



SUSTAINABLE REPAIR SERVICES

NEW AUSTRIAN CONCEPTS WITHIN THE
"FACTORY OF TOMORROW" SUBPROGRAM

SUSTAINABLE CONCEPTS FOR REPAIRS AND SERVICES



D.R.Z. Trash-Design, Photo: Projektfabrik

In 1999, the Austrian Federal Ministry of Transport, Innovation and Technology (bmvit) launched the “Sustainable Development” research and technology program aiming to effectively support the restructuring process towards a sustainable economy through research. Various research and development projects as well as demonstration and diffusion measures, which will give new impetus to innovation in Austria’s economy have since been supported within the scope of a number of subprograms.

The “Factory of Tomorrow” subprogram aims to encourage trend-setting pilot projects in the field of sustainable technology development. Model examples include sustainable technologies and innovative manufacturing processes, the use of renewable raw materials or future-oriented products and services with a consistent focus on the usefulness of the product. The Austrian Research Promotion Agency (FFG) is managing the “Factory of Tomorrow” subprogram.

■ Repair jobs and other services for day-to-day requirements of private households – such as renting services, maintenance of household appliances, laundry services etc. – contribute substantially to a longer service life of products and thus to the conservation of resources as well as to waste prevention. In addition, such labor-intensive and sustainable services create considerable value added as well as regional jobs.

At present, the market for repair services in Austria is still rather poorly developed. It is usually small and micro enterprises that offer such services. Public authorities support the repair sector and publish “Repair Guides” (printed or

online, for federal provinces or individual regions). Furthermore, the business field of “repair” has in recent years been established and firmly embedded by a number of social enterprises. This later entailed the creation of regional repair networks, which mainly consist of small enterprises in the repair services sector, such as www.repanet.at

In spite of these initiatives potential users of repair services find themselves still confronted with numerous barriers to use these services. Apart from an often unattractive price-performance ratio the requisite input of gathering information, time, long travels, and transportation are reasons for consumers to rather buy a new product. It is essential to overcome these market barriers by the creation of intelligent concepts and to offer new solutions for improved networking between services on offer and potential users. In addition to measures prolonging the service life of appliances such as repair-friendly design and the promotion of the repair sector new strategies for the reuse of discarded products and product components are essential.

This requires the creation of cycles, in which used products are collected separately and sorted after disposal and then either repaired and sold for reuse in second hand stores or disassembled; still functioning components can be used as spare parts for new products. In some cases, social enterprises offer such services, in particular for electrical appliances and electronic products. However, in this field too, new solutions for efficient organization and marketing will be required in order to make better use of existing potentials.

Various projects implemented within the “Factory of Tomorrow” subprogram focused on new strategies and measures aiming to make sustainable approaches such as repair services more marketable thus creating the basis for a broader diffusion of these services.

RepaMobil

PROJEKT 1

Removal of market barriers for household-related product-service systems, in particular by means of repair service points at locations with a major customer frequency.

Wiederverwendbarkeit von Elektro(nik)-Altgeräten

PROJEKT 2

(Reusability of waste electrical and electronic appliances)
Creating the prerequisites for reuse-cycles for waste electrical and electronic appliances

Semimanuelle Demontage von Elektro(nik)-Kleingeräten

PROJEKT 3

(Semi-manual disassembly of electrical and electronic small appliances)
Optimization of the technology of manual disassembly of small electrical and electronic appliances in social enterprises

Nachhaltigkeitssiegel für gut reparierbare Produkte

PROJEKT 4

(Sustainability label for easy-to-repair products)
Definition of criteria for a sustainability label for appliances with repair-friendly design – marketing and public relations campaigns among manufacturers and consumers – training of testers and award of the sustainability label.

D.R.Z. Trash-Design, Photo: Projektfabrik



■ This project aimed to mitigate existing market barriers in the field of household-related product-service systems – especially repair services – by means of new organizational structures. The creation of service points at locations with high customer frequency is to bring repair services closer to the customer.



Photo: R.U.S.Z

The basis for this approach is the creation of local/regional networks of small and medium service suppliers in various trades who jointly offer their services and ensure an effective processing of orders.

The practical approach will be to create mobile or stationary service points in major centers and other locations with a high customer frequency (shopping malls, train stations, universities, etc.) that accept orders for repair jobs and other household-related services, which subsequently will be referred to members of a regional network. After repair the products can be claimed at the service point. The benefit for potential customers consists in an improved availability of repair services as well in the avoidance of “burdensome” errands. In addition, it may be expected that such forms of organization, in the long run, will ensure optimization of costs for service providers and thus an improved price-performance ratio for customers.

The project has been implemented by the working group for waste avoidance, conservation of resources and sustainable development in Graz. Large enterprises and institutions such as Magna Steyr AG & Co KG, Joanneum Research, the Karl Franzens University of Graz, and the

Graz University of Technology participated in the project. Five service providers of the repair network Graz contributed experience from practice. In addition to a social repair shop, participants included small enterprises working in the fields of electronics, EDP, and bicycle repair.

An online survey among participating large enterprises served to ascertain the demand for the new services and to conduct a feasibility study. The INES (Improving New Services) tool helped to evaluate the sustainability effects of the concept as compared to the status quo. Based on these findings the project team developed implementation concepts for pilot projects at the various locations. The results have shown that the conditions for the realization of pilot projects are favorable. The staff of participating enterprises reported a considerable demand for repair and service points.

The greatest demand for repair services exists in the fields of audio and video systems, bicycles and shoes as well as EDP equipment and small electrical appliances.

Necessary prerequisites for the acceptance of repair services people stated included low costs, convenience, binding cost estimates and advice from expert personnel.

Various models have been analyzed with a view to **implementation variants**:

- Stationary receiving / service points at the various locations of enterprises
- Mobile receiving points with special vehicles, roll-on roll off containers or trailers
- Problem box: Only mediation of services, inquiries in writing will be forwarded on certain days by a person
- Virtual receiving point: Only mediation of services via Internet, inquiries via e-mail are forwarded and processed by hotline staff

Enterprises favor a weekly depositing and pick-up service by means of a mo-

bile receiving point. The optimum variant for service providers also consists in a mobile service point with their own vehicle and RepaMobil staff. This model should be combined with the virtual variant.

The analysis has shown that a number of positive effects may be expected for all actors participating in the RepaMobil project:

For the staff of large enterprises, advantages such as easier availability of repair and other services, the avoidance of additional travel, and the improvement of workplace quality were in the foreground. Providers of repair services expect an increase in incoming orders and thus more economic stability, strengthening of existing and the creation of new networks as well as an improvement of competitiveness.

The benefit for the region consists in the creation of new jobs and the safeguarding of existing jobs in the service sector.

Also, the promotion of the repair service sector constitutes an essential contribution to waste prevention and the conservation of resources and thus to sustainable development.

Rough cost estimates have been made for all models developed within the project. At present, researchers are developing concepts for the practical implementation at individual locations.



PROJECTS

PROJECT 2

REUSABILITY OF WASTE ELECTRICAL AND ELECTRONIC APPLIANCES

■ This research project focused on fundamental work for the reuse of waste electrical and electronic appliances. Investigations have been conducted in two social enterprises in cooperation with the Institute of Waste Management of the University of Natural Resources and Applied Life Sciences, Vienna. Participating businesses included D.R.Z. (Disassembly and Recycling Center) in the field of collection / selection and R.U.S.Z (Repair and Service Center) in the field of repair and marketing.

The starting point for the realization of this project was a cooperation between the Viennese waste management agency MA 48 and D.R.Z. focusing on the disassembly of used electrical and electronic appliances. Within this cooperation, appliances are collected and sorted at three garbage collection points and delivered to D.R.Z. who remove hazardous materials and prepare remaining material for recycling. Part of the appliances is suitable for reuse. Also, appliances suitable for reuse are sorted out at the garbage collection points already and sold at the MA 48 flea market – however without functional tests or repair.

At D.R.Z. information technology and telecommunications equipment is sorted and selected, disassembled, assembled again and sold via e-bay and the D.R.Z. shop, respectively. Members of the “Trash-Design” department create artistic objects (e.g. standing tables from old washing machine drums) using components from disassembled appliances. In addition, there is a spare parts store where still functioning components are collected and offered for sale. www.ersatzteilnetzwerk.at

Some appliances that are suitable for reuse are repaired in partner enterprises of the Viennese REPA-Net. One of the objectives of the project was to ascertain the potential of reusable appliances by means of analyses in the field of collection, selection, and repair as well as by market research. Subsequently, researchers investigated judicial and organizational issues and elaborated proposals aiming to make better use of existing potentials in the field of reusable appliances. This was also to serve as a best practice example of how reuse, which has a high priority in the guidelines on used electronic equipment, can be put into practice.

Strategies towards effective reuse cycles:

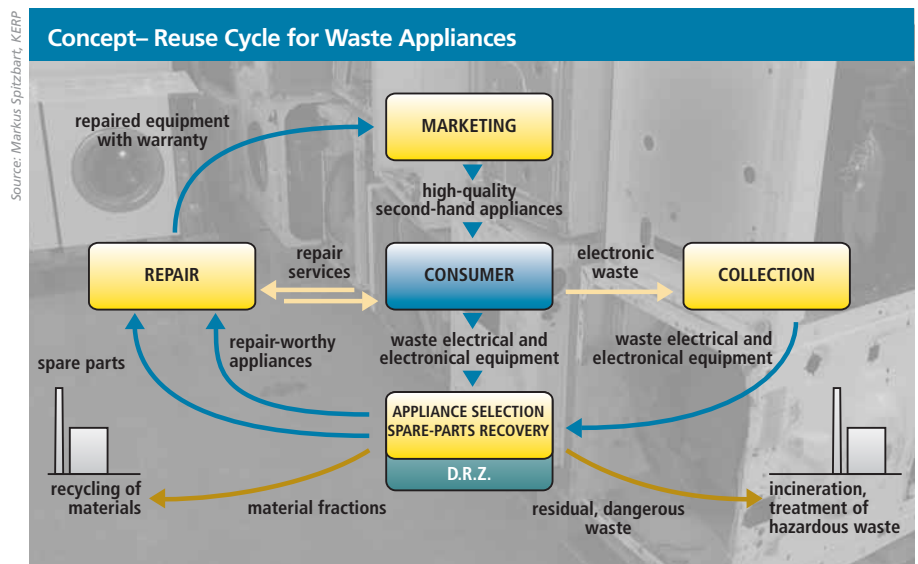
- Optimization of collection systems and selection processes
- Retrieval of usable spare parts from damaged appliances
- Optimization of repair processes
- Development of functional tests and mobile measuring units

An important aspect of the reusability of equipment refers not only to good functioning but also to an acceptable optical appearance of appliances. A key point concerns collecting logistics and the avoidance of damage during collection and transportation.

Surveys have shown that 60% of small household appliances, IT, telecommunications as well as audio and video equipment are not damaged, however, only 20% of larger household equipment are in working order.

Analyses have shown that, depending on the type of equipment, 10% to 25% of appliances are potentially suitable for reuse if all criteria concerning optical appearance, technical condition, and demand are taken into account.

A key issue in the subsequent logistic and organizational processes concerns selection in the enterprises. A workshop addressed the development of selection criteria in order to optimize



- Analysis of legal and organizational issues
- Evaluation of the market potential, site analysis and development of a shop concept

Researchers analyzed collecting systems and processing methods from the deposit of equipment to disassembly or reuse. This permitted to investigate input streams and unused potentials.

the selection of reusable equipment. These criteria refer to remaining service life, efficiency of the product, and expense for repair as well as to safety standards. This process requires above all a communicative person who, on account of expert-technical know-how and knowledge of customer behavior, is able to provide advice for repair departments.

Another emphasis of the project was on the development of a market analysis and a marketing concept. While the demand for second-hand appliances does exist, it varies substantially depending on the type of equipment.

A combination of workshop, Internet, and shop sales promises to bring the best sales record. Marketing via already existing structures should therefore be continued and the shop concept should be extended.

Overall, the results of the investigations have shown the following potentials for the reuse and marketing (separately by type of equipment):

■ **Large household appliances:**
A great number of still operational equipment is lost because transportation is rather cumbersome. The solution could be a take-back system and pick-up service combined with an extended shop structure.

■ **IT and telecommunications equipment:**
There is great demand in Austria and Eastern Europe and marketing prospects via the Internet are promising.

■ **Audio and video systems:**
Actually, there are a great number of reusable systems in this group. However, the reuse potential in this field

has to be assessed with caution as the requisite input for repair often exceeds the proceeds from resale.

■ **Small household appliances:**
While in this area a relative large number of reusable appliances have been identified, marketing of these products was possible only via flea markets.



PROJECT 3

SEMI-MANUAL DISASSEMBLY OF ELECTRICAL AND ELECTRONIC SMALL APPLIANCES

■ In Austria, the implementation of the WEEE (Waste Electrical and Electronic Equipment) Directive aiming to reduce the growing amount of electronic waste has had a positive effect on the business sector dealing with recycling and the reuse of such appliances. However, stiff competition in the appliances reuse sector also had the effect that cost reductions increasingly become more important factors than quality and occupational safety. Manual disassembly enterprises have to find new approaches and aim to integrate mechanical technologies in order to stay competitive.

The aim of a project coordinated by the KERP (Center of Excellence Electronics & Environment) was to improve the disassembling technology for electrical and electronic small appliances concerning efficiency, quality and flexible adaptation to changing conditions in order to improve the competitiveness of social enterprises.

Characterization of the input of appliances as well as disassembly simulations were used to identify methods of opti-

mization of the various processes, which were then evaluated and tested in a pilot plant. Here, it was also important to take into account the social work aspect.

First, researchers analyzed the input of appliances and determined the average material composition for 18 types of appliance. In addition, they ascertained key data such as duration of disassembly, optimum degree of disassembly, costs of disassembly, and possible proceeds from material fractions. These data formed the basis for subsequent simulations.

The investigated scenarios for process optimization differed from the original situation on account of various layouts (disassembly line versus individual disassembly working places). Other differences concerned the arrangement of working places as well as the assignment of individual process steps to different working places (e.g. presorting the input



D.R.Z. Selektion, Photo: Projektfabrik

of appliances, separate recovery of hazardous materials), and the transportation of incoming and outgoing material. For the original and seven further scenarios, researchers simulated a disassembly operation of six months and compared parameters such as the throughput of appliances, costs of disassembly, and proceeds from sales. The simulations also took account of other parameters that reflected workers' performance, their ability to learn as well as the considerable personnel turnover.

An important measure to improve efficiency and to optimize costs consists in presorting. The scenarios in which individual workers always disassembled only a certain type of appliance attained the best overall evaluations. This approach resulted in more efficient working processes and improvements in the training of workers. Overall, the project has shown that the potential for optimization in manual disassembly has not yet been fully exhausted.

SUSTAINABILITY LABEL FOR EASY-TO-REPAIR PRODUCTS

■ The experience of repair technicians tells us that electrical and electronic appliances are increasingly designed in such a way that repair becomes more and more difficult. The sustainability label aims to motivate manufacturers to reverse this trend and have their durable and easy-to-repair products certified. At the same time, targeted marketing and PR campaigns are to enhance consumers' demand for repair-friendly products.

The sustainability label, which has been developed jointly by the Austrian Standards Institute and "die umweltberatung" in cooperation with partners from the repair sector, will be affixed directly to the product; it will offer consumers reliable support in their decision for a new appliance. Two guidelines available at the Austrian Standards Institute give detailed criteria for the award of the label and for the training of testers who will evaluate the appliances and clear them for certification. Important prerequisites for a repair-friendly product include the availability of spare parts, easy disassembly, and simple access to design documents for repair technicians.

The result of the evaluation will be shown on the label by the quality levels "Excellent", "Very good" or "Good". Products that do not attain the level "Good" will not get the label.

Photo: die umweltberatung



Award of the sustainability label: washing machine Eudora 2007

Products with the sustainability label comply with all requirements of the Austrian Electrical and Electronic Appliances Decree enacted in 2005 (in accordance with the EU Directive).

Manufacturers who want the sustainability label for one of their products, submit a series produced appliance or a prototype for testing. The list of testers is available at the Austrian Standards Institute. If the appliance complies with the requirements, the manufacturer applies for certification with the Standards Institute. The appliance will then be entered in a list of products conforming to standards.

In June 2007, the project team presented the first certified appliances (e.g. the washing machine "Eudora titan").

PROJECT PARTNERS

Project 1

RepaMobil, Graz 2007

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Project 2

Wiederverwendbarkeit von Elektro(nik)-Altgeräten, Wien 2007

Project Coordinator: DI Markus Spitzbart
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Project 3

Semimanuelle Demontage von Elektro(nik)-Kleingeräten, Wien 2007

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Project 4

Nachhaltigkeitssiegel für gut reparierbare Produkte, Wien 2007

Project Coordinator: DI Sabine Seidl, Georg Pirkner
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INFORMATION PUBLICATIONS

The final reports have been published in the bmvit series "Reports on Energy and Environment Research".

Project 1: 25/2007 Project 2: 24/2007

Project 3: 22/2008* Project 4: 21/2008*

* These reports will be available from June 2008.

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FORSCHUNGSFORUM provides information on selected projects within a bmvit program focusing on "Sustainable Development". Published by the Austrian Federal Ministry of Transport, Innovation and Technology (bmvit), Division for Energy and Environment Technologies; Director: Dipl.Ing. M. Paula; Renngasse 5, A-1010 Vienna. Cover photo and illustrations: R.U.S.Z. Reparatur- und Servicezentrum, D.R.Z. Demontage- und Recyclingzentrum Wien, Markus Spitzbart, KERP Kompetenzzentrum Elektronik & Umwelt GmbH, Projektfabrik. Editors: Projektfabrik, A-1180 Vienna, Währinger Straße 121/3. Layout: Wolfgang Bledl. Printed by: AV+Astoria Druckzentrum GmbH, A-1030 Vienna, Faradaygasse 6.

▶ FORSCHUNGSFORUM is published at least four times a year and is available for free from: Projektfabrik, 1180 Vienna, Währinger Straße 121/3, versand@projektfabrik.at

P.b.b. Erscheinungsort Wien, Verlagspostamt A-1010 Wien.