

Augsburg stays cool

Household surveys and online workshops on adaptation to climate change

During the heatwave in the summer of 2019, temperature measurements and surveys of the heat awareness of residents were undertaken in around 600 households in the "Abc – Augsburg bleibt cool" (Augsburg stays cool) project. The results are used to identify summer heat areas in Augsburg and to thus support municipal planning processes to reduce the heat load in the city and to protect vulnerable population groups.

A total of four workshops are planned to transfer the measurement results into municipal practice. The first of these four workshops on "heat protection in urban planning" was held on 23 April 2020. Due to the current Corona situation, this was held in virtual form, bifa was responsible for the

Biowaste in large housing estates

A workbook for Baden-Württemberg

Working on behalf of Baden-Württemberg's State Environmental Institute (LUBW – Landesanstalt für Umwelt Baden-Württemberg), bifa developed a workbook for improving biowaste collection in large housing estates. With moderation provided by bifa, the workbook was tested and developed further in a model project in the cities of Heilbronn, Karlsruhe and Stuttgart. The initiator and funder of the project was the Ministry for the Environment, Climate and Energy Management (Ministerium für Umwelt, Klima und Energiewirtschaft) in Baden-Württemberg.

The objective was to find out which technical and organisational measures can be used to improve the often difficult biowaste collection in large housing estates. In many cases, below-average quantities of biowaste are generated there and an above-average fraction of, for example, plastics is found in the biowaste.

Many residents do not know how to separate waste correctly and why do-

organisation, concept and moderation. With the help of various online tools it was possible to give the 20 participating urban and green space planning, housing management and science experts insights into the results of the Augsburg field campaign, and to present best practice examples. Working in small groups, measures were worked up to reduce the heat load in Augsburg's neighbourhoods. The focus was placed on water areas, planting and green infrastructure, cold air lanes and possible designations for master-plans or land use plans.

The set of measures worked up will be used as a basis in the continuation

ing so contributes to climate protection.

Some of the housing estates also lack the space for separate bins and sufficiently large biobins. The Ministry for the Environment and its partners therefore started the model project in 2019 with the slogan "Biobin – Baden-Württemberg is contributing" ("Biotonne – Baden-Württemberg macht mit") and a large box of tools and campaigns.

"Practice should show which measures we can use to increase the biowaste quality and quantity in large housing estates. Thanks to the great commitment of the waste management and housing companies involved in Stuttgart, Heilbronn and Karlsruhe, we were able to compile a package of measures, which takes into account the particular need in large housing estates", said Baden-Württemberg's Minister of the Environment, Franz Untersteller.

In the pilot project, the waste management firms and building management of large housing estates in the municipalities involved received a

of the project, in order to modify the heat zones identified within the Augsburg city area in an exemplary way so that the heat load is reduced and the occupancy quality in summer temperatures can be improved. The project is funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit). The project partners are the University of Ulm, the City of Augsburg, the University of Augsburg, the aerial photography evaluation and environmental consultants "Sachverständigenbüro für Luftbildauswertung und Umweltfragen" (SLU) and bifa.

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draft version of the workbook. bifa moderated the model project with interviews and workshops. The participants discussed their experiences from the pilot use and provided many valuable tips for needs-based further development of the documents. Based on this, the workbook was revised, and consists of guidelines, more than 20 project modules and numerous tools for implementation on site.

From the spring of 2020, the workbook will be available for all interested cities and rural districts and building management departments or firms. In addition, PR work material has been developed by lichtl Ethics & Brands GmbH.

Up-to-date information on the model project and the workbook can be found at:

<https://um.baden-wuerttemberg.de/de/umwelt-natur/abfall-und-kreislaufwirtschaft/modellprojekt-biotonne-richtig-nutzen/>

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Corona Pandemic

Lessons for our economies

The current most prominent representative of the microbial world, SARS-CoV-2, has managed to get the majority of the world's population to discuss the health hazards, the transmission routes and the stability of this single virus variant.

Despite rapidly growing scientific advances, in detailed issues (example: disinfection of protective masks) an astonishing number of knowledge gaps exist. However, SARS-CoV-2 is only one representative of an unimaginable diversity of microbial beings. Their biodiversity is estimated to be more than 10^{12} species and the number of individuals is around 10^{32} bacteria and viruses. These numbers challenge our

imagination: If all viruses were to be lined up tightly packed, the length of the row would be one billion light years.

Despite these immense numbers, microbes remain invisible for most people in their everyday lives. Their presence is often only recognised if a few of their representatives harm our health. However, only the symptoms of a disease caused by the pathogens are detected. The pathogens themselves can only be detected in patient samples, in products, on surfaces or in the air using sophisticated analysis techniques.

Despite their large biodiversity, until now only a few hundred species have appeared as human pathogens. >>

Dear Readers, Dear Partners and Customers of bifa,

You are probably reading this bifa aktuell while working from home. In the editorial of the 1st issue of 2020, I wrote "Society and the media are currently more occupied by the "new type of corona virus" and the threatened pandemic than with climate change". These have become reality and determine our daily life in an unprecedented radical way. The terrible images from Northern Italy probably contributed to the extremely drastic measures taken by our executive authority, which have virtually paralysed our economic and social life. These measures were largely accepted, they were absolutely urgent. Their economic consequences,

however, will encumber us for many years to come. Unfortunately, at the same time, we cannot dismiss the risk that medium-term climate change, the overuse of resources, species extinction, etc., represent a far greater threat to our civilisation. This makes it even more important for social groups to remember their responsibility and to place sustainability at the centre of their efforts. As an environmental institute, we want to continue to make our contribution to this.

W. Rommel
Yours, Wolfgang Rommel

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>> Here it must be noted that more than 99.9999 % of the worldwide estimated microbe species are still unknown. This "dark matter of the microbial world" is sure to conceal more diverse representatives, which can challenge global society in a similar way to the current SARS-CoV-2. In addition to human health, the health of (livestock) animals and plants must be protected, as their limited diversity (5 crop plants represent 75 % of the world harvest) favours the effects of infectious diseases.



Due to their ubiquitousness in the air, in water, in the soil, on humans, animals, plants and on all surfaces, undesirable microbial life forms constitute a particular challenge for global material flows and in particular for many sought after material cycles. The current pandemic has once again clearly shown how easily pathogens can spread globally. In addition to infected persons, plants (for example, EHEC on shoots) and animals (examples: bird flu, swine fever) are important spreading sources of known and new infectious agents. Only living beings (humans, animals, plants and microorganisms) are directly affected by pathogens. Their excretions and waste produced by them can also be vehicles for the spreading of pathogens, as are all objects, products and environmental media that come into contact with

them. Therefore, hygienic precautions must be applied reliably in occupational safety, in processing, in product safety and environmental protection. The SARS-CoV-2 pandemic has made it blatantly obvious that hygiene aspects must be optimised in many fields of activity, so that future pandemics have fewer consequences. In this context, the circular economy striven for reasons of material ecology can also entail risks, if all pathogens in the recycling are not rendered harmless for humans, animals and plants. Because viruses are only reproduced via the metabolism of the respective host organism, their occurrence in a material cycle will not increase. This is not the case for organisms with their own metabolism (bacteria, fungi, parasites), as these can repair damage that occurs and can mostly reproduce outside of their host. Such pathogens can then spread in the environment

independently, which often means that defensive measures are no longer possible. For example, the infection of banana trees known as the Panama disease (banana wilt), threatens production in many growing areas. Despite their diverse manifestations, pathogens have one thing in common: They are made up of comparatively unstable biomolecules. Although the stability of different proteins, lipids, nucleic acids can be highly different, knowledge of several very resistant representatives provides the opportunity of making justified assumptions on how to control such new types of pathogens. The bifa Umweltinstitut tests the efficacy of new disinfection methods and products in different fields of application and thus contributes to limiting hygienic risks.

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Potential of sector coupling for waste treatment plants

bifa starts study on behalf of the Federal Environment Agency (UBA)

In sector coupling, economic sectors are linked to each other so that renewable energy cannot only be used optimally and integrated in the electricity sector but also in the fields of heating, cooling and transport. The possibilities and potential of sector coupling for waste treatment plants have hardly been examined systematically to date. bifa is now undertaking a study of this on behalf of the Federal Environment Agency (UBA).

It will consider plants, which not only treat waste but also recover energy, e.g. plants for municipal waste incineration, biowaste fermentation, waste wood incineration and sewage sludge incineration. To this end, the possibili-

ties of sector coupling (also known as electrification), will be evaluated from a technical, ecological and economic point of view. Carbon capture and utilization (CCU) technologies will also be considered. The view is of the future: The reference year for the forecasts will be 2035.

An evaluation model will be developed to classify suitable combinations of waste treatment plants and sector coupling technologies (e.g. power-to-gas, power-to-liquid, heat and waste heat options). It can be used to perform location and potential analyses, including for individual waste treatment plants. If nothing else, in a Germany-wide consideration – including consideration of legal and political



aspects – of the potential contribution of sector coupling to efficient energy and material use and greenhouse gas emission reduction for waste treatment plants will be pointed out.

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PV recycling requirements and standardisation for the CSA Group

Recycling – reuse – shutdown

bifa undertook a study for the Canadian Standards Association (CSA) on the generation of waste from photovoltaic modules in North America. Apart from drawing up an overview of existing PV waste provisions and such inpreparation for the USA and Canada, the initiatives of the federal states were also examined.



There are currently no federal laws specifically tailored to, as the amount of waste generated by the PV modules mainly based on crystalline silicon is currently still small.

In individual states of the USA, for example, Washington, New York, California and others, however, initial regulations have already come into force or are in preparation. In the study, the individual regulations and standards are compared with the laws in the European Union and in particular the

Directives for electronic waste (WEEE) and corresponding regulations and standards. As electrical equipment, since 2012, in Europe the waste from PV modules is subject to a recycling obligation.

In the USA there is already a range of recyclers, many of which currently remove the frames and cables of the modules and then deposit the remaining quantities on suitable landfill sites. With the help of a statistical life model after Weibull, forecasts for the poten-

tial waste generation up to the year 2030 were produced for the USA and Canada on the basis of the existing and expected development of PV systems.

With the adoption of the new NSF ANSI 457-2017 standard on Sustainable Leadership Standard for Photovoltaic Modules, an important international basis was laid for extended producer responsibility.

Further use of used PV modules, following a comprehensive quality and safety check, is a potential way of reducing the quantities of waste. An important requirement is the creation of common international rules and standards for collecting statistical data, the trade, use and disposal of PV modules. The implementation will be an important task in the coming years.

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Life cycle assessments of packaging

Experiences from 20 years of LCA

For more than 20 years, bifa has produced life cycle analyses and assessments for products, processes and systems in all kinds of different areas of the economy. Life cycle assessments are characterised by the fact that they cover environmental effects from cradle to grave, i.e. through all stages of the life cycle (starting materials, processing, transport, disposal).

Life cycle assessments for packaging systems in particular were and are the subject of a large number of such analyses. For example, bifa evaluated the environmental effect of various standard packaging materials in classic food packaging or the use of renewable raw materials for the production of plastic and paper packaging.

From this work, several fundamental findings can be deduced for the life cycle assessment of packaging. As a rule, production of the necessary original packaging materials has the

greatest influence by far on the overall ecological balance. This contribution is determined by two factors. On the one hand, the material-specific ecological backpack of the respective packaging material and on the other the specific quantity or weight of packaging material required for the packaging. This means, a reduction in the weight of the packaging materials required reduces, almost directly proportionally, the environmental burden of the packaging.

In addition, recycling of the used packaging at the end of its life has a significant influence on the life cycle assessment. Incineration of packaging would increase its environmental burden significantly. On the other hand, recycling the material reduces the environmental burden of the packaging, as secondary material is produced, which makes the primary material superfluous in the next life cycle.



Analysis of a life cycle assessment on the basis of the contribution to climate change or carbon footprint, often the only aspect discussed nowadays, can lead to wrong conclusions in the evaluation of bio-based plastics at the latest. bifa therefore recommends that a comprehensive appraisal of the effects is always carried out on the basis of different effect indicators.

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