

Recycling of foundry dusts

Accumulating dusts are processed into pressed pellets

The sub-project of the ForCYCLE II project network focuses on the development of methods for the efficient use of resources and recycling of foundry dusts.

Foundries produce large quantities of iron-containing dusts every year. To date, the dusts have often been landfilled or recycled at a low level. Economic potentials are not yet fully exploited, resulting in high costs for disposal.

Resource efficiency through the production of SiC compacts

A wide variety of alloying agents are used to treat molten metals in foundries. Alloying agents containing silicon serve to silicify the melt during the melting process. If they are added at a later stage, they are referred to as preconditioning or inoculation of the melt. They are used to adjust the microstructure during solidification in order to achieve optimum mechanical properties of the cast product. The material used is usually ferrosilicon or silicon carbide, which is pressed into cement-bonded mouldings for use in cupola furnaces.

The company GPS SiC Keßl GmbH Co. KG is a producer of SiC-based mouldings, which are used by foundries for silicification. Within the scope of the project, in coopera-



Stacked pressed pellets in series production

tion with GPS SiC GmbH & Co. KG, it is being investigated whether and how accumulating dusts can be used as a silicon supplier and as a raw material supplier for metals.

The project is funded by the Bavarian State Ministry for the Environment and Consumer Protection as part of the ForCYCLE II project network.

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bifa plays a central role in the region's hydrogen strategy

Environment Minister Thorsten Glauber and Dr. Fabian Mehring visit bifa

On 29 April 2021, the Bavarian Minister of the Environment, Thorsten Glauber, visited the bifa Umweltinstitut for the second time together with the Parliamentary Managing

Director of the parliamentary group of the Freie Wähler, Dr. Fabian Mehring, in order to get an idea of the status of the hydrogen system study funded by the Bavarian Ministry of the Environment, among other things.

As already reported, bifa Umweltinstitut GmbH has been working on this study since October 2020. According to the minister, bifa now plays a central role in the region's hydrogen strategy and has also achieved Bavaria-wide significance in this field.

Both the minister and MdL Mehring see bifa's particular strength in its implementation competence and its excellent networking in business, administration and science. He therefore also held out the prospect of funding further projects.



Environment Minister Thorsten Glauber and Prof. Dr. Wolfgang Rommel

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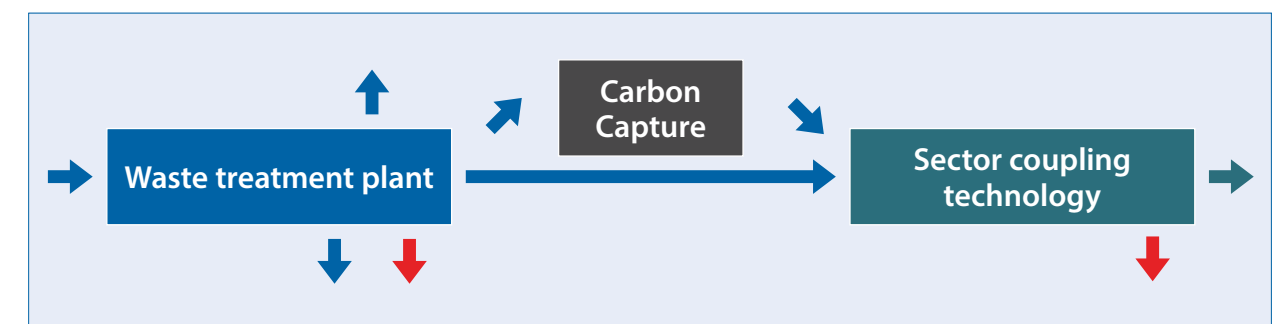
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newsletter of bifa Umweltinstitut GmbH

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Contribution of waste treatment plants to future energy systems

bifa presents first results of a study commissioned by the German Environment Agency



Sector coupling at waste incineration and fermentation plants uses generated electricity and, if possible, CO₂ from the flue gas to produce hydrogen, methane or methanol

What contribution can waste treatment plants make to the energy systems of the future? bifa is investigating this question in a current study. Options for sector coupling in the electricity sector are considered, but also the more extensive use of heat and biogas. The use of carbon dioxide (Carbon Capture and Utilisation, CCU) is also taken into account.

The study is being commissioned by the German Environment Agency (Umweltbundesamt – UBA) and financed with federal funds. Initial results were presented by bifa at the Berlin Waste Management and Energy Conference 2021 (Thiel N., Schönemann M., Dietz W. and Rommel W.: Sector coupling at waste treatment plants – options and success factors).

What does the study contain?

Data from electricity-generating waste treatment plants in Germany were aggregated as a basis. Already implemented examples of sector coupling at waste treatment plants are examined. Electricity-based sector coupling aims at the production of fuels such as hydrogen, methane and diesel or of basic chemicals such as methanol and ammonia. As a first step, the production paths have hydrogen production by means of electrolysis in common. Both electrolysis with a polymer electrolyte membrane and alkaline electrolysis are mature technologies in the single-digit megawatt range.

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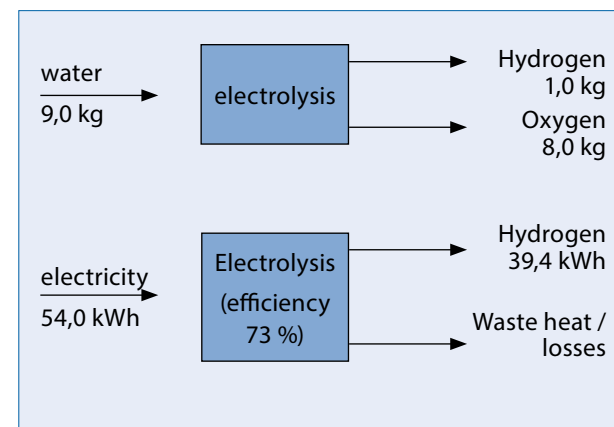
Accumulating dusts are processed into pressed pellets



>> Methane and methanol production are also considered, starting from the hydrogen produced and incorporating carbon dioxide from flue gas. While electrolysis currently achieves efficiencies of 71-74 %, catalytic methanation is at 56 % and methanol production at approx. 52 %, calculated in each case with the calorific value of the products for electricity use at the electrolyser.

Results of the current study

The computational simulation of hydrogen production at a thermal waste treatment plant shows significant influences on economic efficiency and climate gas emissions. Scenarios and sensitivities are calculated. For hydrogen



Material and energy balance for the production of 1 kg hydrogen

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production, the results indicate that the current energy-economy boundary conditions only allow profitability if sales revenues can be achieved that are significantly above the current price level of hydrogen produced on a large scale from natural gas. For the climate balance, it should be noted that although sector coupling replaces fossil production paths, the electricity used is no longer fed into the grid. This means that electricity has to be generated elsewhere, which in turn causes greenhouse gas emissions.

Waste treatment plants offer good conditions for sector coupling as well as starting points for the use of the products in the municipal environment, e.g. in local public transport. Whether hydrogen or methane, methanol or other demanded downstream products are ultimately to be produced is the subject of the current study. The economic and ecological boundary conditions will change significantly in the coming years. Influencing factors include the CO₂ price, the increasing share of renewable energies in the electricity mix and the need for grid stabilisation measures. Public sector actors in particular are called upon to invest in climate protection measures to secure the future. Sector coupling at waste treatment plants can make a contribution here.

Anchoring climate protection – setting new sails

Digital workshop to test the „triple jump scenario“

Under the motto “Anchoring climate protection – setting new sails”, the 5th Climate Protection Conference took place in Augsburg's A³ economic area between 28 January and 11 February 2021. In target group-specific events, various climate protection-relevant topics were highlighted in a digital format.

bifa chaired the expert workshop on the „Further development of the triple-jump scenario“. The triple jump scenario was developed in 2013, building on the regional climate protection concept. It forms the strategic basis for reducing CO₂ emissions in the Augsburg region (55 % CO₂ reduction by 2030 compared to 2009).

Panel of experts discusses planned climate protection targets

The aim of the workshop was to critically examine the targets set in the three-jump scenario and to review whether and to what extent the scenario can be further developed. A 15-member panel of experts was invited. It consisted of the climate protection managers and central

climate protection actors from science and industry in the Augsburg region. The workshop was designed and moderated by two bifa moderators.

After a short impulse to introduce the basics of the triple-jump scenario, the experts worked in three parallel working groups on the topics of electricity, >>



>> heat and traffic. The central questions of the discussion were: What (new) framework conditions and technical developments have occurred since the scenario was created in 2013? But also looking into the future: What technical and regulatory changes can be expected by 2030? What steps are possible under such conditions or necessary to achieve the climate protection goals?

Overall, the discussions provided important insights for further action. Although not always easy, the so-called „look into the crystal ball“ was experienced as interesting and important: i.e. it was worthwhile to question

apparent self-evident facts and to see which technological developments can be expected and what effects changing economic or regulatory framework conditions will have. This offered the potential to reconsider or reassess some points of view – even those of high-ranking expert committees. Basically, however, it was also stated that it was not due to the lack of suitable climate protection measures, but that a decisive question was how the existing measures could be implemented across the board.

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Transboundary movements of plastic waste

It's all in the code...

The sharp increase in illegal transboundary shipments of plastic waste prompted the member states of the Basel Convention to adopt stricter regulations for the control of such waste shipments. These regulations came into force on 1 January 2021.

The VVA (Regulation (EC) No 1013/2006 on shipments of waste) distinguishes between shipments within the EU and shipments to non-EU countries. Within the EU, the code EU3011 applies to selected non-hazardous plastic waste that is virtually free of contamination and other types of waste. As green-listed waste, it can be shipped within the EU without notification. The procedure according to Art. 18 VVA (Annex VII) applies.

...but also in the foreign matter content.

Mixtures of green-listed plastic waste must be explicitly mentioned in Annex IIIA in order to be classified as such. All other plastic waste mixtures are to be classified as notifiable with code EU48. This also applies to plastic waste classified as hazardous to which the code AC300 applies.

Whether plastic waste as defined in entry EU3011 is „virtually free from impurities and other types of waste“ can



be determined on the basis of national and international specifications. To this end, the Commission is currently preparing Focal Point Guideline 12.

The VVA also lays down further regulations on shipments outside the EU to OECD or non-OECD countries.

If you have any questions, we will be happy to assist you!

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BRIEFLY INFORMED

EVENTS

29 September 2021: one day – two events

> Environmental protection with staying power: Reverie?

Talk at the Technikum

> 30 years bifa Umweltinstitut – Anniversary celebration at the Technikum

Näheres unter: www.bifa.de

16 July 2021: Adapted or missed – How can climate adaptation become part of the corporate strategy?

This online workshop is aimed at Bavarian companies that want to deal with the consequences of climate change.

Info at: www.bifa.de

