



WE ARE GOING AHEAD.

COME WITH US!





WE CHANGE THE WORLD – simply and yet so complex ...

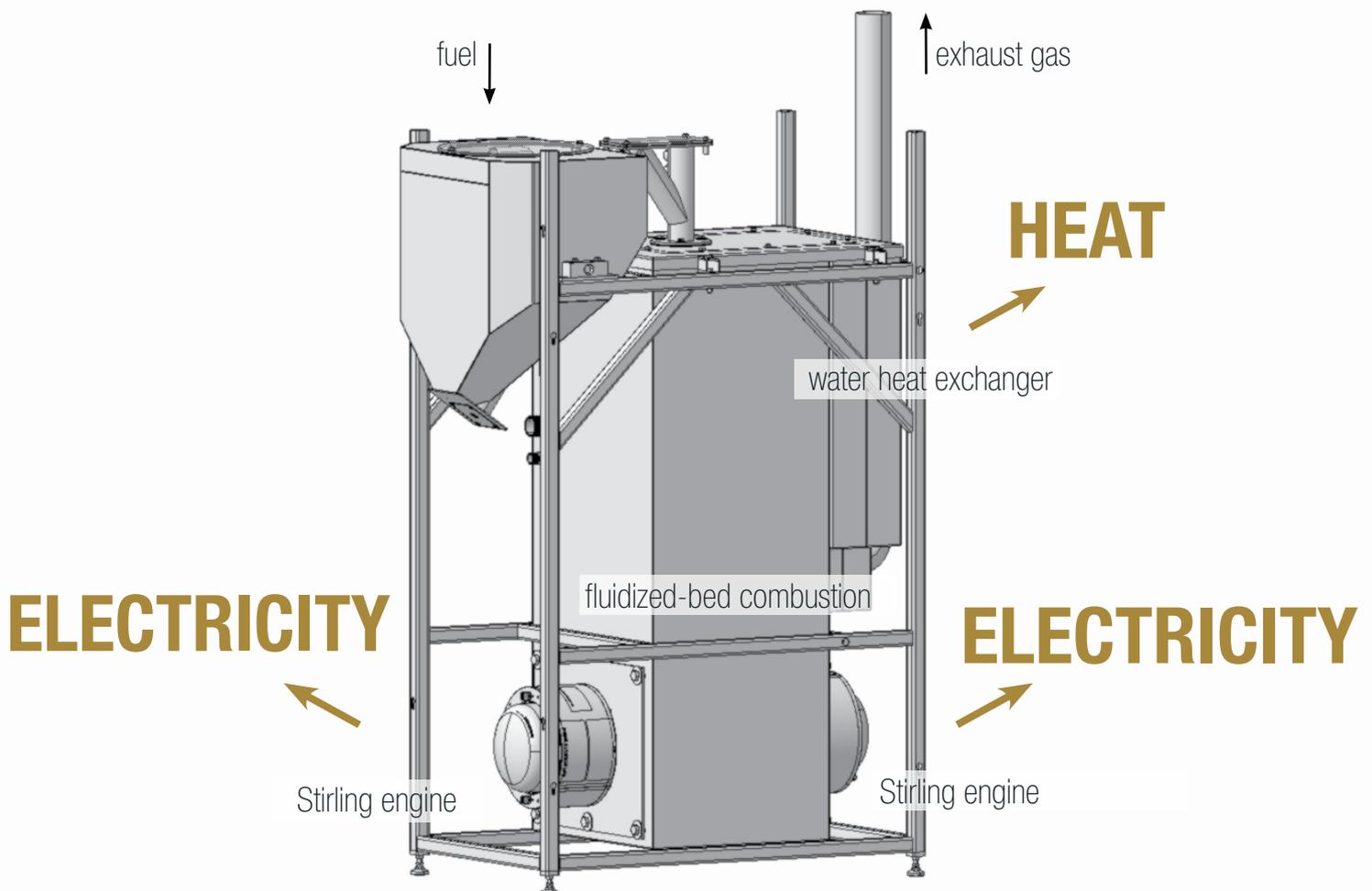
Electricity and heat - two everyday commodities. Indispensable for our modern life, for the comfort of everyone. At the same time, they represent the greatest challenges to the environment and the wallet. Issues such as climate change, global warming and sustainability concern us more than ever before.

**In short: the burner produces electricity and heat.
Economically & environmentally friendly.**

Our job is to find answers to questions that have not yet been answered. With a system that delivers the technology of large power plants to every household in a decentralized manner.

DONE!

- > We are facing a fully functional system and go into serial production.
- > We fuel with pellets and in the future with **ALL** other biogenic fuels.
- > We achieve a degree of efficiency that is second to none and generate at least **EUR 5 WORTH OF ELECTRICITY FROM EVERY EUR 1 OF PELLETS.**
- > We achieve emission values well below any threshold levels.
- > We scientifically prove the benefits and functionality (including TU Wien, Univ. Prof. H. Hofbauer).
- > We protect the BURNER by means of **REGISTERED PATENTS.**
- > We have the worldwide exclusive supply contract with the world's largest Stirling engine producer.



And we have the centerpiece – the core of the BURNER:

Cogeneration (CHP - combined heat and power system) for small applications and the lower power range based on fluidized bed combustion and one (optionally also two) Stirling engine.

THE BURNER

BURNER Pioneers GmbH

founded October 2019

SHAREHOLDERS

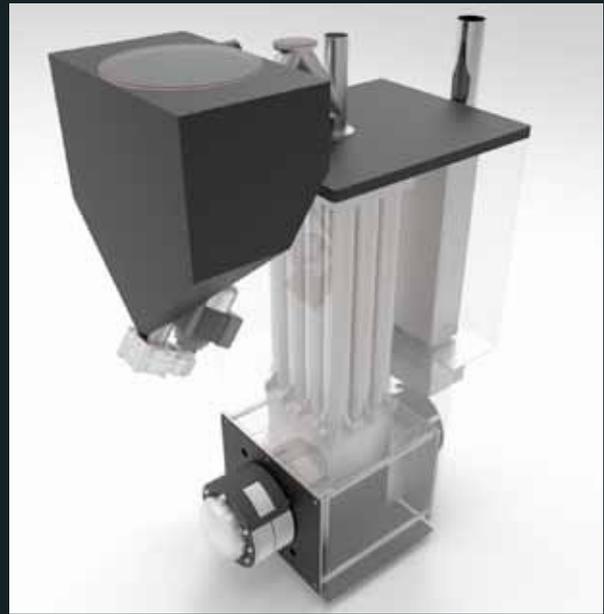
- > Alfred Beilschmidt
- > Norbert Damböck
- > Markus Leopold

TYPE OF COMPANY

limited liability company

ADDRESS

Alois-Ebner-Straße 3
3150 Wilhelmsburg
AUSTRIA



THE TEAM

It is all about ensuring the perfect mix and balance - in the BURNER's technology as well as in the people behind the project. Who are the people involved, where do they come from and what is their respective task? Here are the answers in a nutshell. Of course, these answers cannot replace getting to know each other personally - but you should not miss out on that opportunity anyway.

NORBERT DAMBÖCK the »helmsman«

finances, administration



So far and ongoing:

27 years of self-employment and participation (investment/shareholder) in several companies
norbert.damboeck@burnerpioneers.com

ALFRED BEILSCHMIDT the »father of the BURNER«

*initiator & idea provider
research, development, technology*



So far and ongoing:

25 years of self-employment as Master chimney sweep, plumber and control engineer
alfred.beilschmidt@burnerpioneers.com

DR. MARKUS LEOPOLD the »networker«

construction, production



So far and ongoing:

23 years of self-employment in the area Research & Development and prototype construction
markus.leopold@burnerpioneers.com

THE MARKET – it is blazing.

We go ahead - as we have completed this fiery idea.

The BURNER is on fire. And revolutionizes the field of power generation and heat recovery. For private customers as well as for companies or public sector institutions.

THE POTENTIAL – simply hot!

The BURNER is on fire. We have left the developmental stage and are in the implementation phase.

Euphoric as pioneers, successful as experts. The market is hot - and we are eager to use our decisive competitive advantage - in terms of technology, time, and economy. We position the BURNER in defined relevant market segments. And we offer a completely new customer experience through to delivery. The nice thing about it – there are no geographical or economic limitations for the application of the technology in the consumer area.

THE BRAND – full of energy!

In addition to technological and economic optimization our focus is on achieving market leadership.

The conceptional phase and the development of the BURNER brand has been completed and has left the project stage. In numerous steps we have turned our prototype into a designer piece. Brand building began at the same time. The design is the central part on which all further steps are now based. Our language is clear and burns with energy.

THE MONEY (FUNDING) – it burns for more!

Not a Cent was wasted in the development process.

All steps taken so far up to the production of the prototypes have been implemented exclusively through the shareholders' own funds and financed by enthusiastic investors. The BURNER is ready for serial production and is bursting to hit the market. The BURNER pioneers are not 3 crazy people. Behind the BURNER brand are 3 clever minds, 3 individualists, 3 types who want to make the world a better place, who will save it and conquer it - with many partners.

**With the perfect product, a company of good standing –
and you as the investor.**



ICEBE
IMAGING
NATURE

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An die BURNER PIONEERS
Alois Ebner Straße 1
A-3150 Wilhelmsburg

Subject: Evaluation of the product idea cogeneration (CHP combined heat and power system) with fluidized bed combustion and integrated Stirling engine for small applications from a scientific point of view.

Dear Mr. Beilschmidt, esteemed project team of the BURNER Pioneers,

As you know, I am very impressed by your product idea, as it represents at long last an innovative solution and is therefore a highlight in the biomass industry. There is currently no decentralized cogeneration system (CHP combined heat and power system) for the lower output range based on biomass on the market and your product idea could close this gap in the long term. But let me elaborate on my assessment:

Current situation and development tendencies

In the coming decades energy supply must be converted to a sustainable basis. Such a change will also be accompanied by a change in the supply structures. Energy supply is currently primarily based on fossil fuels and on centralized structures. This makes sense, since almost all the fossil fuels in Austria must be imported. This task is executed by large energy suppliers. In addition, the associated conversion plants (power plants, refineries, ...) can so far only be operated cost-effectively in large units. The situation is different with the new forms of renewable energy such as solar energy and wind energy. These conversion plants (oder transformation plants) are operated in regions where the respective form of energy is sufficiently available; it makes sense to use decentralized or regional solutions with low output. However, these two forms of energy have the serious disadvantage that they are supply-oriented and are not available on a demand-oriented basis. To make the energy available on a demand-oriented basis, appropriately dimensioned storage facilities must be available in the system, which make an adjustment between generation and demand possible. Biomass, another form of renewable energy, does not have this disadvantage. Biomass is stored solar energy and can therefore provide energy on a demand-oriented basis. When the required form of energy (e.g., heat, electricity) is needed, it can be generated from biomass and made available. Therefore, due to its permanent availability, energy from biomass must be rated higher than solar or wind energy. No additional storage facilities are required. There are well-engineered systems for generating heat from biomass both in the low (ovens, boilers for central heating systems) and in the high output range (local heating systems) on the market. Systems for cogeneration (CHP combined heat and power generation) have only been able to establish themselves on the high output range market in the last few years. This system has however the disadvantage that heat must be transported over long distances, which entails not inconsiderable transport losses. In the low output range, however, there has so far been no satisfactory solution for CHP. Plants with a steam process are not economical, plants based on gas generation with a gas engine still have problems with availability, and the degree of efficiency that can be achieved when generating electricity based on thermoelectricity is too low.

Product idea

Since their invention, Stirling engines have been impressive due to their high thermodynamic efficiency, which, if implemented perfectly, is equal to the maximum possible efficiency of a Carnot process. The available engines can unfortunately only approximate this Stirling process, so that this theoretical potential cannot yet be fully exploited. Many different embodiments (aus dem Patentrecht – wenn das nicht auf Patente abzielt, können wir auch types sagen) of Stirling engines have been developed.

When using Stirling engines in biomass plants, the heat input into the Stirling engine has not yet been solved satisfactorily. Stirling engines are often operated with hot exhaust gas flows (e.g., in the exhaust gas flow after biomass firing). However, heat exchangers in exhaust gas streams tend to become contaminated on the one hand and on the other hand have only low power input due to the low heat transfer in gas streams or require large heat exchanger surfaces. Several attempts have been made to implement designs with integration in combustion chambers with gas combustion (e.g., with natural gas or wood gas). Because of the high temperatures and different heat loads, the heat exchanger of the Stirling engine is exposed to high levels of wear and tear.

Innovation content

All three problems mentioned above are completely resolved by the BURNER. The approach chosen in the present case therefore offers an extremely innovative solution for this problem. Here, the heat exchanger for supplying heat to the Stirling engine is integrated into a fluidized bed, which at the same time also brings about the combustion of the biomass.

This has the following advantages:

- No risk of contamination due to the cleaning effect of the fluidized bed
- Very good heat transfer in the fluidized bed (approx. 10 times higher than in gas flow) therefore only a small heat exchanger surface is required
- Uniform heat input - at a constant temperature in the fluidized bed (800 ° C)
- Compact design - through dual utilization of the fluidized bed on the one hand as a combustion chamber and on the other hand for heat transfer into the Stirling engine.

Such designs have been proposed elsewhere in recent years and were theoretically and practically examined, but so far there are no marketable products. Your product idea also includes several innovative constructive approaches (e.g., distributor plate, air preheating, control for loading), which go far beyond the previously proposed, so that there is a high probability of marketability.

Market

As already mentioned at the beginning regarding future developments. Energy supply will be based on renewable energy and will be achieved in a decentralized manner. If user comfort shall be maintained - which can be assumed - the energy supply must be demand-oriented. The present product idea of a decentralized energy supply with biomass, where demand-oriented amounts of energy can be provided, has precisely these characteristics. Typical applications are single and multi-family houses, especially wherever fossil fuels are still being used for heating, where biomass is currently used for heating, but where in the future electricity shall also be generated at the same time using biomass. In Austria, around 2,000 wood chip stoves, around 3,500 log boilers and around 4,500 pellet stoves were newly installed in 2016, i.e., a total of around 10,000 new wood stoves for single and multi-family houses. If only 10% of the new wood fired solutions in Austria were designed as fluidized bed firing solutions with a Stirling engine, this number would be 1,000 annually. This does not include possible quantities in the surrounding countries. In summary, I hope that with these statements I was able to adequately express that I believe this product idea to have a high level of innovation and was also able to describe the existing market opportunities.

Univ. Prof. Dipl. Ing. Dr. Hermann Hofbauer



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