The Future of Energy in Fuchstal

bifa provides advice and support for showcase municipalities in innovative energy projects

To achieve a comprehensive sustainable supply of energy, in addition to power generation and heat provision, mobility must also be dealt with. Sector coupling, energy conversion and storage processes are indispensable elements for increased use of renewable energy. This is now becoming reality in Fuchstal.

With our support and that of our project partner, the consultants Ingenieurbüro Sing, the Fuchstal municipality in the rural district of Landkreis Landsberg am Lech successfully applied for a funded project under the national climate change initiative of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit). In this project, large-scale technological elements for sector coupling and energy storage in the community are being implemented. These are an electricity store, a power-to-heat plant and a heat store. The units are coupled with the existing wind farm and the existing heat network.
After planning the technical details, the realisation is now starting this year, the second of the three project years. To this end, calls for tender were published for the individual units and the tenders received were examined. Extensive discussions were held with the tenderers of the three system components in order to clarify all questions in advance. The district council has passed the resolutions agreeing the suppliers for the heat store, the power-to-heat plant and the electricity store. bifa is assisting and advising the municipality and the firm of consultant engineers during the entire project period.
In the meantime, the Fuchstal municipality is already forging further turn of energy policies plans and, with bifa at its side, has successfully participated in the "Hyland" hydrogen competition of the Federal Ministry of Transport and Digital Infrastructure (Bundesministerium für Verkehr und digitale Infrastruktur). As a 'Hystarter', Fuchstal is currently examining options for sustainable mobility as the next step on its way to the energy future.
Due to its citizens' wind farm with four wind turbines, numerous photovoltaic systems and a heat network fed with heat from the CHPs of a biogas plant, the Fuchstal municipality is already a showcase community and in July 2020 was officially recognised as a shaper in the turn of energy policies team of Hubert Aiwanger (Bavarian Minister of State for Economic Affairs, State Development and Energy).

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Caesium and strontium in waste

Behaviour during incineration and in ash disposal

Since June 2020, together with our cooperation partner, the Chair of Energy Process Engineering at the Institute for Process Engineering and Environmental Engineering of Dresden's Technical University, bifa has been conducting research into the behaviour of caesium and strontium in waste during incineration and in the ash disposal.

To this end, incineration tests are being performed in the Centre for Energy Technology of TU Dresden, not only in a grate firing system but also in a fluidised bed firing system. Small quantities of non-radioactive caesium and strontium compounds are added to the municipal waste-like fuel. The fuel bed and fluidised bed ashes produced as well as fly ash samples are examined systematically in the bifa laboratories with regard to ash ageing and leachability. The objective is to determine the mineral phases containing caesium and strontium as well as the solubility of the elements, and in this way to acquire fundamental information for forecasting the long-term behaviour of these substances as the basis for a disposal strategy for contaminated waste in the event of nuclear accidents.
One of the methods applied corresponds to the approach developed by bifa for the waste legislation classification of bottom ash from household waste incineration, which is the basis of the practical guidelines of the IGAM and ITAD associations. The work is being undertaken on behalf of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit).

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Event

21st Bavarian Waste and Landfill Conference 29 and 30 September 2020, Messe Augsburg

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Looking for incineration capacities

Mixed commercial waste in Bavaria

Working on behalf of the Association of Bavarian Disposal Companies (Verband der Bayerischen Entsorgungsunternehmen e. V. - VBS), bifa examined the situation of disposal of mixed commercial waste in Bavaria with regard to incineration capacities and options for relieving the situation.

Before the outbreak of the corona pandemic substantial capacity bottlenecks existed. Many disposal companies had problems finding takers for their waste and their storage capacities were frequently full to their limits. After the pandemic has ended, the situation will quickly return to being as it was before.
Among other things, the causes of these bottlenecks lie in the population and economic growth, the loss of incineration capacities due to the phasing out of coal-fired power plants, the reduction in EU-wide waste quantities placed in landfill and import restrictions of Asian countries.
Insufficient data are available on the volume of mixed household-type commercial waste. Based on information available in the literature, a quantity of approx. 925,000 Mg/a can be estimated for Bavaria. >>

Dear Readers, Dear Partners and Customers of bifa,

We have now been living in completely unusual times for half a year. The novel coronavirus SARS-CoV-2 determines our lives. The measures to handle the worldwide pandemic it has triggered and the almost desperate attempts to return to some kind of "normality" are testing our society. Certainties that until recently were considered to be almost incontrovertible, especially in the environmental debate, are now suddenly beginning to falter. Where disposable packaging was to be avoided wherever possible – not only, but particularly for food – we now find that it can be advantageous after all in terms of hygiene. So it is not surprising that its quantity has increased significantly in recent months. At the same time, the quantity of commercial waste for disposal has reduced. At the end of last year, experts expected precisely the opposite. Nobody can really predict when these trends will reverse again. For me, however, this very clearly shows that monocausal or one-dimensional approaches do not get us anywhere. We must learn to deal with complex, non-linear processes. You will find several examples of this in this bifa-aktuell.

W. Rommel

Yours, Wolfgang Rommel

Also in this issue:

>> Of this, around 370,000 Mg passes through sorting plants, 425,000 Mg is disposed of directly in thermal recovery and 130,000 Mg in other systems. Insufficient statistical data are also available on suitable plant capacities for the sorting of such waste. An operator survey undertaken together with the VBS indicated a capacity of approx. 800,000 Mg/a for Bavarian sorting plants, around one half of which is currently used.
The 14 domestic waste incineration plants (DWIP) in Bavaria account for more than three quarters of the energy recovery capacity. Easing the load on these plants could help to relieve the situation significantly. In order to identify the greatest levers for adjusting the situation, among other things, bifa analysed the theoretical DWIP relief potential for important waste streams through complete separation and recycling of the recoverable materials in the waste. It was not possible to examine which part of this theoretical potential can actually be realised within the scope of this study. Nonetheless, the results allow the order of magnitude to be estimated.
The most important fields of action have proven to be improvements in the areas of separation of commercial waste at source and the collection of biowaste. Further significant potential can exist, above all, in the sorting of mixed commercial waste and the collection of lightweight packaging. However, when evaluating the DWIP relief potential, apart from the quantities of the additionally separated recoverable materials, their calorific value must also be taken into consideration, because waste with a high calorific value uses more DWIP capacity than waste with a low calorific value.
Furthermore, it is possible to extend DWIP capacities by building new plants. Even if such a project is planned, a relieving effect is only to be expected in the long term due to the time delay associated with the approval process. The degree to which the capacities of existing DWIP can be extended must be evaluated specifically for each plant.
The results of the study have been published as bifa-Text No. 69 and are available from *www.bifa.de*

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Mobility station opened

Milestones in the "Demonstrating the Zwickauer Turn of Energy Policies" (ZED) project

Despite the corona pandemic, two important milestones for the ZED project have been advanced decisively: On Friday 17 July, the project partners – including bifa – together with residents and the media officially open the Marienthal mobility station. In addition, this event was also the go ahead for a survey of all households in Marienthal.

Kathrin Köhler and project partners from ZED officially open the mobility station in the Marienthal district of Zwickau

Is visiting the doctor or supermarket on foot too far? No car to hand? Until now, many senior citizens have faced the challenge of no longer being able to run their daily errands independently. This is no longer the case in this district thanks to the opening of the mobility station and subsequent project week. The Zwickauer ZED project now also uses the station to communicate energy research questions at grass-roots.
bifa has already moderated two large citizen forums and several workshops. The results of these events have now also been incorporated in a questionnaire, which will be distributed to all 8,000 residents of Marienthal with the opening of the station. The objective of this household survey is to examine the acceptance of various (technological) developments, such as the planned energy centre in Marienthal and attitudes to regenerative energy and solutions for climate protection and climate adaptation. Energy supply, mobility and climate protection in the district appear to be highly relevant with regard to environmental effects and are thus particularly important for realisation of the planned ZED zero emissions district. A measuring campaign to determine the summertime heat in Marienthal homes is planned – also in order to extend the general "heating focus" in the winter to include extremely relevant issues of adaptation to the effects of climate change in the summer.
The project is one of six nation-wide lighthouse projects and is being funded by the federal ministries of research and of economic affairs with around 16 million euros.

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Eco-efficiency of respiratory and anaesthesia accessories

bifa compares disposable and reusable products for Dräger

In future, Dräger Medical Deutschland GmbH would like to give greater consideration to environmental concerns in the development of its products. In this context, Dräger engaged bifa to undertake a systematic comparison of its own disposable and reusable products in the areas of respiratory, anaesthesia and monitoring accessories.

To acquire a realistic comparison of the environmental effects and the costs, the analysis covered the entire production path including use on the patient in the OP and on intensive care wards as well as the treatment of the products. The results of the eco-efficiency comparison can be summarised as follows:

Anaesthesia accessory products: The disposable products examined have a significantly better ecoefficiency than the reusable products; the ecology index and the costs for the hospital are also considerably lower.

Monitoring accessories: The disposable products examined have a significantly poorer ecoefficiency than the reusable products; the ecology index and the costs for the hospital are also considerably lower.

Respiratory accessories: The disposable product and the reusable product examined have virtually the same ecoefficiency; this also applies to the ecology index and also to the costs.

In the case of production of the disposable products, the environmental impacts are mainly due to the production of the products and the production of disinfectant wipes where wipe disinfection is necessary during the use phase. Product manufacture plays a significantly smaller role for reusable products due to their multiple use before their disposal. Apart from the manufacture of disinfectant wipes for wipe disinfection (monitoring accessories), the emissions here mainly result from the provision of electricity for the equipment used to treat the products after use. Environmental credits result from the recycling of plastic packaging as well as paper and carton board. They reduce impacts on the environment only slightly.
In addition, the product alternatives were compared by carrying out a qualitative assessment of hygiene risks. Here all disposable products performed better than the reusable alternatives.

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Emission measurement of airborne endotoxins

Draft VDI guidelines published

The objective of Germany's Federal Immission Control Act (BImSchG) is to "protect humans, animals and plants, soil, water, the atmosphere as well as cultural and other material goods from harmful environmental effects and to prevent the occurrence of harmful environmental effects". Plants requiring approval must prevent harmful "environmental effects due to emissions into the air, water and soil, including waste management" and must implement emission-reducing measures.

Bioaerosols and endotoxins can be emitted during the handling and processing of biomass. These include, for example, large animal stables, biomass drying plants, wastewater treatment plants and (bio) waste treatment plants.
Work has been carried out for several years on producing VDI Guidelines on recording the emissions of bioaerosols and endotoxins. With these guidelines, results are obtained under standardised conditions, which enable different studies to be compared. The official draft of VDI 4254 Part 2 (April 2020) supplements the existing guidelines to include the recording of endotoxin emissions. Endotoxins are constituents of the cell wall of Gram-negative bacteria, inhalation of increased doses of which can cause health limitations. While many microorganisms in the air are rendered inactivate rapidly, e.g. due to drying stress or sun radiation, some bioaerosol constituents prove to be significantly more resistant under environmental conditions. These also include the bacterial endotoxins. They can therefore be used as a "main parameter or indicator of plant-related emissions of bioaerosols". bifa worked with others on producing measurement programmes for recording the emissions of airborne endotoxins and for testing the effectiveness of mitigation measures. The several years of work on the guidelines was supported by the practical experience available.

Gram-negative germs like E. coli (picture)
Sources of endotoxins

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