

## Waste as a resource for sustainable development

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Take-back and recycling systems for disused electrical and electronic appliances have existed in Switzerland for more than 20 years. Based on this long-standing experience, the State Secretariat for Economic Affairs (SECO) decided back in 2002 to support developing countries and emerging markets with their efforts to develop e-waste management systems. Empa was entrusted with the performance of these activities. SENS eRecycling and Swico are members of the advisory support committee.

In developing countries, the recycling of materials from waste is largely conducted in the so-called “informal” sector, i.e. by poor people who are also poorly qualified and equipped to perform this activity. This poses numerous risks, including environmental pollution, health hazards and the spreading of dangerous materials. In general, there is a lack of appropriate awareness, i.e. with respect to generally accepted and implementable quality and sustainability standards. Since 2003, the State Secretariat for Economic Affairs (SECO) has been developing knowledge partnerships in the area of e-waste management. As part of the Swiss e-Waste Programme, Switzerland has supported India, China, South Africa, Columbia and Peru with their efforts to improve their e-waste management systems. Corresponding guidelines have now been issued in nearly all of these partner countries.

This success has led to the development of a more comprehensive approach in the form of the Sustainable Recycling Industries (SRI) follow-up programme. The development objective of the SRI programme is the sustainable integration and involvement of small and medium-sized companies from developing countries and emerging markets in the global recycling of secondary resources. The SRI programme is once again being financed by the SECO and is being implemented jointly by Empa<sup>1</sup>, the WRF<sup>2</sup> andecoinvent<sup>3</sup> via three linked programme components.

– Life cycle assessments: the SRI programme compiles regional life cycle inventories (LCI) for the evaluation of

the environmental and social life cycle performance of industrial and informal activities. To this end, the required local and regional expertise is being expanded and developed in Brazil, India and South Africa.

- Recycling initiatives: together with private and public institutions, the SRI programme provides support in making existing local e-waste recycling capacities in Columbia, Egypt, Ghana, India, Peru and South Africa more sustainable, including, in particular, within the informal sector.
- SRI Roundtable: the SRI programme promotes stakeholder consultation with the objective of improving e-waste management systems and, in particular, developing sustainability criteria for secondary materials in the form of an ISO document.

### Plastics recycling in India

It is estimated that between 0.5 and 1 million people in India work in the area of plastics recycling. A large share of these activities take place in the “informal” sector without government regulation and support. Plastics recycling is an important source of income for poverty-hit population groups, provides the industrial sector with secondary raw materials and ensures significant reductions in CO<sub>2</sub> emissions. There are, however,

<sup>1</sup> www.empa.ch/tsl – Swiss Federal Laboratories for Materials Testing and Research/Technology and Society Department.

<sup>2</sup> www.wrforum.org – World Resources Forum.

<sup>3</sup> www.ecoinvent.org – The world's most consistent & transparent life cycle inventory database.



Photo 1: Skinning of cables and colour-sorting of fractions in the informal sector in Delhi, India.

major challenges, such as substandard recyclates, the insufficient removal of prohibited additives, the unprofessional disposal of hazardous substances and a lack of safety measures under labour law.

The SRI programme is supporting the Indian plastics recycling sector in developing more sustainably with a focus on flame-retardant plastics. This relates to the international requirements for the removal of persistent organic pollutants (POP) (see also article on “plastics recycling”).

Thanks to professional removal, improved granulate properties and thus broader market access are achieved, which in turn also creates scope for further environmental and social improvements. As part of the project, various technologies for the removal and disposal of contaminated plastics fractions are being evaluated, with training being provided to different stakeholders. The findings are being implemented in flagship projects and are thus contributing to a smooth “formalisation” and improvement of the recycling sector.

The recycling of plastics, and especially plastics from waste electrical and electronic equipment with harmful additives, poses a problem in most developing countries and emerging markets. The experiences gained and the successes achieved in India are therefore attracting interest around the world and are also being applied successfully in other countries.

### CENELEC auditing in Columbia and Peru

The project activities were launched in Colombia and Peru around 10 years ago. With the support of the Swico CEO at this time, various events were held in close cooperation with the local ministry of the environment and with the support of the environment minister as well as the national industry associations Andí (Colombia) and SNI (Peru). The objective here was to make producers, importers, wholesalers, administrative bodies and industry associations aware of the problem and encourage them to cooperate.

Various studies supported the process and led to the first legal regulations on the take-back and recycling of computers and their peripheral appliances. National acts, which assign increased product responsibility to producers, importers and wholesalers, were ultimately passed in Peru in 2012 and in Colombia in 2013. Various technical standards were also developed and issued.

As a result of these legal framework conditions, several collective take-back systems for disused electrical and electronic appliances were established in both Colombia and Peru. In Columbia, nine recycling companies established the ACORAE association in 2017: Latin America's first association of e-waste recyclers. At the initiative of the Ecocomputo and Red Verde collective take-back systems, initial audits were performed by Empa experts at 10 companies in 2016 and 2017 on the basis of the international EN 50625 standard (CENELEC). Audits were also conducted in Peru. The results are



Photo 2: Audit in accordance with EN 50625 at a recycling company in Lima, Peru.

impressive: most companies that perform manual dismantling work comply with European requirements. At individual companies, there is still need for improvement with respect to the removal of hazardous substances and the proper handling of components containing hazardous substances or dangerous components that are removed from waste appliances, such as lithium batteries, background lighting from flat-screen displays containing mercury and plastics. After around 10 years of cooperation with Colombia and Peru, these two countries are now pioneers in South America for the sustainable handling of waste electrical and electronic equipment. The larger take-back systems in Colombia, which came together to form an umbrella association in 2017, are planning to join the WEEE Forum this year.

Photo 3: Working groups developing the concept for the GP at the WRF in Davos in 2018 and the result – IWA 19 with a further 18 months of intensive work.



#### Guidance principles for the sustainable management of secondary metals

From 2015, the SRI programme summoned important stakeholders to a roundtable in order to advance the development of “Guidance principles for the sustainable management of secondary metals” (GPs) and ultimately to publish the result as an International Workshop Agreement as part of the International Organization for Standardization (ISO). This ISO IWA process was a consensus-building process, which comprised four workshop sessions with subsequent public reviews and was completed with the publication of the IWA at the end of 2016. This activity was overseen by the Swiss Standards Association (SNV) on behalf of the ISO and implemented by the SRI Roundtable.

Photo 4: The five principles and 17 associated objectives.



#### 17 Objectives

- 1.1 Enable safe and healthy workplaces.
- 1.2 Establish working terms and conditions that are decent and equitable.
- 1.3 Eliminate child labour, forced labour and all forms of discrimination.
- 1.4 Ensure freedom of association and the right to collective bargaining.
- 1.5 Provide clear channels for communication and dialogue with workers.
- 2.1 Respect and foster local communities' rights.
- 2.2 Enable social inclusion of workers in the community.
- 2.3 Establish clear channels for communication and dialogue with local communities.
- 3.1 Conserve and protect water, air and soil resources.
- 3.2 Restore severely damage areas from metals recovery operations.
- 3.3 Conserve and protect biodiversity, ecosystems and ecosystem services.
- 4.1 Promote technologies and strategies to increase secondary metals recovery.
- 5.1 Evaluate existing baseline conditions of secondary metals operations.
- 5.2 Mitigate negative and strengthen positive impacts of operations through a management plan.
- 5.3 Strengthen the organisational capacity of economic operators.
- 5.4 Ensure compliance with local and national laws and regulations.
- 5.5 Eliminate bribery, money laundering and corruption.

The objective of the GPs is to create a credible global framework for the sustainable management of secondary metals. They aim to provide economic agents (e.g. individuals, micro, small and medium-sized companies as well as large firms) as well as governments, standardisation organisations and other interested parties with guidance in connection with this issue.

The GPs formulate 17 objectives for the sustainable management of secondary materials, which are in turn assigned to these five principles:

**Principle 1:** enabling safe, healthy and equitable working conditions

**Principle 2:** building and strengthening local community relationships and resilience

**Principle 3:** conserving and protecting the environment and natural resources

**Principle 4:** improving recovery of secondary metals

**Principle 5:** implementing a sustainable management approach

The GPs are currently being tested with respect to their applicability in various SRI projects, as the IWA must be developed further into an ISO standard within three years. Specific application experience in the field is required to this end.

#### Outlook

The success story of the SRI programme and its predecessor, the Swiss e-Waste Programme, will likely continue. Together with the programme managers, the SECO is currently discussing where the focus of a continuation of the SRI programme from 2019 might lie and what shape it could take. Irrespective of this, the achievements of these programmes in the form of new knowledge and expertise will be spread and developed further within the partner countries and associations by the many individuals involved.

Further information on the SRI programme:  
[www.sustainable-recycling.org](http://www.sustainable-recycling.org)  
[www.sustainable-recycling.org/e-library/publications](http://www.sustainable-recycling.org/e-library/publications)  
[www.sustainable-recycling.org/wp-content/uploads/2015/06/161230\\_GPVersionDraft3.0.pdf](http://www.sustainable-recycling.org/wp-content/uploads/2015/06/161230_GPVersionDraft3.0.pdf)