# Efficiency of collection systems

## Development of a recyclables strategy for the town of Wasserburg am Inn

*Apart from the waste management of the pure urban area with old town and suburb districts, through a legal ordinance issued by the district of Rosenheim, the town of Wasserburg am Inn, has also been assigned the official tasks of collecting and transporting wastes, the removal and collections, transport and disposal of wastes for recovery and operating the recyclable materials depot with acceptance of problem waste and waste equipment under the electrical and electronic waste equipment law.*

The town intended having its existing waste management checked with regard to ecological and economic aspects, to define objectives and from this to deduce action options, especially with regard to the current requirements of the recycling and waste management law („Kreislaufwirtschaftsgesetz"). To this end, Wasserburg am Inn commissioned Projektgemeinschaft AU Consult GmbH and bifa to check the efficiency of the collection systems and the development of a recyclable materials strategy.

To evaluate the actual situation, the existing contracts were first checked with regard to the conditions they contained and possible savings options were determined. The existing collection and recovery system was then analysed. The theoretical recovery potential and relevant options for further exhausting the potential of this reservoir were determined and recommendations for actions by the town were derived on the basis of criteria, for example, practicability, citizen-friendliness and positive accompanying effects, such as the reduction of emissions by reducing individual traffic. This was prepared for the relevant flows of biowaste, paper, paperboard, cardboard (PPK), lightweight packaging, bulky household waste, waste timber and scrap metal, small electrical appliances and equivalent material non-packaging as well as other recyclables such as used textiles, used shoes and other used goods on a material flow basis. After comparing the efficiency of the existing recyclable material depot with the contemporary requirements of a citizen-friendly bring system, possible optimisations for operation of the recyclable material depot were also pointed out.

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# Funded waste separation technology project

## Trials at TST Trenn- und Sortiertechnik GmbH

Together with TST Trenn- und Sortiertechnik GmbH – a member of Recycling Technologies Bayern e. V. – bifa has started a new funded project on the topic of „separation technology". The objective is to extend and optimise the performance range of separation apparatus through which air flows, developed by TST Trenn- und Sortiertechnik GmbH in Weißenhorn, within the fine grain range (< 500 µm). Different possible solutions had already been tested and showed remarkable progress and further large potential compared to the purity and treatment in the initiate state. Further test optimisations are planned for the future, which drive forward such a simple and energy-saving separation process for the fine grain range and to make them feasible for practical application.

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# Welcome!

## bifa welcomes Dr. Karsten Wambach as a new project manager

Since January, Dr. Karsten Wambach has been the project manager responsible for process engineering. Before that he worked as an independent consultant for green production, sustainability and modern waste concepts. From 2001 to 2012 he worked for the SolarWorld Group, most recently as managing Director of Sunicon GmbH in Freiberg. He built up one of the largest companies worldwide for the recycling of silicon and set up the first pilot line for value-retaining recycling of solar modules. Other companies he has worked for during his career include Flagbeg Solar International GmbH and Bayer AG. He is the founder of PV CYCLE and was the first president of this trade association in Brussels. We wish him exciting projects and hope that he enjoys working at bifa!

# Events

**15. Bayerische Abfall- und Deponietage**
19.-20.03.2014, Augsburg

**Augsburg OPEN**
03.04.2014, Augsburg

**IFAT**
05.-09.05.2014,
Munich Fair
Hall B.3, Stand 171.270

# Publications

**bifa-Text Nr. 62**
Ökoeffizienzanalyse von Photovoltaikmodulen

**bifa-Text Nr. 63**
Abfallaufkommen in Bayern - Prognose 2016 und 2023

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aktuell

1.2014

# Ecoefficiency analysis of PV modules

## bifa publishes up-to-date results

*Photovoltaics (PV) is an important element of the sustainable energy supply and makes a significant contribution to the turn of energy policies. Yet critics of solar technology still question the benefits of electricity generation with PV modules from an environmental point of view. The new study by the bifa Umweltinstitut draws a future-orientated picture of the ecological and economic effects of photovoltaic systems along the whole life cycle.*

The study evaluated the production of the PV systems, their operation in different application cases and different recycling scenarios. Wafer and thin-film technologies were examined. The evaluation was made not only as a snapshot of the present time, but also describes the potential of medium-term developments. The study was funded by the Bavarian State Ministry of the Environment and Consumer Protection („Bayerischen Staatsministerium für Umwelt und Verbraucherschutz") and was supported by a large number of companies operating in the photovoltaics industry.

PV is a particularly environmentally friendly type of electricity generation, whose environmental effects (including climate change, acid rain, resource consumption) are a factor of 10 to 20 lower than for electricity generation with fossil fuels. However, apart from the environmental evaluation, „electricity from PV" and „electricity from fossil fuels" differ in several features, e.g. controllability. >>

## Dear Readers, Dear Partners and Customers of bifa,

We are pleased to present interesting projects to you again in this new year. For example, we were able to complete our extensive PV study in cooperation with renowned players of the solar industry and present the results in a „bifa Text" document. The forecast report on waste generation in Bavaria, forecasts for 2016 and 2023 („Abfallaufkommen in Bayern - Prognose 2016 und 2013") has also been published as a bifa Text. In recent weeks bifa has started numerous new projects, for example, waste separation technology trials and advising the Kreisenergiewerke in Augsburg. We would like to present our new project manager for process engineering, Dr. Karsten Wambach, who we warmly welcome to bifa. We also congratulate the „Netzwerk Recycling Technologies Bayern" network, which now stands on its own two feet as a registered association.

We are currently in the middle of the preparations for the trade event of 2014: the IFAT. The trade fair is growing and with it the size of our stand: Compared to 2012, we now have twice as much space for our guests.

W. Rommel
Yours, Wolfgang Rommel

Furthermore in this issue:





Recycling Technologies BAYERN



>> Against this background, the differences between the PV technologies investigated are small. The causes of the environmental effects vary due to the fundamentally different production of wafer-based and substrate-coated modules/laminates. In the cost analysis performed not only the PV technologies were considered but also their use in different application cases.

The use of PV on large roofs has the best environmental-related assessment due to their use of existing infrastructure (e.g. roof slope or grid connection). Outdoor systems achieve somewhat worse results by comparison due to the disproportionate cost for the other system components (e.g. substructure and cabling). Depending on the application case and technology, the energy pay back times for the PV systems are between 0.6 and 1.3 years. The potential for successful implementation of an integrated and technologically high-quality recycling system proves to be significant from an environmental point of view. For wafer-based modules, for example, more than 20 % of the environmental costs of production could be saved.
bifa Text No. 62 Ecoefficiency analysis of photovoltaic modules („Ökoeffizienzanalyse von Photovoltaikmodulen") contains detailed documentation of the background and scientific relationships and is available to order now from www.bifa.de.

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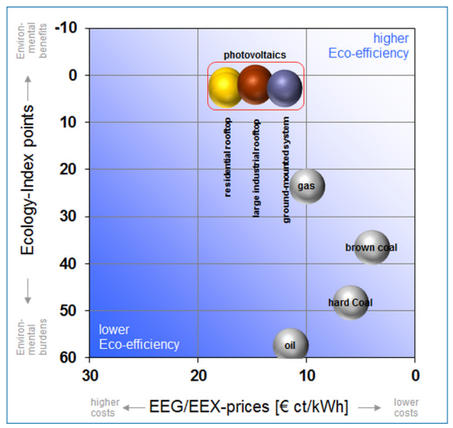


*Eco-efficiency portfolio for three PV technologies for residential rooftops, large industrial rooftops and ground-mounted systems and basic classification of electricity generation from non-regenerative sources (a lower ecology index signifies less environmental impact; a high ecology index signifies greater environmental impact; cost index: Incentives for PV systems according to EEG (12.2012) and EEX prices for non-renewable energy sources [FfE 2010]). Reference unit: Generation of 1 GWh electricity.*

# Waste generation in Bavaria – forecasts for 2016 and 2023

## A contribution to the future organisation of the waste disposal landscape in Bavaria

*In the study, commissioned by the Bavarian State Ministry of the Environment and Consumer Protection („Bayerischen Staatsministerium für Umwelt und Verbraucherschutz"), the expected quantities of the most important wastes that have to be submitted for disposal in Bavaria were forecast. In addition, wastes which are not subject to mandatory submission but are of interest for other reasons were also considered. The result shows forecasts up to the end of 2016 and 2023.*

The main subject of the forecasts is the waste management changes to be expected during the respective periods, which are affected by societal, ecological, economic and technical variables. Particular attention was paid to the relevant and difficult to estimate factors, which are the result of existing and expected changes to standards or the policy framework during the forecast period.

Taking into account the potential changes of relevant influencing factors, scenarios were drawn up to forecast possible effects on quantity flows and quantity corridors. In order to comment on possible generation of municipal waste, a maximum quantity and a minimum quantity scenario was formed. An important difference between these two scenarios is above all the possibility of further developments in the German recycling law („Kreislaufwirtschaftsgesetz" KrWG). Developments towards further „liberalisation" of the waste industry or maintaining the status quo under the overall management of the public service or „(re-)municipalisation" are all feasible.

The maximum scenario for total residual waste generation, in line with the forecasts for the subfractions, is characterised by the trend and basic forecast of a slightly decreasing quantity for total residual waste over the years. The forecast and significant reduction in the minimum scenario is characterised by the individual domestic and business waste fraction and reduction in quantity through increased skimming off of recyclable materials (in the largest private marked development due to an additional private recyclable materials bin) and extending mandatory deposits for disposable drinks packaging to fruit juices and „Nektars" (fruit juice drinks with 25-50% fruit juice content) as well as diet drinks.

The forecast recyclables quantity from households in the maximum scenario is characterised by the trend and basic forecast of an increasing quantity over a longer period and the effect of extending separate collection of recyclables through the obligations in the recycling law (KrWG). The minimum scenario shows a reduction in recyclables quantities due to the introduction of a recyclables bin or expanding commercial collections and the special influencing factor of the decline in print media in paper, paperboard and cardboard (PPK).

bifa Text No. 63 Waste generation in Bavaria –forecast for 2016 and 2023 („Abfallaufkommen in Bayern – Prognose 2016 und 2023") can be purchased from www.bifa.de.

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# Kreisenergiewerke Augsburg

## External technical support during the founding phase

*The district assembly of Augsburg administrative district decided to form the „Kreisenergiewerke" - district energy plants. In this way, as part of the turn of energy policies and the future objective of the regional climate protection concepts, options for organising at municipal level are to be exhausted comprehensively.*

For the initial phase of the new Kreisenergiewerke (district energy plants) company, it is planned to commission bifa Umweltinstitut GmbH not only to provide external technical support but also assistance with the corporate organisation and the management, in order to ensure efficient implementation of the necessary actions and to shorten the startup phase. A concept developed by bifa is to be implemented in two phases. The objective of the first phase with the foundation of the Kreisenergiewerke as a GmbH (plc) is to draw up a business plan on the basis of an analysis of action options for the district energy plants. The methodological approach ranges from discussions with the mayors and local authority representatives of the administrative district and many other stakeholders in the areas of
energy generation, energy distribution and energy use in Augsburg
administrative district through to an energy survey of the district's properties. An expert advisory committee with representatives of the local authorities and political groupings in the district assembly will provide support and contribute during the first phase. An important aspect here is to ensure that the newly founded Kreisenergiewerke find their place within the regional climate protection concept of the economic region. A central aspect is the development of specific projects and implementation possibilities. The results of this analysis, the discussions and the development of projects will then be incorporated in the business plant for the Kreisenergiewerke. At the same time the next steps will already be stated in more specific terms and in implementable projects (among other things from the ideas of the municipal partners) and will point out possible funding options. Equally, participation models will be drawn up for the respective project approaches.

In Phase 2 the developed projects will then be further developed and implemented with the relevant players.

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# Recycling Technologies Bayern becomes an e. V.

## The network now stands on its own two feet

*For three years, bifa managed the „Recycling Technologies Bayern" network within the scope of a „Central SME Innovation Programme" project funded by the Federal Ministry of Economic Affairs and Technology („Bundesministerium für Wirtschaft und Technologie"). Public funding was gradually reduced and expired on 31.12.2013.*

In November last year, eleven members of the network, and therefore the majority, founded Recycling Technologies Bayern e. V.. The association has therefore been economically independent since the beginning of the year. It finances itself from membership contributions. bifa will also continue to provide the network management. Several other companies have already applied for membership. However, it is not intended for the association to become too big, so that intensive and personal exchange continues to be possible.

The central objective of the association is to promote cooperation and exchange between members in the areas of research, development and marketing. Other objectives are to provide support for members in tapping new markets and working up marketing strategies, promoting the development of new products and the development of national and international fields of business in the area of environmental technology.

Apart from bifa, the members are exclusively Bavarian companies which produce and supply recycling technology:

- AVA Huep GmbH & Co. KG
- bifa Umweltinstitut GmbH
- Entsorgungstechnik Bavaria GmbH
- Erdwich Zerkleinerungssysteme GmbH
- ESTA Apparatebau GmbH & Co. KG
- hamos GmbH
- Hosokawa Alpine AG
- Huber-Technik GmbH & Co. KG
- Ruf Maschinenbau GmbH & Co. KG
- S+S Separation and Sorting Technology GmbH
- Trenn- und Sortiertechnik GmbH

The association board members are Roland Ruf (Ruf Maschinenbau GmbH & Co. KG), Michael Perl (S+S Separation and Sorting Technology GmbH) and Dr. Siegfried Kreibe (bifa, Chairman). The network coordinator is Anita Gottlieb (bifa).

We wish Recycling Technologies Bayern e. V. continued success!

*Participants of the e.V.-kick-off-meeting - end of 2013 in Augsburg*

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