



The researchers are investigating how the proportion of fuel and compost fractions as well as the fuel quality of collected green waste varies over the course of the year, depending on different treatment lines and input material.

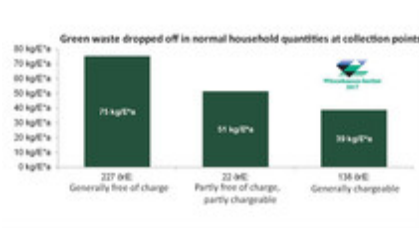
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Recycling garden waste optimally

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Annual volume potential of green waste, total quantities for Germany and per capita
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Green waste quantities collected by waste management companies: The impacts of fees and fee amounts are clearly visible.
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Sorting green waste and using it for producing energy

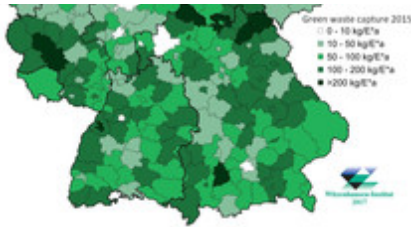
In addition to the “Biotonne”, the organic waste bin used by German households for mainly disposing of domestic vegetable waste, the separate collection of coarse woody materials from garden and park waste could provide a significant amount of fuel for thermal utilisation. Scientists have investigated the potential provided by biomass that is better suited for combustion in CHP plants instead of composting.

Until now, the potential provided by garden and park waste from urban areas, so-called green waste, has not yet been sufficiently exploited for high-quality recycling, be it as a material compost or as an energy fuel.

Researchers at Witzenhausen-Institut are now investigating which quantities of green waste in Germany can be collected for energy use. In the Grün-OPTI project, they are investigating how green waste can be optimally collected, processed and utilised in terms of the material and energy. For this purpose they surveyed the operators of 175 treatment plants in Germany. Based on this survey they documented and evaluated the existing collection systems and facilities.

Separate woody material before composting

Around three-quarters of the green waste composting facilities operated by the surveyed waste management companies separate woody materials for fuel utilisation before and/or after composting. The main marketing route for this fuel is for supplying biomass-fuelled heating and cogeneration plants. The plants sort on average about 18% of the delivered green waste as a fuel fraction. The researchers believe that up to 30% could be thermally utilised. Project manager Felix Richter: “Based on about 5 million tonnes of green waste per year, we get 1 to 2 million tonnes of fuel if we separate the woody parts. Together with local heating network operators, we are now investigating how these woody fractions



The overview shows the amount of green waste collected by 387 waste management authorities in 2015. The collected quantities differ greatly, also depending on the respective collecting system.

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can be utilised in CHP plants. Most of the material complies with the DIN standard for woodchips.” The green and herbaceous parts can be processed into high-quality compost.

Recommendations for collecting and recycling green/garden waste

With a view to optimised material and energy recycling, garden waste (green waste) should be collected separately. However, it is often not possible to dispose of large quantities of green waste, especially bulky amounts, using the “Biotonne”, the organic waste bin. Nevertheless, some municipalities and waste management authorities (WMAs) are still failing to separately collect such organic waste, which by law must be transferred to a public waste management organisation for disposal, in addition to the “Biotonne”. Germany’s Closed Substance Cycle and Waste Management Act (KrWG) has stipulated such a separate collection since the beginning of 2015.

While in 2014, according to the survey conducted by the institute, a national average of 62 kg of green waste was collected per inhabitant per year, the potential of 178 kg per inhabitant per year is almost three times higher.

These factors influence the amount of green waste that is collected by the waste management authorities:

Type of collection: Pickup and bring systems

Green waste fraction: Woody green waste, herbaceous green waste, foliage

Fee: Free, chargeable, quantity dependent, fraction dependent

Collection cycle with timber systems: Fixed, on call, number of collection dates

Opening hours for bring systems: Seasonal, year round, daily, weekly

Collecting container for bring systems: Container, open pile, refuse collection vehicle

Availability of the collection point with bring systems: Inhabitants or km² per collection point

It turns out that the quantity collected increases when there are more frequent collections and when there are many well-distributed and accessible collection points – and in particular when household quantities can be dropped off free of charge. With free drop-off, the collected volume of 75 kg per inhabitant and year is almost twice as high as with the chargeable variant. Conclusion of the researchers: For the highest possible recycling rate, the waste management companies should improve their convenience and service when collecting, if possible by means of free pickup instead of requiring people to pay a fee at (a few) collection points.

Processing green waste efficiently

The researchers conducted a series of practical investigations at three green waste treatment plants. Here they cooperated with the respective waste management companies for the Wetterau, Rhein-Hunsrück and Bergstraße rural districts. Together with these commercial operations they investigated the factors that must be taken into account for the efficient treatment of green waste in order to produce high-quality compost and fuel. Based on these factors they developed recommendations for a resource-saving use of materials and energy. In the next step they defined success criteria for a “woody green waste” value chain. The potential savings in greenhouse gas emissions would be considerable: the production of compost and renewable energy could save around 3.3 million tonnes of CO₂ per year with the current collection rate of 4.7 million tonnes of green waste.

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