	n/a
n/a	n/a
n/a	n/a
50.56%	16.0
90%	8.0
n/a	6.0
	30.0
1	1.0
8	7.0
Green Guide	2.0
25.00%	n/a
0/100	4.0
	17.5
n/a	2
n/a	1.5
n/a	1.8
	5.3
	7.68

TVs

The TVs section was won by Sharp's LC-52SE1 with the largest margin in any of the product categories. The product's success came mostly from not using any PVC and from its energy efficiency. Note that the figures provided for this product in regards to energy use are not applicable to the Japanese market, where a different energy efficiency certification is being used. The second place went to the model from Panasonic (TC-42LD24), closely followed by the Sony KDL-32EX710. Both of these products had very similar scores throughout the scoring sections. The Samsung model in fourth place was clearly let down by the lowest scores in the energy efficiency section but despite having the highest score in the lifecycle segment (of note is the highest share of recycled plastic) it could not catch up to the Panasonic and Sony products.

Panasonic and Sharp have provided Greenpeace with information with transparency that went beyond the requirements of the survey and have been awarded points for this.

Philips, like Apple, has unfortunately once again decided not take part in this survey. Its Econova 42 is believed to be the first TV that is free of PVC and BFRs. As can be seen from the table below, when the known data has been entered for this product, it is already very close to its competitors. While the accuracy of this data cannot be guaranteed - since it has not been signed off by the company - the Econova would have stood a good chance to achieve a top placing.

* Note that Japan uses its own rating for energy efficiency. The rating used for the Sharp LC 52SE1 has been supplied by Sharp following the Energy Star methodology. The figures provided are not applicable to the Japanese market.

** Philips did not take part in this survey and entries in red mark those where there is some uncertainty as to the accuracy of the information found or where no information could be found at all.



Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands
Tel: +31 20 7182000
Fax: +31 20 7182002