The future of sewage sludge recovery

New legal specifications stimulate the market

New legal specifications have led to further loss of the importance of soil-related recovery of sewage sludge and the trend towards thermal recovery continues.

Decline in agricultural recovery

> Reduced area availability and fertiliser intensity due to more stringent provisions in fertiliser law ("Düngerecht" - DüMV) as well as bans on use within the scope of purchase agreements with the food industry and for organic farmers
> Extended test spectrum for soil and sewage sludge as well as increased test frequency for sewage sludge according to the relevant regulations (AbfKlärV – 2017) make analysis costs more expensive and in turn the overall recovery costs also rise
> Increased work and testing in the currently specified notification and delivery note procedure
> Increasing logistics and transport costs

Limitation to agricultural utilization

> Until now, recultivation of lignite coal mining areas was a good, plannable recovery option.
> However, this is in sharp decline, because most of the former mining areas have been refilled.

Thermal recovery

Thermal recovery capacities in waste incineration plants, in cement works and other industrial plants as well as in mono-incineration plants are scarce and have led to rising disposal prices.

It can be assumed that this trend will continue, until the first mono-incineration plants emerge, against the background of mandatory phosphorous recovery for wastewater treatment plants > 100,000 PE from 2029 and for wastewater treatment plants > 50,000 PE from 2032. The disposal situation could worsen further due to the loss of co-incineration capacities as part of the "coal phase-out" by 2022.
Politics wants to counteract this by promoting inter-municipal cooperation for the construction of mono-sewage sludge incineration plants and the development of interim storage facilities. bifa Umweltinstitut supports the Bavarian sewage sludge network and takes care of developing the system further.

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Consequences of climate change – strategies for Bavarian trades

Closing project event in the Handwerkskammer für Schwaben in Augsburg

With its high temperatures and low rainfall, 2018 supplied diverse illustrative material for climate change and thus also shifted the topic of adaptation onto the public agenda.

Just how necessary adaptation measures have now become can also be seen at the well-attended closing event of the "trades project", implemented by bifa Umweltinstitut and the University of Munich, together with the "Chamber of crafts for Swabia" (Handwerkskammer für Schwaben). It was funded by the Bavarian Ministry of the Environment ("Bayerisches Umweltministerium").
The special feature of this project was the systematic involvement of the "affected persons" in the research process: Seven trades – from a building contractor to a room designer through to a roofing contractor – were represented just as much as experts from professional associations or the authorities. It was repeatedly found that measures for adapting to current and expected conditions are not optional, but are already a necessity for many companies now. Because the aim is to be and remain effective and competitive, to protect employees adequately and to keep potential financial risks low. However, it was also found that in particular, relevant opportunities and risks exist in the areas of extreme summer weather and milder temperatures during the winter months.
Not only did the extent to which the firms are affected by climate change become clear, but also their innovative power and commitment to mitigating risks and to targeted use of opportunities. Specific adjusting mechanisms for climate adaptation were worked up, which can also be used as starting points and can provide inspiration for the climate adaptation of other trades.
A brochure, "Das bayerische Handwerk im Fokus des Klimawandels" (Bavarian Trades in the Focus of Climate Change) was produced as part of the project and is available free from *www.bifa.de*.

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Collecting used textiles in the Augsburg City area

Drawing up and specifying sustainability criteria for tender invitation documents

In 2017, in cooperation with the law firm Dageförde in Hanover, bifa Umweltinstitut drew up a special use concept for the collection of used textiles and it was approved by the City of Augsburg's municipal council at the end of 2017.

During the course of this, Augsburg's council assigned aws (the waste management and cleaning firm of the City of Augsburg) the task of preparing the contract award documents for the collection and recovery of used textiles, and to submit them to it for a decision. For the first time, the call for tenders was to take into consideration the future sustainability guidelines of the City of Augsburg. Consideration of sustainability criteria fit for the future in calls for tender in this form is to date unique in Germany. >>

Dear Readers, Dear Partners and Customers of bifa,

2019, a new year that surprised us in southern Bavaria with masses of snow, the like of which we hadn't experienced in a long time. So much snow fell in such a short time that an emergency had to be declared in five Alpine districts. Indeed, in some places it was possible to hear or read that climate change can't be that bad after all – if such a winter is possible. Not at all – the climate models all consistently predict that extreme weather events will increase. While writing this text it is 15° C outside, plus 15, mind you! We must spare no effort in limiting the inevitable climate change as far as possible. We would also be very wise to prepare for its inevitable effects. On page four we report on a corresponding pilot project of the trades.
Climate change and resource consumption are closely linked. Phosphorous is generally considered to be a scarce resource. In fact, according to the latest figures issued by the US Geological Survey, its reserves to production ratio is more than 1,000 years. It is not the deposits that are the problem, but their availability, quality (pollutant content of the ore) and the consequences of mining. Phosphorous recycling is definitely important. Sewage sludge is a very significant phosphorous source and its soil-related recovery would be the circular economy par excellence – if it wasn't for the problem of contaminant accumulation. To find out more, read the article on the "Future of sewage sludge recovery" in this issue of bifa-aktuell.

W. Rommel

Yours, Wolfgang Rommel

Also in this issue:

>> aws plays a pioneering role. In cooperation with Kanzlei Dageförde, bifa Umweltinstitut compiled verifiable sustainability criteria specifically for Augsburg for the aspects of ecological, social, cultural as well as economic sustainability in direct relation to the collection of used textiles. The differences between charitable and commercial collectors were also considered. Overall, working in close consultation with aws and the City of Augsburg's sustainability office, ten tangible criteria were drawn up. In all cases, the focus was on the verifiability of the criteria using credible documents.

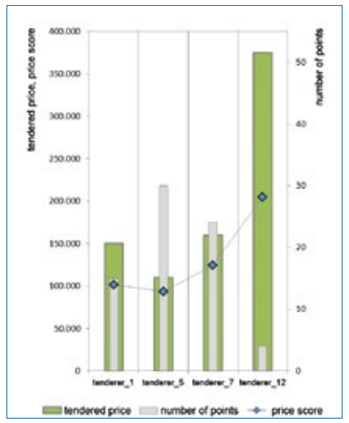

Illustration of the evaluation of a fictitious tender procedure

As contract awards are no longer decided based on economic factors only but also on sustainability, a special evaluation matrix was developed. Different evaluation formulae were checked for their reliability, comprehensibility and ultimately their legal certainty and compared with each other. With the matrix, it was now possible to select a used textile collector, who on the one hand offers a fair price and on the other is actively committed in the areas of sustainability. The basic requirement for consideration as a tenderer was the fulfilment of certain minimum requirements, such as compliance with the EURO 5 exhaust standard for the vehicles deployed in the city, certification as a specialist disposal company of all companies involved in provision of the service and payment of the legal minimum wage to employees. Bonus points could be acquired for aspects such as compliance with the EURO 6 exhaust standard for vehicles, compliance with specified (standard industry) reuse and recovery rates as well as activity as a vocational training firm and paying employee's wages above the legal minimum. The call for tenders was published and implemented in mid-2018. The City of Augsburg was divided into different lots, where one collection area was reserved for verified charitable used clothing collectors only. By using the matrix, in the contract award procedure, two bidders were identified for the different collection areas and the contracts were awarded successfully.

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Life cycle assessment of flexible-energy processes

bifa examines the environmental effects of making energy use in large-scale industrial processes flexible in the model region Augsburg

The energy-flexible model region of Augsburg provides a platform for integrated, multi-disciplinary consideration of the potential, effects, opportunities and barriers to energy-flexible factories. Science, business as well as associations and civil society organisations are currently examining the technological, ecological and societal aspects. The transdisciplinary discourse helps to accommodate the respective points of view and makes a significant contribution to successful implementation of the turn of energy policies.

Due to the growing share of renewable energy sources in the production mix, the challenge that arises is to reconcile the timing of energy generation and consumption. A central approach to this involves making consumption flexible.
As part of the Copernicus SynErgy project, Cluster 6 "Model Region Augsburg", bifa Umweltinstitut produced the life cycle assessment for energy-flexible process concepts on behalf of Naturschutzbund e.V. (NABU). To this end, bifa undertook case studies with renowned companies in the region:

> **MAN Energy Solutions:**
Induction of steel scrap and alloy constituents for cast iron production
> **SHOWA DENKO CARBON:**
Graphitisation of fired carbon moulds
> **UPM Paper:**
Thermo-mechanical production of wood-based products from wood chips

In conjunction with load profile simulations of the Fraunhofer IGCV, in which the respective flexibility measures of the companies involved were calculated, bifa compared the environmental effects of the standard production processes with the flexible energy consumption concepts.
The additional ecological costs of making energy use in the company flexible (e.g. for reheating or extended oxidation effects) were determined by bifa and classified as being very low.
The central finding for the "model region Augsburg" was that the measures considered for achieving flexibility have positive effects on the regional energy supply on a power plant scale and on grid stability. Making energy consumption flexible supports the turn of energy policies and thus contributes to climate protection.
Publication of all project results, as a consolidated presentation of the first development phase, is planned for September 2019 in the form of a reference book.

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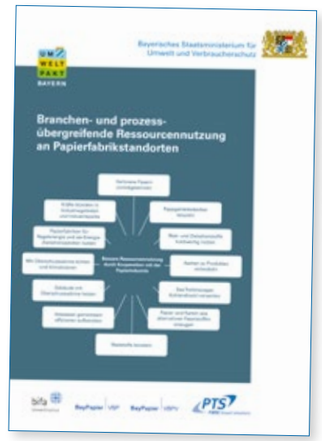
All around the paper mill

Using raw materials and energy more efficiently through cooperation

Can raw material and energy efficiency be further improved if paper mills, other businesses in the region and local municipalities increase their collaboration? Yes, it is possible, and at the same time, costs and environmental impact can be reduced! This is the result of a two-year project within the scope of the Bavarian Environmental Pact ("Umweltpaket Bayern").



The results were presented to the public on 29 January 2019 in the UPM paper mill in Plattling. The event was opened by the administrative chief in the Bavarian State Ministry of the Environment and Consumer Protection (Bayerisches Staatsministerium für Umwelt und Verbraucherschutz), Ministry Head of Department Dr. Christian Barth. Dr. Siegfried Kreibe of the bifa Umweltinstitut presented the project and reported about barriers and routes to success for cross-industry cooperation.
The project partners presented twelve areas for action to the some 50 participants. They range from the use of ash in the construction industry through to the recycling of paper cups, from heating, cooling and air-conditioning with surplus heat through to the recovery of CO_2, from alternative fibres through to the consolidation of forces in industrial parks. Andreas Helbig of Seda Germany GmbH, Robin Huesmann of LEIPA Group GmbH, Michael Heberle of UPM Communication Papers and Mika Kämpe of UPM Plattling gave an insight into the current activities of their companies.
Potential cooperation partners are now invited to examine the networking approaches together with the paper factory near them and to thus make a contribution to further improvement of raw material efficiency and climate protection in Bavaria.
The project partners were bifa Umweltinstitut GmbH, the association of Bavarian paper factories ("Verband Bayerischer Papierfabriken e.V."), the association of the Bavarian paper, cardboard and plastics processing industry ("Verband der Bayerischen Papier, Pappe und Kunststoff verarbeitenden Industrie e.V.") and the paper foundation ("Papiertechnische Stiftung"). bifa was responsible for the moderation and project management. The project was funded by the Bavarian State Ministry of the Environment and Consumer Protection (Bayerisches Staatsministerium für Umwelt und Verbraucherschutz).
A free brochure with the results of the project and potential networking partners is available from *www.bifa.de*.

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Energy concepts of today for tomorrow

bifa evaluates sector coupling technologies and develops practical implementation concepts

The energy future without greenhouse gas emissions will, to a large extent, be based on the energy source electricity.

Abundant renewable solar and wind energy is available – electricity can be produced from them cost-effectively. In addition, hydropower, agricultural biomass, as well as solar thermal and geothermal energy are used for heating. Energy stores are becoming increasingly necessary, to adjust weather-dependent photovoltaics and wind power to the timing of the demand.
With this view of the future, bifa Umweltinstitut is examining technologies and is developing concepts, in which energy for the heat and mobility sectors is provided by electricity. Energy is stored electrochemically or thermally. The range of variations in approaches already being tried out in Germany on a pilot scale is large, and difficult for the uninitiated to evaluate. Also, implementation requires consideration of the locational options and conditions, and in particular the complex energy legal framework.
bifa performed technology and business model scouting for a potential power-to-gas location. Use of hydrogen in transport and special vehicles emerges as primarily viable. By contrast, in the Fuchstal energy future project, in which bifa is participating, the objective is to achieve overall ecological-economic optimisation of a battery accumulator and a heat store in the context of grid-relevance and security of heat supply. A third approach, followed by bifa in several projects, are

local district supply concepts, in which electrically operated heat pumps increase hydrothermal heat or waste heat to the use temperature.
The bifa energy team is ready and available for further technical-economic challenges.

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