

End-of-life lamp recycling life cycle assessment

bifa examines the environmental performance of the recovery of end-of-life lamps (eol lamps) for the Lightcycle take-back system

Within the scope of a study undertaken for Lightcycle Retourlogistik und Service GmbH, mercury balances and analyses of other environmental effects were produced for the eol lamp treatment and downstream recovery paths.

With the help of the life-cycle assessment, the potential effects of possibly changed limits for mercury contents on the disposal paths were illustrated and environmental interactions were also shown.

Due to close cooperation with the operators of treatment plants, a very good database was available to describe the fractions from the treatment, which was linked with secondary data as part of the life-cycle consideration to describe the disposal chain.

The main objective of eol lamp treatment is to remove mercury from the materials used to produce the lamps.

The existing eol lamp recycling system achieves very high mercury separation. More than 95 % of the mercury contained in the eol lamps is removed from the material cycle in fractions for disposal (e.g. phosphor powder, adsorbents). Around 90 % of the lamp materials can therefore be recycled after treatment. In particular, due to the recycling, the treatment of almost 8,000 t eol lamps in Lightcycle's take-back system means an approx. 7,000 t CO₂ equivalents lower impact to the environment.

Setting tighter mercury limits for fractions from the treatment could lead to the displacement of treatment fractions, which have been recovered until now, in the disposal. Alternatively, thermal after-treatment of fractions contaminated with mercury is feasible, so that they can continue to be added to a recovery process.

Regarding mercury emissions in air, the



setting of very tight limits and limits at the level of EN 50625-2-1, which reflects current state-of-the-art technology, would lead to a reduction of a few kilograms of mercury per year. This quantity will continue to reduce in the next few years due to falling quantities of lamps to be treated and the reducing quantity of mercury in the lamp mixture to be treated.

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Invitation to the CLEAN AIR Experts Day 2019

The experts' event for clean air in towns and cities

Increasing mobility demands on the one hand and the expectations for high air quality on the other require towns, cities and municipalities to produce creative and sustainable concepts.



At the CLEAN AIR Experts Day the focus is on preventing air pollution in and due to traffic. Forward-looking mobility concepts, intelligent traffic management and innovative technologies and solutions will be discussed, which are intended to ensure clean air.

The programme offers diverse highlights for all participants: Key note speeches will be given by Prof Dr Annette Peters, Director of the Institute for Epidemiology at the Helmholtz Zentrum Munich, Dr Daniel Dettling of Zukunftsinstitut GmbH and Dr Carl Friedrich Eckhardt of the BMW Group. In addition, the city talk with representatives from Potsdam, Karlsruhe and Augsburg, and others on the mobility strategies of the cities and the podium

discussion on the role of drive technologies promises to produce interesting stimuli. The programme will be rounded off by the table talk stations on different alternative mobility forms and the lecture sessions on incentives in transport use and intelligent traffic management.

The invitation is directed at representatives of municipalities as well as industry, service providers, science and startups, as well as businesses concerned with company mobility management, in order for them to network and in-

itiate activities that reduce pollution. An interesting programme, an accompanying exhibition and a visit to Faurecia Clean Mobility on the previous evening will promote the exchange and generation of ideas. bifa Umweltinstitut supports the B2B event as a trade partner.

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Event

CLEAN AIR Experts Day on
29 October 2019 in Augsburg

Register now!
www.clean-air-experts.de
<http://www.facebook.com/CleanAirExpertsDay/>

Well water as a central heat source for small residential areas

Ecologically outstanding and innovative solutions for Fuchstal

Sustainability is a large priority in the Fuchstal administrative association. And it needs innovative solutions. Working with the consultant Ingenieurbüro IIIB Energie, Puchschlagen, bifa examined a local heat supply using near-surface groundwater for the "Am Lech" and "Seestall Ost" housing development areas in Dorstetten and Fuchstal respectively.

Can cold groundwater be used as a heat source for residential buildings? What seems nonsensical initially, is enabled by heat pumps: Heat acquired at a low temperature level is raised to a higher level. Several variations of this principle were tested for the heat supply of new building areas of the

Fuchstal administrative association. Hydrogeological test drilling by Geo-UmweltTeam, Marktoberdorf, verified the availability of groundwater. Based on this, supply options were developed and checked for viability. From several concepts prepared, bifa and IIIB Energie worked up two sustainable supply solutions.

One solution is for an uninsulated cold water network. In these, the temperatures are increased for heating and water by on-plot heat pumps. Photovoltaic systems can be integrated on the roof for the heat pumps' power demand. Additional stratified storage tanks are recommended for accumulator storage of the heat.

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Dear Readers, Dear Partners and Customers of bifa,

Why have I been working for bifa for so long? Apart from the people here in the institute, above all it is the great variety of our topics. This issue of bifa aktuell shows: We are not only busy examining the life cycle assessment of end-of-life lamp (light bulb) recycling but are also working on the new waste management concept for the Trier region. We are interested in how health resorts and spas can adapt to climate change and how precious and special metals can be increasingly recovered. And then we are also involved in organising events such as the Clean Air

Experts Day in Augsburg. You have to search long and hard to find a place where a team of 40 staff work on such diverse topics at the same time. Equally important to me are the many professionally and personally enriching discussions with experts and practitioners among our customers and cooperation partners. I would like to thank you all sincerely for this.

W. Rommel

Yours, Wolfgang Rommel

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>> The special feature of the other option is a central groundwater heat pump system. Space heaters can be supplied directly at a system temperature of 30–40 °C. An outdoor photovoltaic system supplies electricity for the heat pump system. Local, on-plot hot water heat pumps are necessary for domestic tap water heating. The economic assessment was based on detailed revenue and cost forecasts. Low heat prices as well as ecological, long-term operation were central requirements of the municipality. For the small supply areas, the two solutions highlighted are economically more viable than, for example, a biomass hot water network, and the costs for the municipality and heat customers are similar. The ecological advantages of the innovative approaches were clearly substantiated.



Following intensive consultation with experts on hand to provide information and advice, the two municipal councils voted to implement the cold water solution. Important aspects included the investment level, the cost

to the municipality and homeowners as well as risks.

As a result of the resolutions, in both new housing areas, sustainable heat supply solutions will be set up for the municipality without further grants. Regardless of this, the developers can make use of the heat pump grants provided by the Federal Office for Economic Affairs and Export Control (BAFA). The heat customers benefit in the long run from a forward-looking, climate-friendly heat supply and favourable supply costs. The studies were funded by BAFA as part of the Heat Networks 4.0 programme.

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Recovering precious and special metals

UBA project on consolidation, temporary storage and degree of recovery completed

Special metals such as rare-earth metals (rare earths) or Indium are not recovered from post-consumer waste, or only to a very limited extent. Many products that contain such metals have only recently appeared on the market. The returned quantities are still too small and large-scale recycling methods have not been implemented.

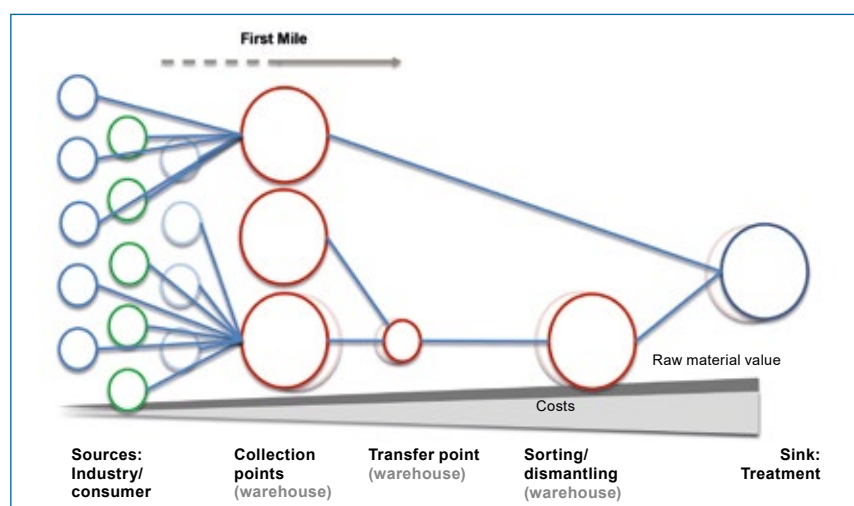
Precious metals, on the other hand, have long since been recovered. However, their collection and separation from low-concentration waste streams of many small sources is a challenge. The concentration or quantity of pre-

cious and special metals in waste products or components is also frequently so small, that their collection or separation is currently not economically viable.

Can new logistics concepts and approaches to intelligent organisation and arrangement of material and information flows help? What technical, organisational and legal options can be created for longer-term interim storage until large-scale recycling processes are available? Together with HSAOps at Augsburg University of Applied Sciences and the law firm avo-cado, bifa Umweltinstitut examined

these questions on behalf of the Federal Environment Agency (UBA). Examination focused on the following waste streams: NdFeB magnets, vehicle electronics, environmental catalytic converters containing precious metals, waste streams containing cerium and lanthanum, fluorescent substances containing rare-earth metals, LCD layers containing indium and tantalum capacitors. Finally, ways of estimating ecologically optimal recovery yields were worked up and proposed measures were developed and assessed. The appropriateness of elaborate legislative measures is evaluated critically in view of the small potential quantities and the expected losses along the recovery chain. An increase in returned quantities of properly collected waste products would be beneficial. Recycling enterprise resource planning systems, workshops on the consolidation of small scale logistical activities or strengthening lean management in smaller dismantling companies could improve the economic viability. The results will be published soon in the UBA text series.

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A guide to the future climate for health resorts and spas

Regionally differentiated basic information and practical tips for climate adaptation and health protection

The climate is changing and has direct effects on man and nature – this has once again been obvious in recent months. Above all, persons who are ill or have health limitations respond very sensitively to climate change.

This poses a double challenge for health resorts and spas: On the one hand, they must respond to changes in their basic resources, i.e. their natural, specific local cures; because otherwise they could potentially lose their affirmed attributes. On the other hand, new, specific offers must be found for their target group – guests seeking recuperation and healing. The digital handbook "Guide to the future climate" ("Reiseführer in die Klimazukunft") (www.bifa.de; www.lokale-passung.de/klimkom2019/) offers practical and

regionally differentiated support in several steps: Basic information, situation assessment, checklist and finally a regionally adapted package of actions – a practical scenario can be developed for the respective town in several stages. The individual steps are illustrated by the results of the study from Bad Alexandersbad, Bad Endorf, Bad Füssing and Bad Hindelang. Whether the decisive stakeholders in the spa town or health resort are "sceptics", "planners", "pragmatists" or "movers and shakers" – this can ultimately be analysed by means of a typology. The communication and co-operation strategies matched to this help to achieve the previously defined climate targets. The digital handbook was developed by bifa Umweltinstitut and the Ludwig-

Maximilians University of Munich. Practical partners were the Bavarian Spa Association (Bayerische Heilbäderverband), and the spa towns of Bad Alexandersbad, Bad Endorf and Bad Füssing as well as Bad Hindelang. The Federal Ministry for the Environment funded the project as part of the German climate change adaptation strategy (Deutschen Anpassungsstrategie an den Klimawandel – DAS).

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Waste management concept for the joint local waste management authority of the Trier region (A.R.T.)

Updating of the existing waste management concept to state-specific requirements

The A.R.T. (Zweckverband Abfallwirtschaft Region Trier) members include the rural districts of Trier-Saarburg, Berncastel-Wittlich, Vulkaneifel and the Eifel district of Bitburg-Prüm as well as the City of Trier. The joint local authority is the waste disposal provider under public law for its members and is responsible for municipal waste disposal within the joint area.



A total of around 530,000 people live in the A.R.T. area, whose area is almost twice that of the State of Saarland. In addition to four disposal and recovery centres, a recycling depot and other earth excavation landfill sites, the A.R.T. also maintains a network of bio-waste collection points and compost sites for the acceptance of biowaste and for the recovery of garden waste. Regent GmbH (100 % subsidiary of A.R.T.) operates a mechanical-biological drying plant (MBT) in Mertesdorf.

In addition to the customer centre in Trier, A.R.T. also maintains its own fleet for the collection of different types of waste. According to section 6 of the State Recycling Management Act of Rhineland-Palatinate (Landeskreislaufwirtschaftsgesetz des Landes Rheinland-Pfalz – LKrWG), A.R.T. must produce a waste management concept (WMC) and update it every five years. In 2014, bifa Umweltinstitut GmbH produced its first WMC for the whole of A.R.T. Be-

fore then, there had been no uniform concept in A.R.T. Instead the WMCs of the individual joint local authority members or the resolutions of regional decision-making committees were decisive for continued development of the municipal WMCs. The concept produced in 2014 is now to be updated and adapted to the requirements set in the "Guidelines on developing WMCs" issued by the Ministry for the Environment, Energy, Food and Forestry of Rhineland Palatinate. In addition to a comprehensive survey of the development of waste quantities and changed organisational structures, it will also include a forecast of the development of waste quantities up to the end of the new WMC as well as a description of the measures to maintain and promote the different steps of the waste hierarchy.

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