

Mission of the Foundation Auto Recycling Switzerland

In 1992, the Association of Swiss Automobile Importers (now known as autoschweiz) set up the Foundation Auto Recycling Switzerland (FARS) to find a solution to the problem of recycling non-metallic automobile shredder residue (ASR) as an alternative to the previous problematic disposal in landfill sites. In Switzerland, some 100,000 end-of-life vehicles have to be scrapped every year. According to the defined purpose of the foundation, FARS «promotes the environmentally-friendly disposal of motor vehicles registered in Switzerland, in particular the environmentally-friendly disposal of non-metallic automobile shredder residue (ASR). The main aim of disposal is to create environmentally-correct solutions to complete the particular material cycle in compliance with the statutory requirements and the latest acknowledged state of the art». Financing is effected by disposal contributions which the automobile importers belonging to the founding body are required to pay by regulation.

Since 1996, ASR has been disposed of in municipal waste incineration plants (MWIP) and similar facilities and the slag has been stored in safe landfill sites. To permit thermal disposal, FARS has so far supported the shredder works with a contribution of around one hundred million Swiss francs. In 2007, the Foundation Council decided to seek ways of improving the MWIP process and instructed the Paul Scherrer Institute (PSI) to conduct a study on this matter. The PSI judged the existing MWIP solution to be «reliable, robust, safe and capable of further development». A MWIP^{plus} solution therefore involves optimised use of the heat for power generation and supply of district heating as well as for the recovery of metals from fly ash and slag.

Recycling of automobile shredder residue in Switzerland: successful cooperation with municipal waste incineration plants

**Daniel Christen, Managing Director
Foundation Auto Recycling Switzerland**

With the prohibition imposed by the Swiss Federal authorities in 1996 on the disposal of combustible waste in landfill sites, the Foundation Auto Recycling Switzerland (FARS) set up by the automobile importers in 1992 had to find a new way to dispose of automobile shredder residue (ASR). Burning this residue in municipal waste incineration plants (MWIP) seemed an appropriate solution because the facilities already existed. So far, 675,000 tons of ASR have been disposed of by burning in this way.

Energy and metal recovery

Co-incineration of ASR, together with other combustible urban waste, is very much more efficient than the straightforward destruction of organic waste. Increasing importance come up to the recovery of energy and secondary raw materials:

- **Energy:** with effect from 2009, the Swiss Energy Act makes provision for cost-covering remuneration for feed-in to the electricity grid (CRV) from renewable energy sources. The authorities have accepted the fact that 50 per cent of the power generated by waste incineration constitutes renewable energy. Municipal waste incineration plants are therefore able to optimise energy recovery. The delivery of process steam is important for both ecological and economic reasons. This activity is being further extended at



ASR: readily available source of energy and raw material supply

the different sites. Rising energy production now truly justifies use of the term «waste-to-energy» plants.

- **Secondary raw materials:** MWIP and landfill site operators began only a few years ago to effect the simple separation of ferrous metals from slag. Rising metal prices have additionally led to the recovery of aluminium and copper. Meanwhile, entire slag landfill sites are being reworked and fed through separating and sorting facilities. Around 8 per cent ferrous and

1.5 to 2 per cent aluminium and copper can be recovered and returned to the material cycle. With a quantity of 650,000 tons of slag accruing every year the yield is considerable. This subsequent processing makes good ecological sense; moreover, it is economically attractive and capable of further improvement.

The next wave of innovation is about to begin

Switzerland is now about to make another leap forward in development. The ZAR project will be started in 2010 as the first waste-to-energy plant equipped with a dry slag discharger at the Zurich Oberland Waste Recovery Plant in Hinwil. ZAR denotes a Centre for Sustainable Waste and Resource Use. The aim of the project is to maximise raw material recovery in processing and sorting facilities on an industrial scale to permit storage of the residual materials as far as possible free from emissions. This will create the new state of the art.

In the present state of our knowledge, dry discharging is necessary because the metals are then free from accretions and do not oxidize. Dry discharge has the further advantage that water does not have to be unnecessarily transported and deposited. Processing saves a total of more than 20 per cent by weight.



Last stage of dry slag discharge: Facility at the Zurich Oberland waste recovery plant in Hinwil

The Foundation Auto Recycling Switzerland is involved

FARS is supporting the ZAR project with a substantial contribution. The project represents a logical continuation of the study presented in 2009 by the Paul Scherrer Institute (PSI) for the optimisation of the MWIP solution for ASR. In this study, the PSI concluded that the previous co-incineration of ASR in MWIPs is a proven, robust and ecologically viable solution but that, in addition to energy, still more metals should be recovered from MWIP residues to the material cycle. FARS is confident of achieving this goal.



Non-ferrous metal separation from MWIP slag: eddy current facility to treat the fine slag

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Foundation Auto Recycling Switzerland
Daniel Christen, Managing Director
Mittelstrasse 32, P.O. Box 5232
CH-3001 Berne

Tel +41 (0)31 302 36 24
Fax +41 (0)31 306 65 60
www.stiftung-autorecycling.ch
info@stiftung-autorecycling.ch