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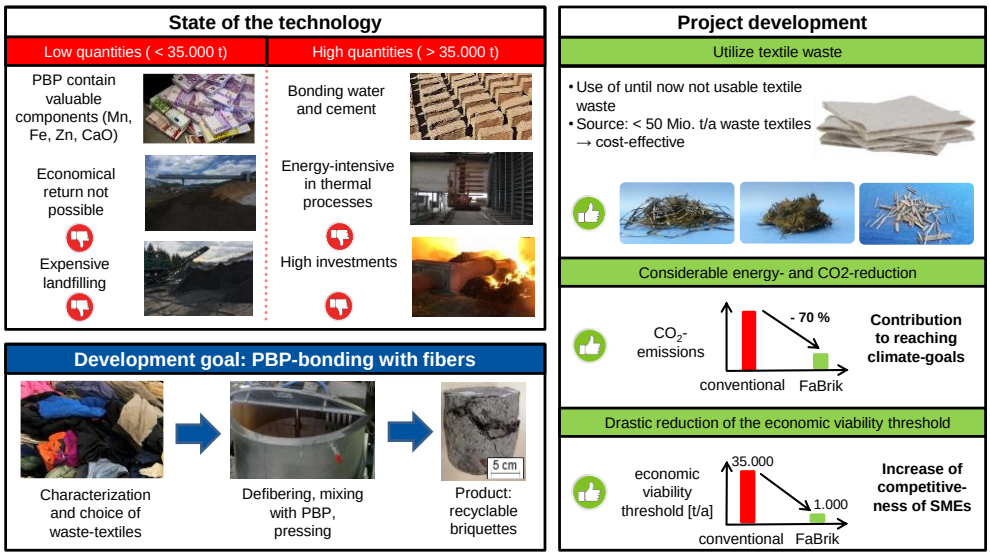
Project titel:	FaBrik – Ressource recovery of metalliferous, dusty production residues with fibre-waste-based briquetting
Duration:	10/2022 – 09/2024
Funding:	BMBF

Mission Statement:
Process by-products (PBP) that occur in metallurgical and mineral processes usually still contain valuable metals such as copper, nickel, and manganese. These PBP are present in form of fine granules, for example as filter dusts, filter sludge granulates or cyclone separations. If PBP accumulates in large quantities, they are currently mostly bound using water and cement and pressed into briquettes with an edge length of 25 to 150 mm. The briquettes can then be reused as raw material in the metallurgical industry. The disadvantage of this process is the large amounts of CO_2 that are released by heating the briquettes to over 1000 °C and producing the cement. The approximately 10 million tonnes of PBP that are produced annually in Europe are mostly produced decentralized in small quantities of 1,000 to 35,000 tonnes per year per production site. The PBP are often landfilled at a cost of 36 to 45 € per tonne, as there is currently no simple, economical, and space-saving method of making the PBP usable again in small quantities. Thus, many valuable materials are lost, and the environment is heavily polluted.
The aim of the project is to develop an environmentally friendly and economical alternative to briquetting PBP with cement, in order to feed it back into the metallurgical process. In doing so, the use of cement is to be stopped and instead fibres from used textiles are to be used to bind the PBP. In addition to saving large amounts of CO_2 by not using cement, the amount of water required can also be significantly reduced. The economic feasibility is made possible by the fact that the landfill costs are eliminated and additionally space for curing the cement, which is necessary with the usual PBP binding methods, is no longer required. In this way, even the binding of small quantities of PBP should become economical.

Approach:
The compaction of the PBP is necessary in order to feed it back into processes. Without compaction, the technically necessary suction would prevent the PBP dust from reaching the industrial furnaces. Fibre reinforcement enables the production of briquettes that are manageable for transport and use in industry. Fibres investigated in the research project should be harmless to health, such as natural fibres and synthetic fibres (mostly PET, PA, polyolefins). Furthermore, mainly fibres that have been landfilled or incinerated so far will be investigated. In addition to the fibres, biogenic starch is to be used as an adhesive based on successful preliminary tests. All in all, the

measures aim at a CO_2 saving of about 70 % compared to conventional methods.
In addition to the increased environmental friendliness, the targeted method also has economic advantages for companies. In addition to the procurement of cement, additional space is required for curing the briquettes. These high investment costs can be significantly reduced by using fibre-reinforced briquettes, so that the economic viability threshold is already exceeded at a volume of 1,000 tonnes annually. In addition to the specific application for binding PBP in the metallurgical industry, it is also conceivable to use the technology in other areas such as the production of mineral wool or for substituting limestone in cement clinker. The increased economic efficiency is ensured, among other things, by the elimination of landfill costs. In addition, costs for the acquisition of used textiles are almost negligible, since a fibre content of less than 5 wt.-% can be expected. In addition, costs are rising due to the increasing scarcity of landfill space and an expected ban on landfills due to stricter environmental regulations would prevent current methods from being used in the future.



Approach of the Project FaBrik

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