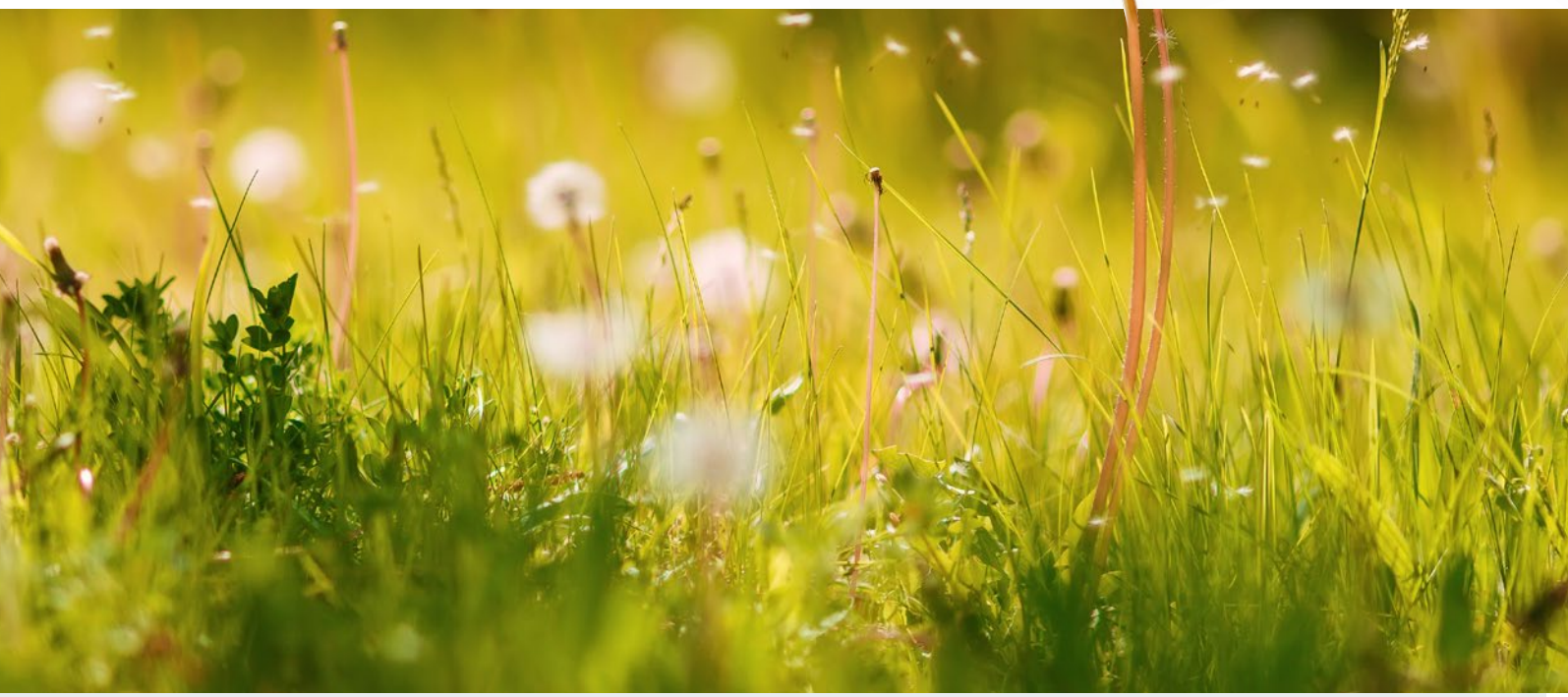
BiEn

BtE Pellets

Fuel that protects our climate

Energetic use of stalk-type biomass according to the BtE process

Climate-friendly thermal energy



Wind and sun are indispensable for the energy transition. Bio energy as well is of great importance for protecting our climate and will in future play a considerable part in producing heat. Solid biomass fuels are optimally suited for heating purposes.

In Germany, private households consume more than 80% of their energy for space heating and hot water. To cover this area of energy demand in a climate-neutral manner, biogenic fuels are necessary, since renewable electricity cannot completely and exclusively cover the heat sector.

For a climate-friendly heat supply, there are only few economical alternatives besides using wood or solar thermal energy. Therefore, it becomes inevitable to increasingly use non-woody (biogenic or vegetable) residual and waste materials for producing energy.

Against this backdrop, Bi.En has developed a process for turning stalk-type biomass and green waste into fuel. The fuel in the form of pellets has similar properties to wood. It can be stored very well, is easy to transport and can be used as the heat demand requires.

Green waste as raw material

Grass clippings as raw material

Pellets obtained with the BtE® process

The BtE®process

The BtE®process (Biomass to Energy) is an innovative and efficient way of turning stalk-type biomass and green waste into energy. After conditioning, this process mechanically separates the biomass into a liquid and a solid phase. The liquid phase, which contains a high proportion of easily fermentable plant matter, is fed to a fermenter for the production of biogas, which is then converted into electricity in a cogeneration unit and used for the process. The solid phase, which is depleted in terms of mineral plant constituents, is dried by means of the waste heat from the cogeneration unit and pressed into pellets or briquettes. The BtE®process places hardly any requirements on the quality of the substrates. It is therefore particularly suitable for the utilization of residual and waste materials such as green cuttings, green waste and landscaping maintenance material. It can also solve the disposal problem associated with these residual and waste materials.

Interesting facts

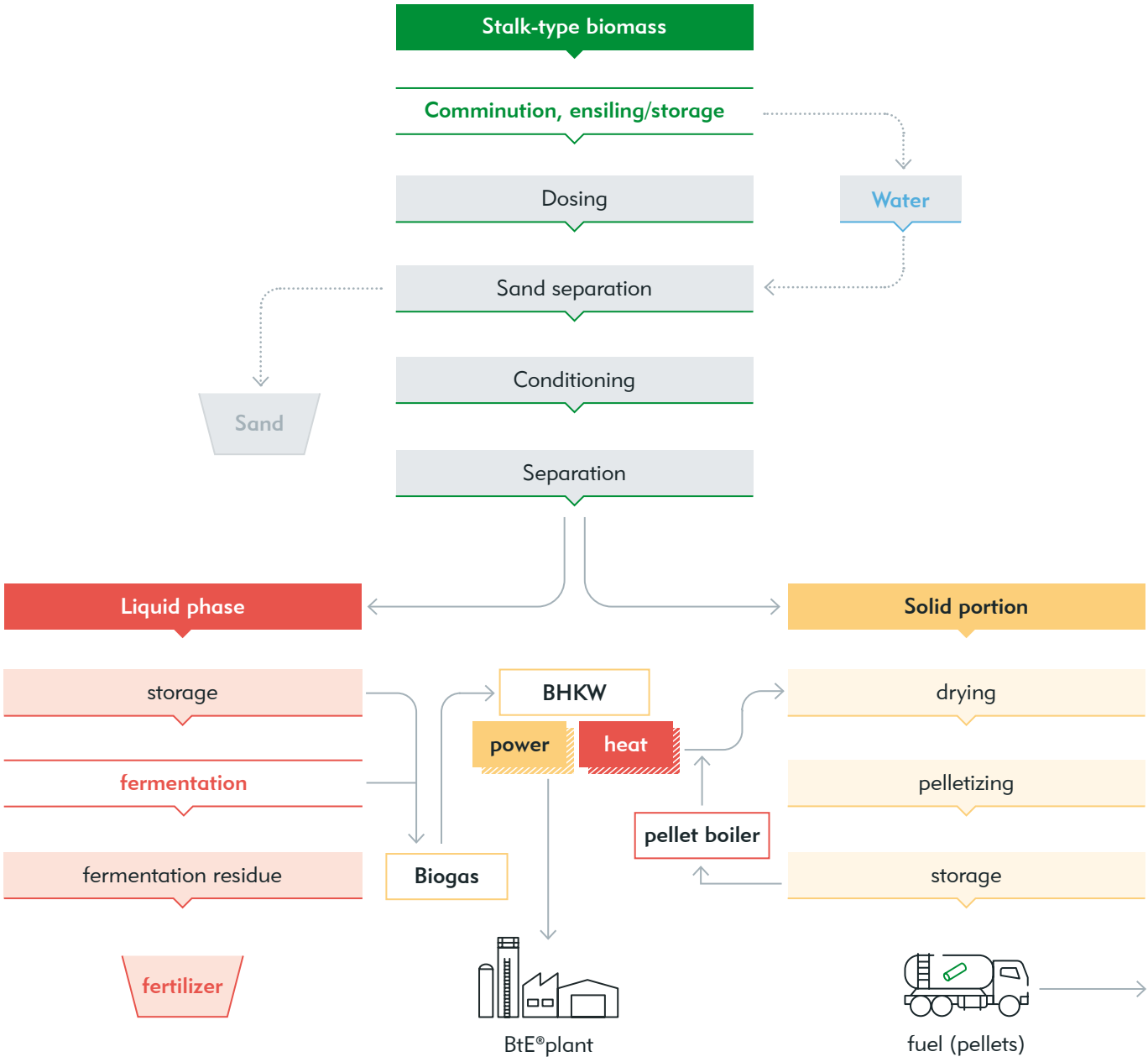
The European Patent Office has granted Patent EP 1 829 829 „Method for separating biomass" for the BtE®process. In addition, the Patent Office has granted a patent for the „non-mixed fermenter" for the fermentation of pressed juice, Patent EP 2 345 712, and the patent for the „roller press" under EP 3 040 192 B1.

Fuels produced by the BtE®process differ from fuels made from natural plants in that their mineral content is substantially reduced. The chlorine and potassium content in the solid portion is approximately similar to that of high-quality wood fuels. In addition, the ash softening point is raised. This reduces problems with slag in combustion plants.

Combustion tests were carried out by the Deutsche Biomasseforschungszentrum (DBFZ) in Leipzig with pellets made from partially woody grasses such as landscape maintenance material. The results show that the BtE®process can produce fuels having similar combustion properties to wood.

Schematic representation: The BtE®process

for energy recovery from biomass



Process conveyor belt

Advantages of the BtE®process are

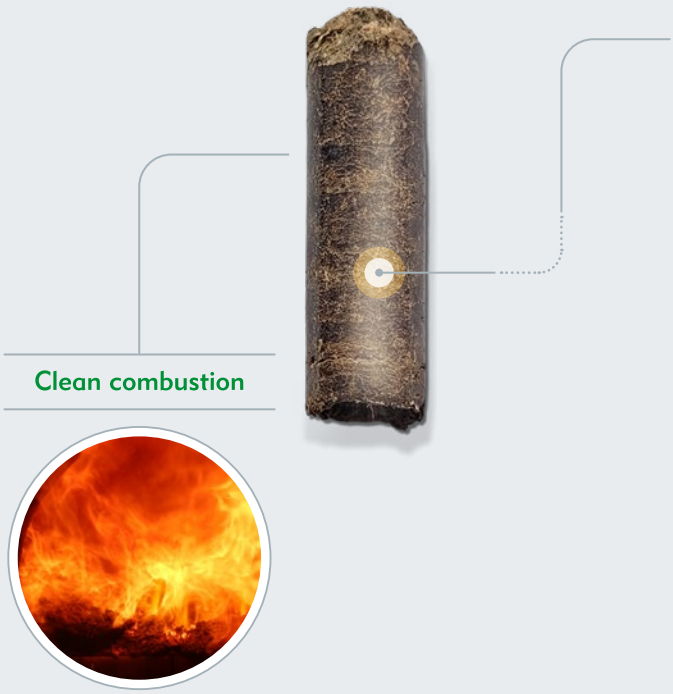
- A renewable and CO_2-neutral solid fuel is produced
- Residual and waste materials are turned into a valuable product
- The high energy yield (approx. 70 %) conserves resources
- Use of short periods in the carbon cycle
- Utilization of a wide range of plant species
- So far little-used resources are developed
- Pellets with high energy density are produced for storage and subsequent use as needed

The BtE®plant for producing fuel from stalk-type biomass in Borgstedt

Bi.En built a plant using the BtE®process on the premises of AWR Abfallwirtschaft Rendsburg-Eckernförde GmbH in Borgstedt (Schleswig-Holstein). The plant has been operated by Bi.En since April 2014. A research and development program lasting several years established that a quality product complying with DIN requirements can be reliably produced.

BtE®pellets and their properties

The BtE®process produces a high-quality, climate-neutral fuel with wood-like properties from regional biogenic residual and waste materials. The properties of BtE®pellets (e.g. calorific value, bulk density) are comparable to those of wood pellets. The standard DIN EN ISO 17225 Part 6 was developed to define quality standards for biogenic solid fuels and non-wood-type pellets. BtE®pellets can meet the requirements of this standard. This means that they are approved for use in incineration plants in accordance with the „Verordnung über kleine und mittlere Feuerungsanlagen" (1. BImSchV - Ordinance on Small and Medium-Sized Combustion Plants) and boilers with type approval.

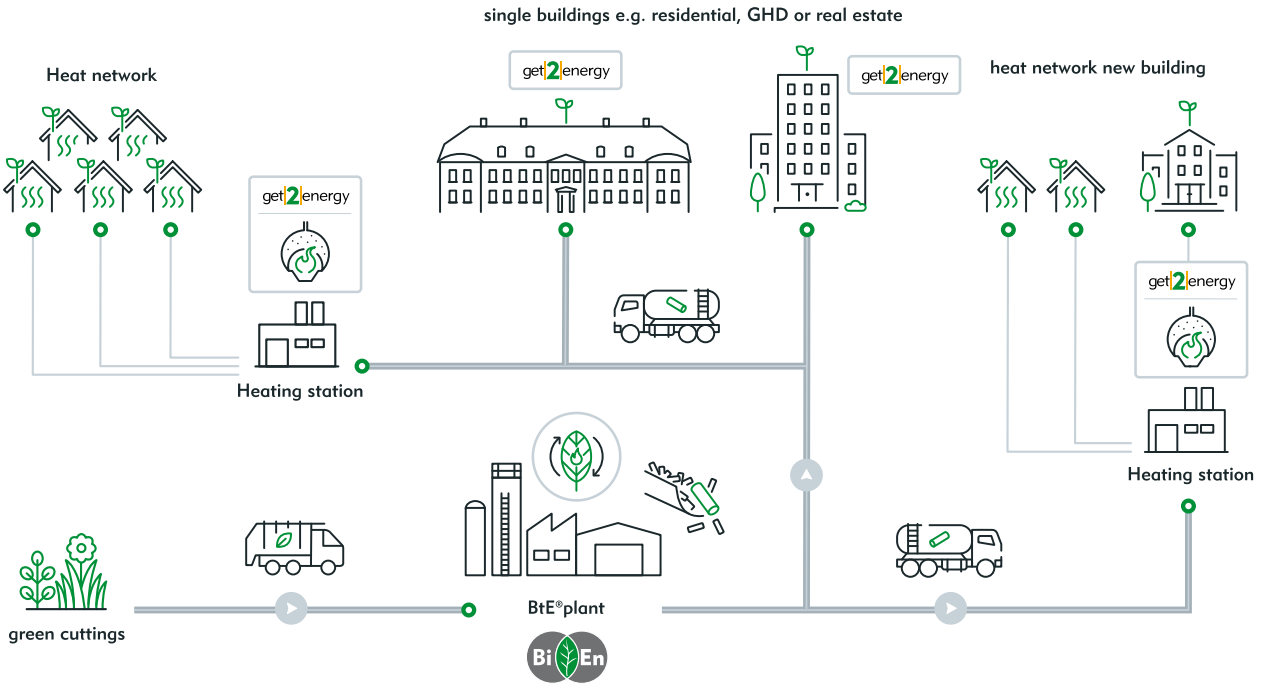


BtE®pellets meet the standard DIN 17225-T6, Class A	
Parameters	**Values**
Water content	< 12 m-%
Ash content	< 6 m-%
Calorific value	≥ 4,0 kWh/kg (≥ 14,5 MJ/kg)
Mechanical strength	≥ 97,5 m-%
Bulk density	≥ 600 kg/m³
Nitrogen	≤ 1,5 m-%
Sulfur	≤ 0,20 m-%
Chlorine	≤ 0,10 m-%

The BtE®process reliably reduces key critical plant constituents (especially ash, chlorine, nitrogen, and sulfur). This improves the incineration of the biomass: The boilers can be operated more smoothly and the legal limits for the emission of environmentally and climate-relevant pollutants in the flue gas are met. This also solves the complex and cost-intensive problem of disposing of residual and waste materials.

Concept of regional energy supply

with BtE®pellets and our subsidiary get|2|energy



Bi.En GmbH & Co. KG

Bi.En was founded in 2009 as a wholly owned subsidiary of getproject GmbH & Co. KG, which for many years has been active in the field of renewable energies. In cooperation with Prof. Scheffer from the University of Kassel, getproject has developed the process for generating energy from stalk-type biomass. The further development and marketing of this process has since been transferred to the subsidiary Bi.En under the brand name BtE®.

Project funding and cooperation in the context of the development of the BtE®process:

- 2011: Future Economy Program of the State of Schleswig-Holstein „Separation of stalk-type biomass for producing electricity and fuel".
- 2013: in cooperation with the University of Applied Sciences in Hamburg (HAW): Project funding from the Central Innovation Program for SMEs (ZIM) of the German Federal Ministry of Economics and Technology „Development and testing of a non-mixed fermenter and a process for the thermophilic fermentation of plant juices" and „Quantitative Microscopic Fingerprinting" (QMF).
- 2017: Funding of the cooperation partner Fachhochschule Kiel GmbH by the Gesellschaft für Energie und Klimaschutz Schleswig-Holstein GmbH (EKSH) from the program „Hochschul-Wirtschafts-Transfer (HWT) Energie- und Klimaschutz".
- 2020: Funding of the project „Reg-Kli-Pel" - for the energy-efficient production of a regional and climate-neutral quality fuel and its low-emission combustion, with funds from the European Regional Development Fund (ERDF) in the state program Economy.
- 2021: Schleswig-Holstein supports Bi.En's participation in the world's leading trade fair for environmental technologies IFAT 2022 with funding from the European Regional Development Fund.

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Landesprogramm Wirtschaft: Gefördert durch die Europäische Union - Europäischer Fonds für regionale Entwicklung (EFRE), den Bund und das Land Schleswig-Holstein

ZUKUNFTSprogramm Wirtschaft
Investition in Ihre Zukunft

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