# PREPARATION OF A BIOMASS POTENTIAL MAP

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On the way to make power supply independent from fossil resources more and more renewable energy sources have to be explored. Biomass has become an important energy resource during the last years and the consumption is rising steadily. Common sources of biomass are agricultural production and forestry but the production of these sources is stagnating due to limited space. To explore new sources of biomass like in the field of landscape conservation the location and available amount of biomass is unknown. Normally, there are no reliable data sources to give information about the objects of interest, namely: hedges, vegetation along streets, railways and rivers and field margins. There is a great demand for an inventory of these biomass sources which could be answered by applying remote sensing technology.

To generate spatial information about biomass resources satellite imagery is used in combination with area-wide available GIS data and elevation data. The multispectral satellite images are assumed to have a spatial resolution of 10-20m and spectral bands corresponding to the Sentinel-2 band configuration. In case of GIS data the German Digital Landscape Model (ATKIS Base-DLM) containing roads, field boundaries and waterways should support the mapping giving hints of potential biomass objects located beside GIS objects. To allow an estimation of the biomass volume a digital surface model (DSM) produced from aerial image matching is utilized.

The proposed approach contains the steps data simulation of Sentinel-2-like data, spectral unmixing, data fusion and biomass object extraction. As the considered biomass objects have elongated shape and widths between 5m and 25m these objects are in most cases smaller than the pixel size. To solve this problem, spectral unmixing is applied to the multispectral imagery to separate different material mixtures reflected in one image pixel. During data fusion and object extraction the unmixing results are combined with the GIS and height data in order to detect image pixel of high biomass potential, whereby the shape of the objects is considered as a feature.

The result of the approach consists of a binary layer indicating detected biomass objects in combination with spatial information layer about the vegetation composition and vegetation height. The estimation of the biomass amount itself is not part of this paper and done afterwards – here only the inputs for this final step are generated. Finally, an object-wise evaluation based on ground truth biomass objects from a field visit is fulfilled containing the commission and omission error.

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