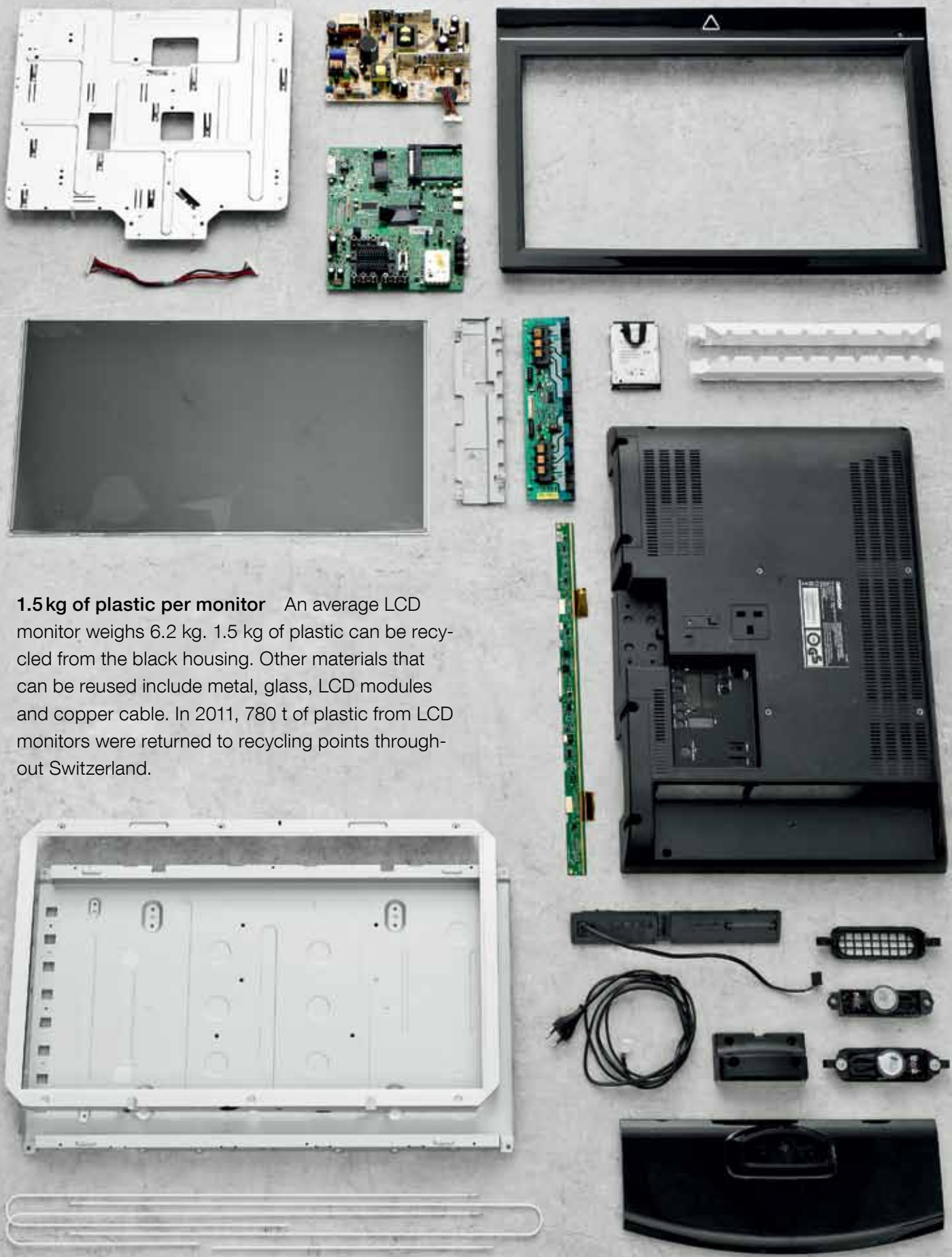
2011 Activity Report

swico recycling



1.5 kg of plastic per monitor An average LCD monitor weighs 6.2 kg. 1.5 kg of plastic can be recycled from the black housing. Other materials that can be reused include metal, glass, LCD modules and copper cable. In 2011, 780 t of plastic from LCD monitors were returned to recycling points throughout Switzerland.

Editorial

I'll own up. I own five mobile phones, three of which are in active use. So I'm also one of those people who have more mobile phones than they really need. "Why don't I turn in the ones I no longer have a use for?" you might ask. Good question. My answer is that for me, a mobile phone is a tool of my job. My old phones serve as backups in case one of the active ones stops working. So I'm like most people. In almost every household you'll find unused mobile phones that could be disposed of. But then again, for all the importance of safe disposal, I think there's only so far you can go to persuade people to part with their old phones. They don't take up much space, so people like to hang on to them – often out of sheer nostalgia. However, that's only one side of the coin – and this Activity Report is devoted to the other. At SWICO, we believe it is vitally important to educate people about the metals contained in mobile phones and other electronic devices, how they are obtained and how they are disposed of. There's much more to it than plastic. A mobile phone might not be worth its weight in gold, and a monitor may not be crammed full of hidden treasures, but returning disused electrical and electronic equipment is still a smart move. Every responsible consumer should know what they are buying, hoarding and disposing of. Armed with that knowledge, they can make the right decisions about what to do with gadgetry they no longer need. I am firmly convinced that most people have an ecological conscience. I doubt that many are indifferent to the conditions under which precious metals are mined or equipment is disposed of in the Third World. SWICO has discussed these issues with experts from the fields of business and research. I hope you enjoy reading the fascinating interviews and articles in this Activity Report.

Finally, a word of farewell: Paul Brändli is retiring in May 2012 and handing over the reins to Jean-Marc Hensch. Thank you, Paul, for all your hard work. And to Jean-Marc Hensch: good luck in your future with SWICO Recycling.

Andreas Knöpfli, President of SWICO

Contents

Half a kilo of copper per monitor Much of a CRT monitor can be recycled: metals such as iron and glass modules – and of course copper. 570 grams of copper wind their way through every CRT monitor. The rust-red metal can be found in the coil, in cables and on the printed circuit board. A total of 500 tonnes of copper from CRT equipment were collected for recycling in 2011.

Copper as well as many other valuable metals can be found in devices we use every day: mobile phones, electrical and electronic devices and equipment all contain valuable rare metals. But where do those metals come from? Will there still be enough of them 100 years from now? And what is the best way to dispose of them? SWICO asked some experts in the field; their answers can be found in this Activity Report.

2011 – the highlights

Greenforum 2011

SWICO Recycling's fourth Greenforum took place on 24 May 2011. Speakers included Rolf Widmer (Empa St. Gallen), Katharina Kummer Peiry (Basel Convention), Daniel Böni (foundation of the centre for sustainable management of recyclable waste and resources) and Paul Brändli (SWICO Recycling). They discussed issues such as the differences between recycling systems in a developing country and a highly industrialised nation such as Switzerland, and the ways in which the Basel Convention tries to prevent products for disposal being exported to the Third World. Dry slag extraction has increased the overall recovery rate in Switzerland. In a developing country like India, by contrast, insulating material is combusted over an open fire in order to recover copper. The figures confirm that Switzerland has continued to expand its pioneering role in the recycling of electrical and electronic equipment. The next Greenforum will take place on 22 May 2012.

SWICO Recycling Award

Last year, the first-ever SWICO Recycling Award was presented to the Josef Frey AG collection point in Sursee. Its aim is to recognise the friendliness and service, but also the processes and transport safety, of a collection point each year. Future awards will be presented at SWICO Recycling's annual Greenforum.

Suisse Public 2011

In 2011 SWICO Recycling was once again present at Suisse Public, the Swiss trade fair for public enterprises and administrations, with the umbrella association Swiss Recycling reuniting its partners at an attractive stand. Expert staff were on hand throughout the exhibition to answer questions on recycling today and visions for the future.

WEEELABEX Project

In April 2011 the WEEE Forum, the European association which brings together representatives of more than 40 waste collection and recovery systems, adopted standards for the disposal of electrical and electronic waste throughout Europe. The standards were developed as part of the WEEELABEX (WEEE Label of Excellence) project, which is being carried out by the WEEE Forum in association with the waste collection and recovery systems. SWICO Recycling has been a member of the WEEE Forum since the latter was founded in 2003. The WEEELABEX project, which is co-financed by the EU, aims to remedy shortcomings in the disposal of used electrical and electronic equipment in Europe. The new processing standard closely matches the existing Swiss standard. The target is for members of the WEEE Forum to implement the new standard in their systems over the next three years.

Reduction in ARF tariffs

The advance recycling fee (ARF) was reduced once again from 1 January 2012, following a decision by SWICO's Environmental Commission from summer 2011. Most affected this year will be the fee for monitor devices. No reduction was granted in the 14- to 20-Swiss-franc fee groups during last year's adjustment. For details see www.swicorecycling.ch

StEP E-Waste Summer School

The third international StEP E-Waste Summer School took place in September. StEP stands for "Solving the E-Waste Problem" and is an initiative of a number of UN organisations. It brought together 19 enthusiastic and committed young researchers from many countries to exchange information on the differences and approaches of various e-waste management systems. They visited representatives of the industry, shared experiences and developed projects. The Summer School was conducted in the Netherlands, Belgium and Switzerland, with SWICO Recycling acting as principal sponsor and co-organiser of the 2011 events.

SWICO Recycling Award

StEP E-Waste Summer School

Paul Brändli, Managing Director of SWICO Recycling, takes a relaxed view on the future – and looks back with satisfaction on past achievements

"I wish everyone sound judgement"

Paul Brändli has two reasons to be cheerful: a successful 2011 business year, and his upcoming retirement in 2012. He talks about his motivations – both emotional and professional.

Paul Brändli, if you had to sum up SWICO's 2011 business year, how would you describe it?
Everything from A to Z! By which I mean both consolidation and launching new projects to address problem areas.

You have been Managing Director of SWICO Recycling since 2007. Why have you decided to call it a day now?
I never allowed myself any time off. Now, at the end of my career, I'm hoping to make up for that. I'm looking forward to spending more time with my wife and family – travelling, going cycling and walking. Whenever I feel like it, whenever the weather is right.

Can you remember the things you were determined to achieve for SWICO when you started in 2007?
We had a cost problem. Not because we were making a loss, but comparing our costs with those abroad. The pressure from companies that monitor those costs on a global basis was intense. Then there was the competition law issue of region allocation when issuing mandates to our partners. There was a real sword of Damocles hanging over the system. I wanted to sort out those two issues as soon as possible.

Did you succeed?
We resolved both the issues, thanks to tendering and the introduction of index-linked compensation. We opened up the market. Waste disposal operations can now offer their services to collection points and traders throughout Switzerland. That has removed the competition issue from the spotlight and enabled waste disposal companies to accept the complete package: not just disused electronic equipment, for example, but also packaging and other items. That has made transport more efficient – in terms of CO_2 emissions and costs. Together with the index-linked disposal price, we have brought costs down to a level that is more comparable with those abroad. A pure cost comparison must, of course, always take account of the statutory requirements in individual countries. We have been able to present a convincing case to global companies in recent years and explain why we are more expensive.

Recycling is indispensable! Paul Brändli explains why at the Greenforum 2009

I'd like to remind you of two key concepts from the 2010 Activity Report: Recycling 2015/2020 and mobile phone recycling. You identified those as key projects last year. Where do they stand today?

In February 2011 we organised a meeting with key players from our industry. It was attended by individuals with European responsibility for the sustainable disposal of electrical and electronic equipment. The meeting disproved the contention that the shortage of resources is the key issue for companies. It revealed, for example, that where the value chain of a PC is concerned, the valuable materials account for less than one per cent of costs. SWICO also presented two projects: critical metals and LCDs. The response was very positive – and SWICO was asked to tackle more such future-oriented projects.

Everyone who attended appreciated the opportunity to exchange experiences, and wanted SWICO to arrange similar natured events. To increase the return rate for mobile phones, we organised a competition for schools to complement the educational documentation we produced. The school classes that took part in the competition had to demonstrate their familiarity with the teaching materials about mobile phones. The top performers received travel money for their class fund. That initiative, combined with other advertising campaigns, enabled us to increase the return rate for mobile phones from 15 per cent to 18 per cent in 2010.

> "We have brought costs down to a level that is more comparable with those abroad."

In relation to the indexation model, do you have a success story to report?

The indexation of the disposal price led to a further modest fall in costs in this area. They're now rising again slightly, owing to the volatility of valuable materials prices.

The opening up of the market has also led to a switch from Cargo Domizil transport to recyclers or collection points. Since we have to pay higher compensation to CDS for the extra services they provide (24-hour collection and administration of the collection point network), this led to a reduction in transport compensation.

Were there any failures?

There were no failures, only challenges.

What's on the agenda for 2012?

The items currently on the agenda are the revision of the VREG, and the rare earths (indium) and toner projects. The invitations to tender for recyclers and logistics are also on the list. Here, we're planning to introduce the WEEELABEX processing rules, which the WEEE Forum members (40 systems) will be implementing by 2014. That will lead to increased comparability of systems in terms of costs and quality of disposal. As far as processes are concerned, ISO 9000 recertification is upcoming.

I don't think my successor will be short of work.

You are leaving SWICO, but do you still have some visions in mind for the association and for recycling?

Visions are long-term plans. I'd rather leave them to my successor, because he is the one who will have to implement them. Nevertheless, I hope the new revision of the VREG will not curtail our independence and the dynamic that goes with it. Our existing track record in terms of volumes collected, return rates, recovery of raw materials and so on is outstanding, and is recognised as such by the federal government. I don't think you'll find anything better anywhere in the world.

Will your successor, Jean-Marc Hensch, implement those plans?

I am convinced that Jean-Marc Hensch, working with the existing team and the Environmental Commission, will make the right decisions about what lies ahead and set the right course from year to year. I wish everyone the sound judgement to make those decisions – the foundations are already in place.

About Paul Brändli

Paul Brändli was born in 1949 and has been Managing Director of the SWICO association since May 2008; he has also been Managing Director of SWICO Recycling since March 2007. Previously he spent 25 years at Hewlett-Packard (Schweiz) GmbH, most recently as head of operations and a member of the Executive Board. Paul Brändli is retiring in May 2012, but will continue to work on specific projects for SWICO and SWICO Recycling as required.

SWICO and SWICO Recycling – an exciting challenge

The new Managing Director of SWICO is an experienced association manager, communications professional and systematic thinker. But how interested in recycling is Jean-Marc Hensch? More and more, as this interview with Angela Cadruvi reveals.

Jean-Marc Hensch, you are moving from natural gas to electrical and electronic recycling. Why?
I've achieved a great deal in the natural gas sector, but I couldn't imagine remaining in the same field until I retire. My interest in SWICO started out as an interest in the association and association management, because IT is a personal passion of mine. But I gradually realised that recycling was a fantastic task for me. The more I found out about it, the greater my interest became.

What is it that you find so interesting?
At SWICO Recycling, people don't just talk in abstract terms about environmental protection: they do something specific to serve the environment. And they use a system that is based on sound economic principles and scientific foundations.

As a lawyer and qualified PR consultant, what do you believe you can offer to recycling?
There are a wide range of legal issues involved in recycling, though I don't see myself primarily in the role of a legal expert. And as for communication, well, that's essential, particularly for an activity like recycling: you have to persuade producers to sign up and encourage consumers to return their old equipment; and you have to communicate professionally with recycling companies.

What can Convention signatories and recyclers expect from you?
That SWICO Recycling continues to strive for disposal that is as cost-efficient and care taking for resources as possible. The goal must be to keep the ARF as low as we can.

New CEOs like to start out by turning everything upside down. Does that apply to you?
Interventions need to be carefully judged. When you make changes, you need to make sure you aren't throwing out the baby with the bathwater.

You haven't taken up your post yet, but are you already making plans for recycling in 2012?
The logistics and recycling contracts are being put out to tender again, and that will certainly require the full attention of the Managing Director. I'll also be improving my specialist knowledge and building up my network – indeed, I've already started doing so. That said, it isn't my aim to know as much as, or more than, the staff of the office or the experts. But I want to be able to discuss the fundamental issues they are dealing with on an equal footing.

How do you see the longer-term outlook for SWICO Recycling?
First, we need to work towards a situation where much greater consideration is given to reprocessing and disposal when new products are being designed. Second, here in Switzerland we have a relatively large number of organisations involved in disposal. We should endeavour to cooperate wherever there is common ground.

About Jean-Marc Hensch

Association manager Jean-Marc Hensch was born in 1959. He was co-owner of a PR agency and Director of the Swiss Gas Industry Association. A lawyer by training and a qualified PR consultant, he is married and lives in the city of Zurich. He likes IT, reading and blogs – and his voluntary commitments, as chairman of the neighbourhood association, chairman of the youth housing association Jugendwohnnetz, and Vice-Chairman of Kongresshaus Zürich. As he puts it, "Zurich is my hobby."

Successful recyclers invest in the future

Fail to invest and you'll soon fall behind. That's also true for the recyclers that SWICO Recycling works with so successfully. They invest in machines, and in people.

Back row, from left to right: Markus Stengele, Solenthaler; Thaddäus Steinmann, RUAG; Sabine Krattiger, Immark/CEREN/Thommen/Reonik; Sébastien Piguet, Cablofer-RDS. Front row: Hansueli Bühlmann, Bühlmann; Sandra Schaer, Thévenaz-Leduc; Paul Brändli, SWICO Recycling

Bühlmann Recycling AG, Münchenwiler

Over the last few years, Bühlmann Recycling has invested heavily in a new shredder to break up and separate the various materials. This adds value by enabling more valuable materials to be recovered from equipment, thus allowing Bühlmann to compete against its rivals from abroad. Martin Ritschard explains: "We invest millions in our operations every year. We're buying a new sorting plant in 2012." The firm is also looking to expand its premises.

Consortium Cablofer-RDS, Prilly

One million Swiss francs! That's how much the consortium invests on average each year in order, as it says, to remain up to date with the latest product trends. In 2012 Cablofer-RDS is investing in replacing its machinery and carrying out studies for the introduction of new processes. New recycling plants are planned for a later date. The vision: to achieve a 100 per cent recycling rate through the recovery and reuse of materials. But that depends very much on equipment design – meaning the manufacturers.

Solenthaler Recycling AG, Gossau

"We've invested in our collection logistics and added four new trucks. We've also expanded our headquarters and our staff office for quality and environmental management." That is how Markus Stengele sums up the investments made in 2011. The firm is especially proud of its SCPI (Swiss Climate Protection Initiative) label. "CO_2 compensation and, with it, climate-neutral logistics and production creates added value for our customers which always looks good on an environmental balance sheet," comments Christoph Solenthaler.

Immark AG/CEREN AG/ Thommen AG/Reonik Recycling AG

"The recycling sector is in a constant state of change. If you don't keep your eye on the ball, you end up producing secondary raw materials for which there is no market demand," says Sabine Krattiger. Electrical and electronic equipment is continually changing, devices containing picture tubes being one example. "Today's customers, expect more and more flexibility from their buyers," adds Krattiger. In 2011 Immark rebuilt its separating station. Further investments in plant technology are planned for 2012. The march of progress continues – in the service of a long-term corporate policy.

RUAG Schweiz AG, Altdorf

RUAG is proud of its professional ideas management process, which enables all members of staff to contribute their input. As Thaddäus Steinmann explains: "Every idea submitted either verbally or in writing is given a consecutive number and its potential is assessed. If it is implemented, the person who came up with it gets a reward that is linked to the economic value of the idea." Leveraging this potential enables processes to be optimised and valuable resources to be saved.

Thévenaz-Leduc SA/Groupe Barec, Ecublens VD

A range of conversions, a Nespresso capsule processing plant and the SENS/SWICO workshop in Ecublens are all on Sandra Schaer's list of investments made in 2010/2011. And there's more to come: "We're planning to expand our existing installations as automotive shredder, scrap shears and paper sorting machines." For Schaer, the main challenge of future recycling is in the increasing pollution of our planet: "Recycling needs to be advanced worldwide, including in Third-World countries."

Ten years of the consumer electronics subcommission

The Environmental Commission is proud of its consumer electronics subcommission. It's been performing a range of special tasks since 2001. Beda Grischott from Sony explains.

SWICO's Environmental Commission is well known, most notably through SWICO Recycling, the successful recycling system. For some years now it has received valuable support from various subcommissions, one of which deals with consumer electronics. Beda Grischott, environment manager at Sony, explains what exactly the subcommission does: "We're chiefly concerned with present and future recycling practices. We're looking for more environment-friendly ways of dealing with 'end-of-life products'. The areas concerned are consumer electronics, games and music. But the subcommission is also involved in cost/benefit analysis, and recommends ARF tariffs for these areas."

Beda Grischott, the manager in charge of service, environment and product compliance at Sony

The only constant is change

Asked what the subcommission's main interests are, Beda Grischott explains: "Of course we're interested in the legal requirements and future changes or statutory regulations, such as the revision of the VREG. The subcommission is determined to have its say, to ensure that 'things stay on the right track'. Its members are increasingly looking to the legal requirements of the future, such as the recently implemented revision of the Energy Ordinance, the Product Liability Act and the associated ordinance."

Recovering valuable materials

When it comes to equipment life cycles, Beda Grischott is very much in his element. That is his business; and as he points out, it is precisely described in Sony's environmental policy. It's about more than simply recycling or re-using products that have reached the end of their useful life: it's also about recovering the valuable materials those products contain. As Beda Grischott says: "I believe we'll be able not only to recycle 'end-of-life products' but also to generate added value via the materials recovered." It will undoubtedly take time; but the closed product cycle that is already operating successfully at SWICO Recycling could soon bring it a step closer.

Pride in his work

2011 was a testing – and very interesting – year for Beda Grischott: "I count it as a major success for us that not only were the ARF tariffs reduced by up to 20 per cent, but also the tariff structure was simplified and the number of tariff groups reduced." He is less happy that totally environment-friendly disposal at zero cost is impossible: the problem is the logistics costs that account for one-third of the total. 2012 looks set to be another exciting year. The main item on the agenda is a balanced set of results for 2011 and 2012. "We'll have to wait for the 2011 figures to see whether we can think about further tariff reductions," he says.

The members of the Environmental Commission

Roberto Vitaliano, ALSO Schweiz AG
Dominik Wirth, Brack Electronics AG
Brigitte Schmieder, Canon (Schweiz) AG
Eric Hubacher, ESAG
Rolf von Reding,
Hewlett-Packard (Schweiz) GmbH
Hans Walker, IBM Schweiz AG
Kevin Klak, Media Saturn Management AG
Stefan Hildebrand, Novis Electronics AG
Roger Keller, upc cablecom GmbH
Christoph Schweizer, Xerox AG
Paul Brändli, SWICO Recycling

A printer yields 3.4 kg of iron All the shiny, silvery parts of a printer are made of iron. And they weigh in at a hefty 3.4 kg. That adds up to 1,600 t of recycled metal from all printers disposed of in 2011.

We're all pulling in the same direction

Two women, five men and a major task: SWICO Recycling's office needs to function like clockwork. To make sure that happens, processes, structures and responsibilities are clearly defined. Everyone knows what they have to do – as they reveal in this report.

Roger Gnos
Technical Controlling/Projects

I carry out on-site checks to ensure that the SWICO agreements are being complied with and I advise the collection points when they are experiencing problems. When there is a project to establish a new collection point I check everything in detail, putting the potential site under the microscope. What I enjoy about my job is seeing the pleasure and skill that the collection point staff bring to their work.

Dennis Lackovic
CFO

Information about contracts is key to my work. The raw materials trend affects the recycling price. And of course that is influenced by currency fluctuations. All that lands on my desk. It's a complex business, but really exciting.

Roland Vannay
Technical Controlling/Sales

My job is to acquire new members for SWICO Recycling. I need really compelling arguments to convince people. And we've got them, because ours is the best return system for electrical and electronic equipment in the world. I'm thinking of the all-in-one solution for product, battery and packaging and the high return rate. So I've got plenty of ammunition when I go out hunting for new customers. I'm happy when, after extensive negotiations, a major customer finally signs up.

Roland Habermacher
Technical Controlling

My favourite times are when I can help to solve problems. My main task is to record the composition of the product groups at our recyclers and their dismantling companies. I also carry out incoming goods inspections there. The basket analysis also includes checking non-ARF products. The information we obtain helps us recruit new Convention signatories.

Loredana Panaro
Marketing

When something is novel and relevant, it gets communicated – that sums up how I work. I organise and coordinate all our information – for the website and also for dispatch via e-mail and letter. What I enjoy about my job is the contact with other people and the diversity of my activities.

Carmen Kälin
Administration

I'm the first point of contact in the office. E-mails to our information address and phone calls come to me. Most of them are about collection orders for companies or the ARF tariffs. I'm always happy when I can help someone. My work also includes managing the databases and checking invoices for recyclers and collection points, so all the agreements with the collection points also cross my desk. Twice a year our signatories get mail from us: the control sheets on which they record the ARFs they've received. The signatories return the sheets to me and I issue the invoices. It's as simple as that.

Paul Brändli
CEO

My team does a great job, daily operations run smoothly. That leaves me free to focus on contacts with members. And to think about strategic orientation.

What you won't find on the label

They are precious, rare and expensive. And they are found in our mobile phones and almost all electrical and electronic equipment: precious metals, rare earths and indium! Who mines them? Who profits? Who disposes of them? Are there losers and winners? Find out what mobile phone salespeople, researchers, professors and bankers have to say.

Electronic equipment enters the recycling process at the point where it is sold. SWICO visited some of the shops to find out about the thoughts and experiences of salespeople – and how much their customers are interested in the environment. There is a lot of knowledge there, but a few "half truths" are also doing the rounds – such as the idea that mobile phones are miniature gold mines. These need to be corrected, in the interests of good recycling.

Customers know a bit

Our first interviewee is young and friendly. He greets customers when they enter the shop and patiently answers their questions: Sandro* is 18, and is currently training to be a retail employee. "Sure I know what's in a mobile phone: plastic, metals, a bit of gold and a kind of hard disk." The young man also knows that many mobiles come from China. He needs to know everything, he says – despite customers hardly ever asking for details. So do customers bring their old mobile phones back? "Yes, we tell them they will get a voucher from us. There's a special mobile phone recycling campaign running at the moment. The proceeds are going to a good cause: 'Jeder Rappen zählt' (every cent counts)." Sandro himself thinks it's very important for the environment that old mobile phones are recycled. Though he admits with a smile: "I've got four old mobile phones at home, and three of them are broken." But, he assures us, he certainly won't throw them in with the other rubbish, but send them for recycling.

> "We tell customers that it is worthwhile bringing back their old mobile phones."

Recycling is definitely important

Katharina* also sells mobile phones every day. She is a shop assistant, 25 years old, and passionate about her work. She's had some interesting experiences regarding where devices come from: "Customers prefer phones made in Hungary to those made in China. It seems Chinese products are seen as inferior." SWICO's journalist asks her to list the countries she knows that make mobile phones: "Sweden, Hungary, China." She furrows her brow and then, looking at the shelf, adds: "Mexico, Taiwan, Vietnam, Korea." Asked about metals, she has a ready response: "A mobile phone contains copper, metal, plastic, polymers, recycled metal and a battery." No, she admits, she didn't know there were traces of gold too. But she did know that there were precious metals – including rare raw materials that will run out sooner or later. Katharina is happy with the proportion of mobile phones that are returned. She feels it is important because of the scarcity of resources. She always points that out to customers, she says, pointing proudly to a collection box placed in a prominent position on the counter. When we move to the next shop, it's clear we're dealing with an expert – and his answer is instantaneous: "A mobile phone consists of 130 different materials, including many valuable metals such as gold." Martin*, 37, is a sustainability manager, so recycling is his daily business. His customers want to know what their mobile phone is made of – but not where it comes from. For him, the return rate is unsatisfactory: "With us, it's less than 10 per cent of the devices we sell. That's far too few. Which is why there are often campaigns to get people to return their old phones."

SWICO would like to thank the mobile phone sales staff of Mobile Zone, Orange and Swisscom in Zurich for their information.

* Names have been changed.

All that glitters is not gold

Aluminium is light. Gold symbolises wealth. Copper is reddish. Such general knowledge is useful, but details are better. We take a closer look at metals.

A little gold here, a bit of copper there. The names of metals have different uses, and their origins, opportunities and risks vary too. But what exactly is a precious metal? Does recycling mobile phones make sense? Where does indium come from? What are rare earths? For answers to these questions and more, SWICO approached Patrick Wäger of Empa.

Let's start with mobile phones: a mobile phone entering the SWICO system consists of 40 per cent plastic, 20 per cent printed circuit boards, 20 per cent batteries and 5 per cent screen. The metals are predominantly the classic industrial favourites: copper, iron and aluminium. Rare metals (see box) such as gold, silver and palladium are present in much lower concentrations (approximately 0.03 per cent gold, 0.3 per cent silver, 0.01 per cent palladium). Patrick Wäger explains the economic implications: "In 2010, gold alone accounted for about 70 per cent of the value of a mobile phone, followed by silver and palladium at around 10 per cent each, and copper, at roughly 5 per cent." But, he adds: "Taking the gold from a large number of mobile phones together may be significant, but at around 25 milligrams of the metal, the yield from an individual phone is negligible." So economic considerations will not suffice to persuade consumers to recycle their mobile phones. They need to realise that closing the materials cycles makes sense.

Industry with a major ecological impact: copper mine in Chuquicamata, Chile

Combining economics and ecology

An Empa study shows that recovering rare metals such as gold and palladium from electrical and electronic devices has clear ecological advantages over obtaining them from ores. Closing the materials cycles by recovering these metals helps to save valuable primary resources and preserve them for future generations. The high market price of gold should be enough to make recycling economically worthwhile.

In 2011, supplies of gold came primarily from China, the US and South Africa, while palladium was produced chiefly in Russia and South Africa. Indium originated mainly from China, South Korea and Japan. Tantalum came above all from Brazil and Central African countries such as Rwanda, Mozambique and the Democratic Republic of Congo. Metal mining and refining already has a significant impact on the environment: disfiguring landscapes, consuming large amounts of energy and generating vast quantities of sometimes highly toxic waste. All of which underscores the importance of recycling electrical and electronic waste wherever possible, to minimise the need for mining.

Rare metals, as Patrick Wäger explains, are crucial to the functioning of components in electronic equipment – not least because devices are getting smaller and smaller.

Good reasons

In addition to the geological, ecological and geopolitical aspects, there are a range of other issues that Patrick Wäger believes need to be considered. They include technology (e.g. linking indium production to zinc production or the availability of processes to recover rare earths); economics (e.g. the difficulties companies face in planning ahead due to price volatility and the increasing complexity of supply chains); and social issues such as the health impact on local people of extracting and recovering rare metals and the way the income from raw materials extraction is used to fund civil wars (e.g. tantalum mining in the Democratic Republic of Congo).

A brief introduction to metals

Precious metals: gold, silver, platinum, palladium, rhodium, ruthenium, iridium, osmium. **Industrial/basic metals:** copper, iron, aluminium, zinc, lead and others **Heavy metals:** collective term for metals with a density greater than 5 grams per cubic centimetre. **Indium:** by-product of the processing of basic metals such as zinc and lead. **Rare earths:** scandium, yttrium and the 15 lanthanides. **Rare metals:** also known as technology metals or critical metals. Found in the Earth's crust at average concentrations of less than 0.01 per cent by weight. They include precious metals and rare earths. Experts emphasise that these terms are used in different ways and this list is therefore not exhaustive.

Differences that are small but critical

Critical metals! The term is used to denote specific metals that are used in minute amounts, but without which a device – and its technology – will not function. We talked about them with resources strategist Professor Armin Reller.

The shredder is the first stage of recovery at Bühlmann Recycling AG

Most electronic equipment – computers, laptops, digital cameras, audio devices and mobile phones – contains precious and critical metals, as do electronic controls. Indium is the archetypal critical metal; and it's one that Armin Reller is especially interested in. Indium is a soft metal with a low melting point that plays a crucial role, most often in a transparent but conductive indium tin oxide mixture. It is also used in CIS (copper indium selenide) photovoltaic cells as well as semiconductors. Before it acquired these applications it was a little-known, unspectacular and even boring metal. A transparent, very thin layer of indium is contained in devices that incorporate LCDs. Armin Reller explains why this metal is so sought after: "It's vital to ensuring the electrical conductivity of indium tin oxide and is almost impossible to replace. There are laboratory substitutes, but they are not yet competitive. There are no actual indium mines; the metal is obtained as a by-product of basic metals such as zinc and aluminium." It is mainly found and produced in China, which accounts for 50 per cent of annual production.

And what about recovery?

Indium occurs as a critical metal in very small quantities. According to Armin Reller it is technically possible to isolate them, but a very laborious process. SWICO asked him about the status of research. "A number of studies, research and pilot projects are currently under way into ways of recovering it. When a large-scale recovery process can be implemented will depend on the advance of technology and the availability and use of potential substitutes." But Professor Reller believes that price trends and the availability of, dependence on and need for innovative future technologies mean indium should be recovered. "The price of indium is volatile and it is entirely possible that it will move into the category of relatively cheap precious metals."

> "Switzerland is highly efficient at recovering basic metals such as iron, copper and aluminium."

Is Switzerland setting an example?

For Armin Reller, recovery is crucial to future metal use. "Switzerland is highly efficient at recovering basic metals such as iron, copper and aluminium. But the economic viability of secondary use is constantly having to be measured against primary production in countries where production costs are often low." Nevertheless, establishing a metals cycle is a desirable objective, and essential for industrial regions that are highly dependent on raw materials. "What's more," as Professor Reller notes, "Switzerland is a European leader in terms of consumption: the Swiss are well equipped with devices containing the full range of functional metals currently used in technology, a fact that is directly attributable to lifestyles and standards of living."

Sometimes Switzerland is too small to be autonomous

It is useful to know that electrical and electronic equipment contains much that is of value. But that alone is not enough. Recovering precious and critical metals requires sophisticated recycling systems. Umicore develops and operates new technologies.

Dr Christian Hagelüken works for Umicore, the world's largest recycler of precious and special metals from complex materials. A total of 19 different metals are recovered at the company's plant in Antwerp. But what has that got to do with recycling in Switzerland? Dr Hagelüken explains: "Recycling complex products like electronics or cars must always be understood as a chain of processes. That chain begins with the collection of disused products, which are then dismantled or mechanically processed to separate out individual components or valuable fractions." He adds: "Metals are not recycled at this stage but instead prepared so that highly pure metals can be recovered. So at the end of the chain is a complex, highly technical metallurgical process in which, for example, the individual metals are separated out from printed circuit boards or catalytic converters and refined into market-ready pure metals." Dr Hagelüken points out: "That last stage is not available in Switzerland."

Swiss recyclers benefit

What that means in practice is that Swiss companies supply Umicore and other companies with entire fractions – catalytic converters, lithium ion batteries, printed circuit boards and others containing (precious) metals – from which Umicore recovers a wide range of metals. The system is based on "toll refining": Umicore provides the service of recovering the (precious) metals, and these can then be made physically available to customers once more. Alternatively, Umicore buys them at their current price. To ensure that this works, incoming materials are sampled and analysed before the actual recycling process begins.

For Christian Hagelüken, Switzerland is exemplary in collecting disused equipment and in managing and overseeing its recycling plants. Yet even here, the mobilisation of small electronic devices in particular could be improved. "It is important that the collecting baskets are not too heterogeneous. It makes sense to have a separate collection category for small ICT devices." Hagelüken also believes the associated pre-treatment processes are often in need of optimisation – particularly to minimise the loss of critical metals. It is better, for example, to remove high-value hardware such as motherboards from PCs before they go through the shredder and send it directly to modern metallurgical processes for the final stage of recycling. The same applies to mobile phones: "These should not be passed via a sorting shredder. Mechanical processing technology reaches its physical limits when confronted with complex material composites. It has been proven that this leads to extensive carry-over of precious metals into plastic, steel and aluminium fractions that ultimately results in losses of these metals."

Recycling involves a number of countries

According to Dr Hagelüken, recycling complex products is just as technology-intensive as manufacturing them. For that reason, the recycling process is divided up among a number of countries. "The best way to process the small proportion of very complex fractions in disused products is in large, highly specialised plants. Switzerland is well equipped to deal with high-tech, but it lacks the critical mass to fill a plant like Umicore's on its own. For that reason, there is little point in trying to become 'autonomous' in this area."

How commodities prices react to the economy

When out shopping we notice that certain products have become more expensive. Or that it costs more to fill the car's petrol tank. According to Francesco Adiliberti of Goldman Sachs we are currently in a situation where the commodities markets are simultaneously exposed to the threat of recession and potential bottlenecks. In this environment, reductions in inventories and scarcity of supply could result in rising prices this year in what is already a tense commodities market. He offers a prediction: Goldman Sachs believes that the price of crude oil in particular could tend to rise over the next 12 months as demand increases slightly – even in a potentially weak economic environment – because the supply situation remains tight. "However, if the global economy starts heading towards recession, prices could fall again in 2013 as a result of declining demand."

Interviewees

Professor Armin Reller, Chair of Resources Strategy/Chairman of the Board of the Environment Science Center, University of Augsburg
Dr Christian Hagelüken, Head of EU Government Affairs, Umicore, Hanau (Germany)
Dr Patrick Wäger, Senior Scientist, Technology and Society Lab, Empa, St. Gallen
Francesco Adiliberti, Managing Director, Goldman Sachs International, Zurich

Almost 60,000 tonnes processed

More flat-screen TVs and monitors, mobile phones and printers are being returned.

SWICO Recycling handled 59,439 tonnes of waste electronic equipment in 2011, a rise of five per cent over the previous year. The falling price of consumer electronics – especially flat-screen TVs – means that first-generation LCD monitors are being replaced with energy-saving alternatives using LED technology. This resulted in some 1,500 tonnes being returned, 43 per cent more than in 2010. In terms of actual units the rise is just 11 per cent, since the size of TV screens is increasing, making them heavier.

457,000 mobile phones were collected, approximately 13 per cent of the sales figure for 2011. Thanks to marketing measures at the point of sale and Pusch (educational documentation for schoolchildren in classes 3 to 9), SWICO Recycling was able to increase the return rate compared to 2010. An average of 1,450 phones were returned every day, as against 1,200 in 2010.

Depending on the order, the age of the equipment is also determined during the basket analysis. One notable development is in the useful life of printers, especially for home use, which is increasingly limited to the duration of the guarantee. Returns in this category rose by 20 per cent.

The composition of the equipment categories is determined by processing tests carried out in the Swiss recycling companies with assistance from Empa. A previously set quantity of equipment is collected and the resulting components are documented.

In total, some 22,000 tonnes of metal (e.g. iron, aluminium, copper, chromium steel) were recovered. Of the 15,000 tonnes of plastic, up to 30 per cent were recycled. Approximately 70 per cent of the 13,000 tonnes of CRT glass were reprocessed to make new CRT monitors. Precious metals (gold, silver, palladium) are recovered from the 2,000 tonnes of printed circuit boards.

Items containing pollutants, such as batteries, capacitors or components containing mercury, add up to less than one per cent. Nevertheless, one of the most important jobs for the recycling companies is to ensure that these components are separated and conveyed into a special recycling or waste disposal process.

Quantities collected by device type (A and B signatories)

	Quantity[3] (in thousands)	Average weight (in kilos)	Metals (in tonnes)	Plastics (in tonnes)	Metal-polymer composites (in tonnes)	Cables (in tonnes)	Glass and/or LCD modules (in tonnes)	Printed circuit boards (in tonnes)	Pollutants (in tonnes)	Other[4] (in tonnes)	Total (in tonnes)	Increase/decrease from 2010
PC monitors, CRT	290	18.17	773	1,048	500	135	2,304	483	< 1	24	5,267	–3%
PC monitors, LCD	376	6.23	1,000	560	–	9	589	163	8	11	2,339	7%
PCs/servers	361	15.06	4,477	313	15	167	–	453	17	–	5,442	10%
Laptops	269	3.55	290	270	97	5	84	139	66	4	955	7%
Printers	441	10.63	1,661	2,521	289	26	32	82	1	76	4,689	20%
Large equipment/copiers	45	121.00	3,051	1,247	707	130	12	106	58	189	5,500	–7%
IT mixed[1]	387	10.51	2,247	928	525	97	9	78	44	140	4,066	10%
CRT television sets	587	28.84	1,667	3,458	563	59	10,937	207	16	9	16,916	9%
LCD monitors	42	35.63	620	223	–	30	386	184	14	52	1,509	43%
CE mixed[2]	2 278	4.51	4,685	3,933	1,136	98	–	251	172	–	10,274	–5%
Mobile phones	457	0.14	10	23	–	–	3	14	13	–	64	26%
Telephones, other	1 051	2.13	1,237	511	289	53	5	43	24	77	2,238	11%
Photo/video	239	0.49	65	27	15	3	< 1	2	1	4	117	15%
Dental											63	–14%
Total in tonnes			**21 782**	**15 061**	**4 135**	**812**	**14 361**	**2 204**	**435**	**586**	**59,439**	5 %
Total in %			**36,6 %**	**25,3 %**	**7,0 %**	**1,4 %**	**24,2 %**	**3,7 %**	**0,7 %**	**1,0 %**		

[1]) IT equipment, mixed, excluding monitors, PCs/servers, laptops, printers, large equipment/copiers
[2]) Consumer electronics, mixed, excluding TVs
[3]) Extrapolation
[4]) Packaging and other waste, toner cartridges

Source: Esther Müller, Empa, based on processing and basket analyses

PC monitors, CRT

Metals	14.7%
Plastics	19.9%
Metal-polymer composites	9.5%
Cables	2.6%
Glass	43.7%
Printed circuit boards	9.1%
Pollutants	<0.1%
Other [4]	0.5%

PC monitors, LCD

Metals	42.8%
Plastics	23.9%
Metal-polymer composites	0.0%
Cables	0.4%
Glass	25.2%
Printed circuit boards	7%
Pollutants	0.3%
Other [4]	0.5%

PCs/servers

Metals	82.3%
Plastics	5.7%
Metal-polymer composites	0.3%
Cables	3.1%
Glass	0.0%
Printed circuit boards	8.3%
Pollutants	0.3%
Other [4]	0.0%

Laptops

Metals	30.4%
Plastics	28.2%
Metal-polymer composites	10.2%
Cables	0.5%
Glass	8.8%
Printed circuit boards	14.6%
Pollutants	6.9%
Other [4]	0.4%

Printers

Metals	35.4%
Plastics	53.8%
Metal-polymer composites	6.2%
Cables	0.6%
Glass	0.7%
Printed circuit boards	1.8%
Pollutants	<0.1%
Other [4]	1.6%

Large equipment/copiers

Metals	55.5%
Plastics	22.7%
Metal-polymer composites	12.9%
Cables	2.4%
Glass	0.2%
Printed circuit boards	2.0%
Pollutants	1%
Other [4]	3.4%

IT mixed [1]

Metals	55.3%
Plastics	22.8%
Metal-polymer composites	12.9%
Cables	2.4%
Glass	0.2%
Printed circuit boards	1.9%
Pollutants	1.1%
Other [4]	3.5%

CRT television sets

Metals	9.9%
Plastics	20.4%
Metal-polymer composites	3.3%
Cables	0.4%
Glass	64.7%
Printed circuit boards	1.2%
Pollutants	0.1%
Other [4]	<0.1%

LCD monitors

Metals	41.1%
Plastics	14.8%
Metal-polymer composites	0.0%
Cables	2.0%
Glass	25.6%
Printed circuit boards	12.2%
Pollutants	0.9%
Other [4]	3.4%

CE mixed [2]

Metals	45.6%
Plastics	38.3%
Metal-polymer composites	11.0%
Cables	1.0%
Glass	<0.1%
Printed circuit boards	2.4%
Pollutants	1.7%
Other [4]	<0.1%

Mobile phones

Metals	16.2%
Plastics	35.7%
Metal-polymer composites	0.0%
Cables	0.0%
Glass	5.2%
Printed circuit boards	20.6%
Pollutants	20.2%
Other [4]	0.0%

Total recycled components

Metals	38.4%
Plastics	22.7%
Metal-polymer composites	7.3%
Cables	1.6%
Glass	24.2%
Printed circuit boards	3.6%
Pollutants	0.6%
Other [4]	1.6%

Thank you!

We would like to thank the companies in the areas of information technology, office electronics, consumer electronics, communications, the graphics industry, and measuring and medical technology that have signed the SWICO Recycling Convention.

3M (Schweiz) AG | 3T Supplies AG | | A | A. Marcandella AG | Aastra Telecom Schweiz AG | ABC DENTAL AG | ABC SOFTWARE GmbH | ACCO Deutschland GmbH & Co. KG | Acer Computer (Switzerland) AG | ad notam ag | ADIVA Computertechnologie AG | ADRENIO GmbH | Aduno SA | AG Neovo Technology B.V. | Agfa Graphics Switzerland AG | Agfa HealthCare AG | Albis Technologies AG | AlphaSat GmbH | ALSO Schweiz AG | Alto Hifi AG | AM Digital AG | AMO Switzerland GmbH | Andres Audio | Anthos Schweiz AG | Apple Sales International | ARP Schweiz AG | Arrow Central Europe GmbH | Ascom (Schweiz) AG | ASL Electronic AG / SA | ASSA ABLOY (Schweiz) AG | ASSMANN IT-Solutions AG | Atena Distribution AG | Atos AG | Audio Tech KST AG | Autec GmbH | AV Distribution AG | Avalon Computer AG | Avaya Switzerland GmbH | Avcom Distribution GmbH | Avision AG | AXA Winterthur | Axavis AG | | B | B&W Group (Schweiz) GmbH | Bader Versand Schweiz AG | Balzo AG | Bang & Olufsen AG | Baumann Koelliker AG | Bausch & Lomb GmbH | Beletec AG | Belinea AG | BELSAT AG | BenQ Deutschland GmbH, Oberhausen | Berlinger & Co. 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The SWICO Recycling success story continues thanks to our Convention signatories as well as our recycling contract partners Bühlmann Recycling AG, CEREN AG, Consortium Cablofer-RDS, Immark AG, Reonik Recycling AG, RUAG Schweiz AG, Solenthaler Recycling AG, Thévenaz-Leduc SA/Groupe Barec, Thommen AG, our logistics partner CDS Cargo Domizil AG, the Federal Office for the Environment, the official SWICO Recycling collection points, the retailers and wholesalers and the Empa test centre.

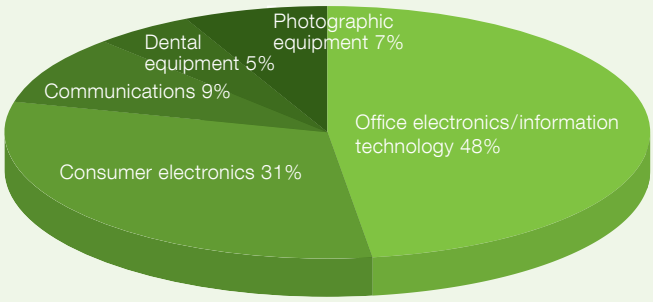
Business year

Trend in Convention signatories

Convention signatories
2011 was a year of streamlining, with mergers, insolvencies and adjustments to the ARF < CHF 500 Convention signatories.

As of 31 December 2011, SWICO Recycling has 680 area conventions, consisting of 15 A signatories and 665 B area conventions. A further 34 new Convention signatories joined during 2011.

By divisions (in %)	2010	**2011**
Office electronics/information technology	51%	**48%**
Consumer electronics	29%	**31%**
Communications	8%	**9%**
Dental equipment	7%	**5%**
Photographic equipment	5%	**7%**



We would like to thank the following companies for the trust they have placed in SWICO Recycling by joining the system in 2011:

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Share of costs

B signatories Expenditure as percentage of total costs	2010	**2011**
Recycling hardware	40.0%	**34.5%**
Logistics	27.9%	**27.8%**
Collection points	13.9%	**15.2%**
Disposal of packaging	8.7%	**11.2%**
ADF on batteries	2.3%	**2.3%**
Audits	0.7%	**1.7%**
PR work	4.1%	**4.1%**
Administration	2.5%	**3.2%**

Source of goods

58% of the total quantity recycled,
i.e. 34,689 tonnes of electronic waste, was disposed of by private households via collection points in 2011.

Business customers	42%
Private households	58%

Cargo Domizil transport volume

Logistics partner of SWICO Recycling
The total volume transported (in tonnes) declined once again in 2011. Just under 10,000 tonnes were transported under the "public service" component, accounting for 16% of the total.

Some 11,000 fewer pallets were transported in 2011, a fall of 19.8%. The number of shipments declined by only 7%.

CDS Cargo Domizil AG	2010	**2011**
Tonnes transported per year	14,246	**9,334**
Pallets transported per year	55,686	**44,661**
Shipments per year	19,818	**18,425**
Shipments per day	80	**74**
Average weight per pallet in kilos	256	**209**
Number of online orders per year	23,032	**21,873**
Number of online orders per day	93	**88**
Proportion of total volume	25%	**16%**

Quantities

Slightly below 60,000 tonnes

The increase in quantities taken back in 2011 was approximately 2,845 tonnes; 5% more electronic waste was recycled. Retailers and collection points increased in popularity as places to return goods. 8.5 kilograms of electronic waste (SWICO product range) was collected and disposed of for every person living in Switzerland.

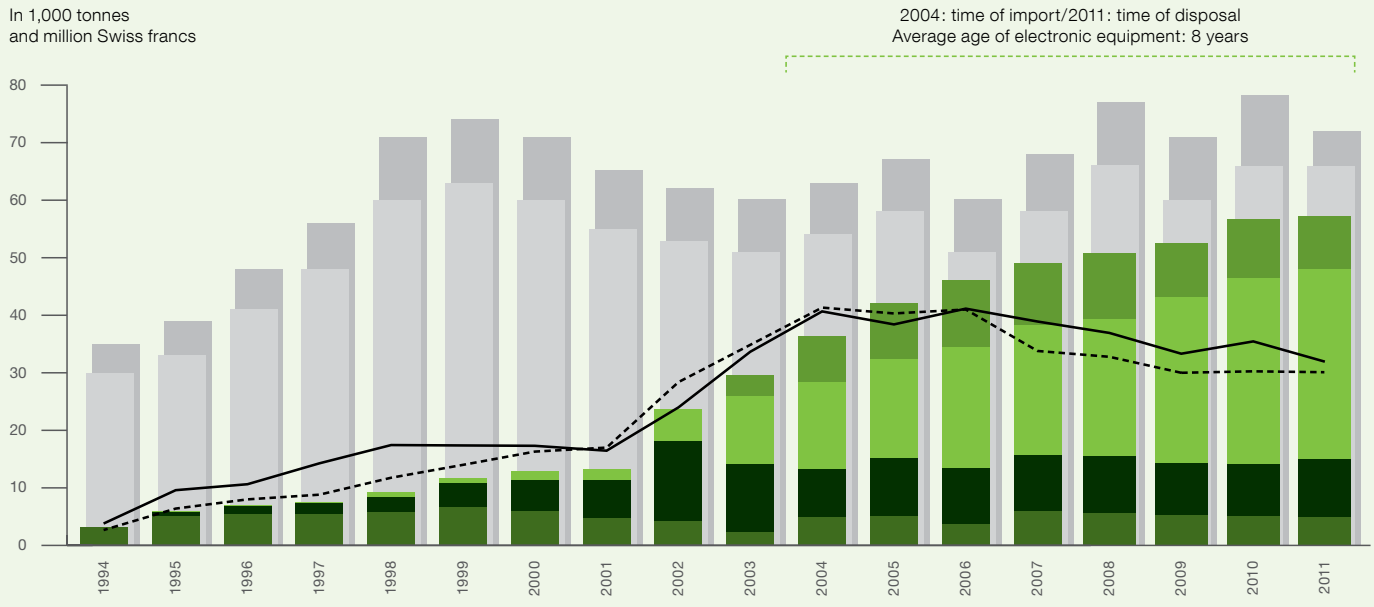
Quantities taken back (in tonnes)	Manufacturers	Retailers	Collection points	Companies	Total
2000	5,920	5,443	1,418	–	12,781
2001	4,772	6,565	1,879	–	13,216
2002	4,284	13,839	5,570	–	23,693
2003	2,270	11,895	11,758	3,700	29,623
2004	4,900	8,309	15,100	8,100	36,409
2005	5,054	10,108	17,268	9,687	42,117
2006	3,687	9,677	21,198	11,521	46,083
2007	5,887	9,812	22,567	10,793	49,059
2008	5,537	9,704	23,346	12,166	50,753
2009	5,286	9,002	28,816	9,519	52,623
2010	5,315	9,118	32,067	10,094	56,594
2011	**4,779**	**10,486**	**34,689**	**9,485**	**59,439**

By divisions (in tonnes)	2010	**2011**
Office electronics/information technology/ security technology	26,950	**28,258**
Consumer electronics/music	27,403	**28,699**
Communications	2,066	**2,302**
Photographic equipment	73	**117**
Dental equipment	102	**63**
Total	56,594	**59,439**

By divisions (in %)	**2011**
Office electronics/ information technology/ security technology	47.5
Consumer electronics/ music	48.3
Communications	3.9
Photographic equipment	0.2
Dental equipment	0.1

Expenditure, income and quantity growth

In 1,000 tonnes
and million Swiss francs



Imported quantities in 1,000 tonnes

- Average quantity imported by Convention signatories
- Imports (effective)

Quantities taken back in 1,000 tonnes

- 8% Manufacturers
- 17% Retailers
- 58% Collection points
- 16% Companies

Expenditure and income in million Swiss francs

- Expenditure (2011: 30.3)
- Income (2011: 31.8)

Recycling rate

The Environmental Commission budgeted for growth of approximately 6% in 2011, corresponding to an expected recycling amount of 60,000 tonnes of electronic waste. The actual total of 59,439 tonnes fell just 561 tonnes short of this figure.

Given an average equipment lifespan of eight years, the quantity collected in 2011 is compared with the quantity imported in 2003/2004. On this comparison, the proportion taken back in relation to the quantity imported eight years ago is over 95%.

Expenditure fell slightly in 2011, to 30.3 million Swiss francs compared to 30.4 million Swiss francs in 2010 – this despite the 5% increase in the amount taken back.

Balance sheet as of 31 December 2011 (in 1,000 Swiss francs)

Assets	2010	2011
Liquid assets	13,479	**12,150**
Accounts receivable	2,614	**3,164**
Accruals/deferrals	359	**429**
Financial assets	28,590	**33,229**
Total assets	45,042	**48,972**

Liabilities	2010	2011
Accounts payable	4,894	**5,665**
Deferred liabilities	2,673	**2,173**
Short-term reserves	868	**2,105**
Latent waste disposal obligation	36,607	**39,029**
Total liabilities	45,042	**48,972**

Profit and loss account (in 1,000 Swiss francs)

Income	2010	2011
Advance Recycling Fees		
A signatories	8,720	**7,601**
B signatories	26,844	**23,892**
Other income	12	**17**
Financial income	54	**271**
Total income	35,630	**31,781**

Expenditure	2010	2011
Staff costs	757	**890**
Recycling	12,012	**10,276**
Transport	8,384	**8,286**
Collection points	4,169	**4,510**
Disposal of packaging	2,622	**3,328**
Disposal of batteries	690	**686**
Del credere on accounts receivable	–	**–**
Audits, analyses, PR, operating expenses	1,205	**1,882**
Endowments		
Securities reserve for fluctuations	600	**500**
Latent waste disposal obligation	5,191	**1,423**
Total expenditure	35,630	**31,781**

Balance sheet

On the assets side, there was little change in liquidity, while the surplus (increased waste disposal obligation) is reflected in an increase in financial assets.

The financial assets are booked as at 31 December 2011 at market rates. A reserve for fluctuations of 10% of these values is taken into account. The balance sheet total increased by just under 4 million Swiss francs compared to the previous year as a result of the increase in the latent waste disposal obligation. One key factor here is the integration of Imaging.ch, which generated an inflow of just under 1 million Swiss francs.

As at the end of 2011, the latent waste disposal obligation was 39 million Swiss francs, which corresponds to 130% of the recycling expenditure for 2011.

For this reason, the ARF for tariff groups 14 Swiss francs and above was further reduced with effect from 1 January 2012. This primarily affects consumer electronics in the TV equipment product group.

Income

Turnover fell by 3.8 million Swiss francs compared to the previous year, to 31.8 million Swiss francs, due to the reduction in the ARF.

Expenditure

On the expenditure side, higher expenditure for disposal of packaging was partly offset by lower logistics costs. The quantity recycled rose once again, but the recycling cost per kilogram was lower than in 2010.

The amounts checked in the basket analysis doubled. A study on LCDs was also compiled, and a number of marketing activities carried out – such as in telecommunications, with activities related to mobile phones – which led to a further increase in the return rate.

The latent waste disposal obligation was increased by 1.4 million Swiss francs, corresponding to roughly 4% of income.

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Tiny but valuable: 24 mg of mobile phone gold! Gold is precious for jewellery – and valuable for technology: it has good conductivity and is therefore used for printed circuit boards, contact surfaces and plug connections.
The gold from all the mobile phones that were returned in 2011 equals 11 gold bars weighing 1 kg each. Some of the metal and plastic in mobile phones can also be recycled. (Source: Umicore)

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