Bayreuth, 17 September 2016 **拜羅伊特， 2016 年 9 月 17 日**

项目建议书和可行性简要分析
Project proposal

Certified quality

- ISO-9001: Our plants meet the highest quality standards and even conform to the requirements of the chemical industry.
- RAL quality certification: Confirms a constantly high level of product quality that is regularly monitored.
- Certified specialist according to § 19 WHG (German Water Resource Act)
- Member of ´Fachverband Biogas e.V.´

项目名称： **两百万只蛋鸡养鸡场沼气发电项目(4. 2 兆瓦/小时电量)**

Project: **Biogas plant for 2,2 Million chicken 4,2 Mw/h el**

项目业主： 北粮农业股份有限公司

Project owner .: **North Agriculture Co. Ltd. China**

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董事长: 约翰 赫列 | 位于: 拜罗伊特 | 商业注册 地方法院 拜罗伊特 HRB 5155 | Ust.ID Nr.DE271712037

Dear Sir.

It is us the HOEBA Group are honored to introduce our biogas plants with the best and most profitable system at the moment.

We are in a position producing through our special system 365 days biogas.

The recovered energy (methane gas) we transform into electricity and heat.

The heat (over 400 ° C) can be used prepare hot water or to change through heat exchangers in refrigeration.

Full of energy yield of methane gas.

In the following quotation, we present a sample of a biogas plant.

From the groundbreaking to finish our offer includes everything.
Planning
Concrete work and earth work
Machine Technology
Commissioning
Familiarization training for staff

The detailed role and functioning of a biogas plant is following in detail.

The biogas plant will be ready for the existing methane converted into electricity.
Next is dried manure in bags packaged for sale processed.
Similarly, high-quality liquid fertilizer (nitrogen and phosphorus fertilizer) won that can be sold.

According to our experience we can for your documentation a

Biogas production of circa:	**m_n^3/a**	**11.066.458**
Electricity production of circa:	**kWh/a**	**30.108.000**
Heat production of circa:	**kWh/a**	**29.680.750**

CO² Grants:?????
This biogas project shall be implemented as CDM project according to Article 12 of the Kyoto Protocol (Clean Development Mechanism), and its associated rules of the CDM Executive Board (EB) to the United Nations Framework Convention on Climate Change (UNFCCC).
A detailed report on the CDM procedure can be found following.

Poultry manure

尊敬的先生：
我们赫巴（HOEBA）集团很荣幸能有机会向您介绍我们目前最先进的和有经济效益的沼气生产系统。
我们有能力通过我们的特殊沼气生产系统确保365 天连续运营。
从沼气中被回收的能源(甲烷气)将被转换成电能和热能。
热能(400 度以上)可被用于制作加热水或通过换热器转换后用于制冷。
可以使发酵原料达到最大的产气量
在下面的報價中，我們提供了一個完整的沼氣廠的模式。
我们的报价包括從地面土建（ 包括建筑材料）到交钥匙工程全部完工的一切程序：
規劃 （方案设计）
混凝土工程和土方工程
機械技術
調試（ 试运转）
员工的熟悉培訓工作
沼氣廠詳細的作用和功能的詳細說明如下：

沼氣廠將可以對沼气中的甲烷气体轉化成電力， 热能或天燃气，车用燃气。

其次是袋包裝干肥料（ 沼渣）的出售。
同樣，含有氮和磷的高品質的液體肥料（沼液）也可以出售。
根据我们的经验和你们提供的资料,我们可以估算出
沼气生产量大约为： **m_n^3/a 立方米 / 每年11.066.458**

如果产生的沼气全部用来发电，
可产生的电能大约为：**kWh/a 千瓦时 / 每年 30.108.000**
产生的热能大约为： **kWh/a 千瓦时 / 每年 29.680.750**

二氧化碳 证书:?????
该沼氣工程将根據京都議定書（清潔發展機制）第12條規定，以及相关的聯合國氣候變化框架公約（UNFCCC）清潔發展機制（CDM）執行理事會（EB）的相關規則，作为CDM （清潔發展機制）項目實施。。

關於清潔發展機制程序的一個詳細的報告可从下面段落找到。

家禽粪便

The poultry farming usually takes place in huge stables, this applies both to the cage, and the barn, which attracts an enormous production of chicken manure by itself, which must be disposed of safely and hygienically. Especially the feces of poultry is a breeding ground for germs and bacteria that spread quickly and can creep into production again, which attracts a huge financial and economic damage.

家禽养殖通常发生在庞大的禽舍内, 这既适用于笼子, 也适用于畜棚, 养鸡场内产生的大量鸡必须安全、卫生地处理。

特别是家禽的粪便是一个细菌和病毒的滋生地, 可迅速传播致病菌, 并污染养殖场环境, 这会引起巨大的财务和经济损失。

Earnings raw material - chicken manure /

原料收入- 鸡粪，

Also not without significance is the need for process heat in poultry breeding, which is needed to heat the stables and breeding facilities. Particularly with laying hens well-tempered stable system is important for effective egg production. In this context, more and more integrated biogas plants with combined heat and power offer, which also produce a high amount of process heat for use in addition to the current production. In this context, the waste heat for heating the stables can be used. Furthermore, the manure is sanitized by the fermentation and can be safely used for the fertilization of agricultural land.

在家禽养殖中的工艺用热不是没有 意义的， 这可以用来保证鸡舍和繁殖设施的正确温度。特别是蛋鸡的恒温鸡舍系统对于有效产蛋是很重要的。
在这种背景下, 越来越多的带有暖气和电力组合产品的集成沼气厂被提供。该种沼气厂产生大量的工业用热用于流水生产作业。
在这种背景下, 发电机产生的废热可以用来加热鸡舍。
此外， 鸡粪在发酵罐里的发酵过程中被消毒，可以安全地施用于农田。

Through the production of biogas from chicken excrement are also contain nitrogen components minimized, which makes a significant contribution to environmental protection. Is also minimized the smell of excrement, which additionally leads to further acceptance of poultry farms and biogas plants.

通过使用鸡粪发酵产生沼气使其所含有的氮成分最小化, 对环境保护做出了巨大的贡献。
厌氧发酵同时也最大程度地减少了粪便的气味， 这将进一步导致家禽养殖场接受沼气厂。

The feces of poultry has one of the highest specific dry matter and a high methane content in the fermentation of the substrate.

家禽的粪便作为发酵的基质，拥有最高的特效干物质和很高的甲烷含量。

chicken excrement has a very low moisture content and therefore can be better transported and handled than other excrement. In addition, the methane content produced is relatively high, but also the proportion of ammonia is not irrelevant. Converted by the substrate in urea Ammonia can damage a biogas plant and reduces the mileage of the CHP engines, but it is volatile and must be filtered as in all other substrate materials prior to combustion.

鸡粪有很低的含水率, 因此可以比其他排泄物被更方便的运输和处理。
另外，所产生的沼气中甲烷气的含量相当高，

但是氨的比例不是无关紧要的, 发酵基质把氨转换为尿素， 氨可以损害一个沼气厂，减少沼气发电厂热电联产发电机的工作里程，但它不稳定, 必须在其它所有发酵基质原料氧化之前被过滤。

By factory farming many medications and antibiotics fed to the animals in chicken breeding facilities, In this case is sure to keep the record of this component as small as possible in order not sustainable without harming the sensitive microorganisms, which convert the substrate into methane.

通过工厂化养殖的鸡饲养设施中、饲料中添加了许多药物和抗生素。在这种情况下，一定要保持尽可能小的抗生素成分添加记录。为了不持续伤害敏感微生物，以便它们把发酵基质转化成甲烷气。

B. Biogas plant description and operational function

Watch

http://www.klaerwerke.hoeba.eu/Media6BP.html

B. 沼氣工廠描述和功能介绍

见

http://www.klaerwerke.hoeba.eu/Media6BP.html

B.1. FOR AGRICULTURAL APPLICATIONS

The provision of energy for the supply of an efficient society can be ensured in remarkable proportions with natural resources of a modern agriculture.

Biogas plants can produce high-quality energy (“biogas”) out of agricultural and other bio-residues like

B.1. 農業應用

一個有效的社会提供的能源供应能够确保现代农业自然资源的显著比例.

沼氣發電廠可從農業殘餘物和生物垃圾，如从饲养豬，牛

e.g. liquid manure from the keeping of cattle, and so on. Afterwards the biogas is refined in fully developed gas engines to electricity and heat.

和家禽得来的液体粪便等, 生产出高品質的能源 (沼氣) 。此后, 沼气被提纯，可燃烧的气体经过全面改进的燃气发动机产生电力和热。

B.2. BIOGAS PRODUCTION

The technique of the biogas production is known for decades and all over the world small and large biogas plants are operated successfully.
The heart of a biogas plant is the digester, in which the methane bacteria use e.g. liquid manure from the keeping of cattle and dried straw powder as “food” to produce biogas out of it. Biogas consists of approximately 50 – 65 % flammable methane. The methane provides the required energy for the gas engine so that the engine can power a generator, which produces electricity as a good sellable product.
According to the german “Renewable Energy Law” an attractive remuneration for electricity from renewable resources/ energy plants is paid. Therewith a high profitability of the biogas plant and the agricultural enterprise can be ensured.
Beside the digester and the combined heat and power unit (CHP) a biogas plant has a few more components such as a substratum receiving station, pumps, gas treatment, gasholder and a storage tank for the fermentation product.

B.2. 沼氣生產

沼氣的生產技術已經被人知晓有幾十年的时间. 在世界各地的小型和大型沼气工厂都在成功运行.

沼气厂的核心是消化罐. 在消化罐中,甲烷菌以发酵基质如混合的粪便和干秸秆粉等为 “食物” 生产出沼气。

沼氣中含有約50 - 65 %的可燃燒甲烷气。甲烷气提供气体发电机所需要的能源來發电.
以便发电机产生電力.

電力是一個很好出售的“產品”.
根據“可再生能源法”用於生產的電力如果來自可再生原材料，会得到有吸引力的報酬。.

对此,沼气工厂和农业企业可以得到高利润的保证。

除了沼气池和热电联产机组（热电联产）一个沼气厂有一些更多的组件，如底层接收站，泵，氣體處理，氣體存储器和和发酵生产原料的储罐。

B.3. FERMENTATION RESIDUE AS FERTILISER

The fermentation residue plays an important part in the operating of a biogas plant which runs on liquid manure from the keeping of cattle / power plants. Inside the digester only the carbon is extracted from the renewable resources. The carbon is contained in the biogas as methane and carbon dioxide, which were metabolized by the methane bacteria. The rest of the nutrients are still contained in the fermentation residue. The nitrogen is available as the attractive ammonium.

B.3. 发酵残余物作為肥料

发酵残渣在一个使用可再生资源的沼气发电厂的运作中发挥着重要的作用.
沼气池内, 只有碳被从可再生资源中去除。
沼气中含有碳.甲烷和二氧化碳.它们由甲烷菌新陈代谢产生.
其余的养分仍然存在于发酵残渣中。氮可作为有吸引力的铵得到。

B.4. HEAT AND COLD UTILISATION

Beside the electrical power also heat is produced. This heat can be used for the heating of buildings and glasshouses, drying of several goods, for fish farming and many more purposes to increase the efficiency of the biogas plant. The intelligent utilisation of the produced heat is remunerated by the legislator with an additional bonus.
The heat can also be converted to cold. With this cold you can operate cold stores, or use in the summer as air conditioning.

B.4. 冷熱能源的利用

除了電力，熱能也被生产。這種熱能可用於建築物的供暖和溫室.
可用于各種貨物的干燥，用于鱼类养殖和有更多的用途，以增加沼气厂的經濟效益。
熱能的智能利用可向立法機關獲得額外的獎金。

熱也可以被轉化為冷。您可以把它用于冷藏庫，或用于夏天的空調。

B.5. PROCESS DESCRIPTION

The biogas process is based upon the activity of so called methane bacteria. These bacteria “eat” organic substances which are available from the manure or the energy plants (renewable resources). A small part of the “food” is needed for the growth of the bacteria, but the largest part of these substances is excreted as gas. The principal constituents of the biogas are flammable methane and not flammable carbon dioxide. Substantial

B.5. 程序描述

沼氣的产生過程是基於所謂的甲烷菌的活動。這些細菌“吃”掉粪便和能源植物中的有機物質.
存在。甲烷細菌的生長需要吃掉一小部分“飼料”，大部分這些物質將作为氣體被排出.

沼气的主要成分是易燃的甲烷和不易燃的二氧化碳。所生产的大量的甲烷可被燃气发动机转化成电和热。

amounts of methane are produced which can be transformed with gas engines into electricity and heat.

The biogas plant consists of several components so that biogas can be produced out of the organic substances:
In the first instance the substances out of which the biogas is produced, such as e.g. liquid manure, is stored in a receipt station. If required in this container fermentable substances, such as e.g. fats, can be added as co-substratum.
The sludge is pumped constantly from the container in the digester. The digester is a completely closed tank made of steel or reinforced concrete. The digested sludge in the digester has a temperature of approximately 35°C. This high temperature provides optimal living conditions for the methane bacteria, so that an effective gas production can result. The digester is equipped with heat insulation to keep the self energy consumption low. Furthermore the digester is constructed gas-proof because the bacteria only survive and work under the absolute elimination of oxygen.

The produced gas is discharged in a pipeline. In a purifying unit condensate and contaminants are eliminated. Afterwards the gas is stored intermediately in a gas holder and from there is transformed by a combined heat and power unit (CHP) into electricity and heat. The electricity can be used internally or fed gainfully in the public electricity network.

The heat is used partly for the heating system of the digester. The surplus of the heat quantity from the CHP can be used for e.g. keeping of pigs, glass houses, drying processes, etc..

The biogas process proceeds continuously, that means every day sludge is pumped into and a corresponding amount is taken out of the digester. The digested sludge is stored in a storage tank till it is used as fertiliser for the arable land. The pre- and the final storage are installed beside the digester. Tthe pump technology, gas treatment and the CHP are installed on strip foundations in factory-made pre-assembled containers.

B.6. CONSTRUCTION OF A BIOGAS PLANT

A biogas plant is a small factory, the various appliances, containers and equipment such as pumps and motors, in order to produce biogas and electricity to be able to convert. The components need to be sensible voted for an effective and trouble-free operation can achieve. The main components of a biogas plant are described below for an idea of building a biogas plant to receive.

B.7. FERMENTER

The fermenter, or septic tanks, is the most important part of a biogas plant. In fermenter, the liquid manure from the keeping of cattle converted into biogas. The fermenter consists of a large gas-tight containers, made of reinforced concrete or steel is. We can, depending on

沼气工厂包括若干组成部分，这样就可以用有机物质产生出沼气.首先，用于生产沼气的物质，如液体粪便被存储在一个接收站。如果该容器内的发酵基质需要，比如脂肪，可以增加为共同底层基质。

沼渣被不断从发酵罐中泵出。发酵罐是一个完全封闭的用钢筋混凝土作成的罐

在发酵罐中约 35 度的温度中发酵原料被消化。這種高溫为甲烷菌提供了最佳的生存條件，因此，可以有效产生沼氣。

厌氧发酵罐配備了熱絕緣设备以减少自身能量的消耗。另外，发酵罐还建造有气体密封装置，因为，細菌只在完全厌氧的环境下工作。

产生的沼气從发酵罐的管道被排放出。在提纯装置里，凝析油和污染物被消除。然後可燃气体暫時被儲存在一个气体储罐中，並從那裡被输送到一个熱電聯產装置以生產電力和熱。電流可用於内部使用或潰入公共電網。或把可燃气体直接输入天燃气管道和做车用燃气。

从熱電聯產装置得来的部分熱被用來加熱发酵罐（ 保持发酵罐内的恒温）。多餘的熱量可被用于养殖场建筑内部的供暖或致冷，供应温室和乾燥工藝等。

沼氣产生的过程是連續的。即每天泵入原料并從发酵罐中泵出相应數量的沼渣。发酵过的原料经固液分离后被储存在储罐中，并被加工成液体肥料和固体废料用于有机农业。在发酵罐旁邊安装有前期和后期的存储设备。泵技術站，气体处理和在工廠被預組裝的熱電聯產发电机组集装箱安装在条形地基地里。

B.6. 一個沼氣工廠的建設

沼氣廠是一家小工廠，有各種設施，容器和设备，如水泵，電動機，以便產生沼氣并轉化為電能。各組成部分需要切合实际的协调一致产生一個有效和無故障操作才能實現。
收到建立一個沼氣廠的想法后。沼氣工廠的主要組成部分分述如下，

B.7. 發酵罐

發酵罐，或者被称为“厌氧消化罐”，是沼氣廠最重要的一個組成部分。在發酵罐中，液体的粪便等有机垃圾轉化為沼氣。
發酵罐包括一個大的由鋼筋混凝土或鋼材製造的不透氣（密封）的容器。

the desired and necessary requirements Fermenter both systems (s u) offer.

我們可以根據所期望的和必要的要求，提供两种發酵系统的发酵罐（見下文）。

B.8. CONSTRUCTION OF FERMENTER

The fermenter is a stationary cylinder with a ratio of diameter to the height of approximately 1:1 and is made with a special shuttering on the spot. The slim reinforced concrete container can be executed into heights of 8 to 20 m. Is established either from reinforced concrete or from stainless steel plates the ceiling or roof structure of the container and closes gastightly. The roof is usable so that in the maintenance or repair case all important safety and machine technical equipments of the fermenter can be reached.

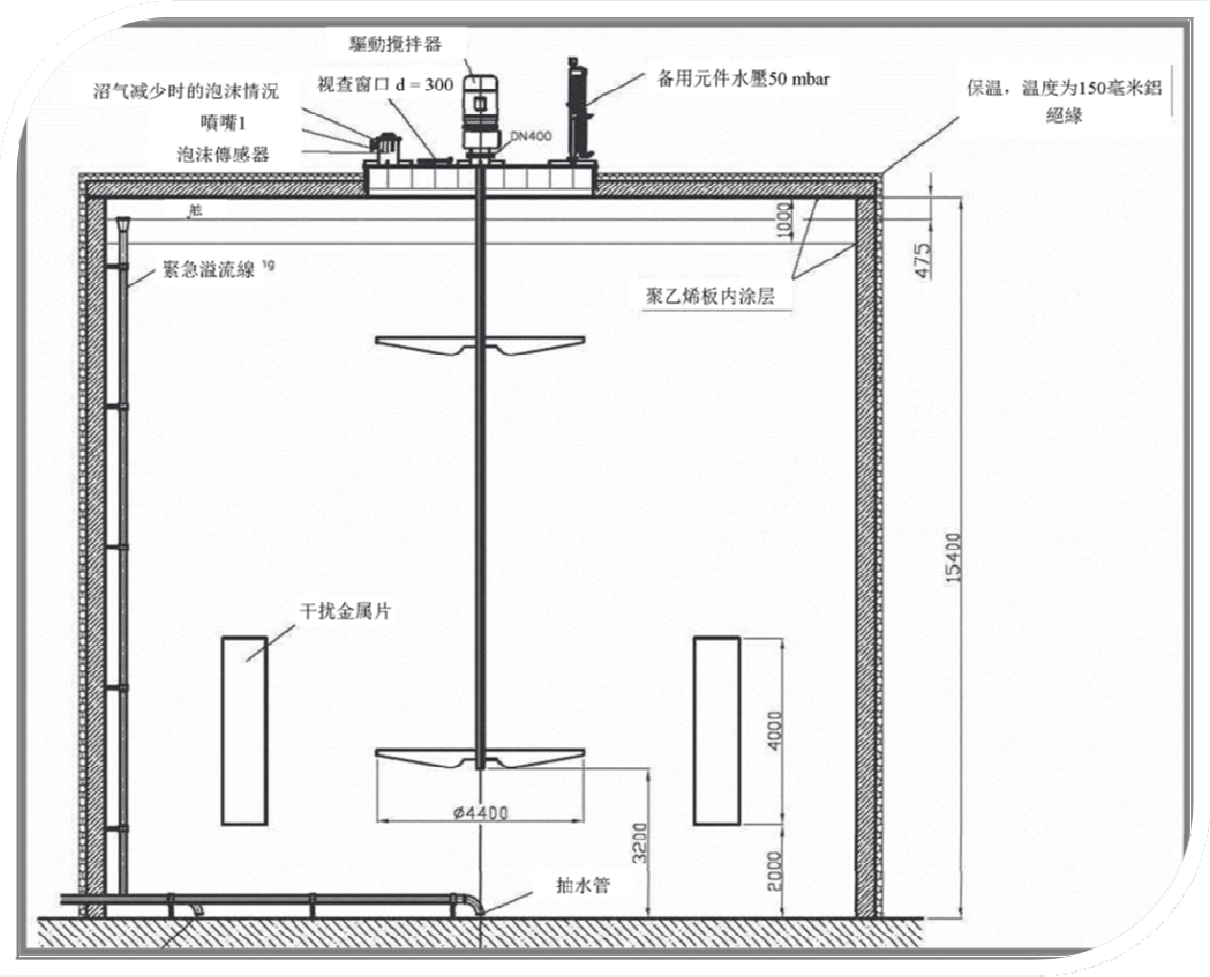
B.8. 發酵罐的結構

發酵罐是一個高度和直徑的比率約為 1:1 的固定气罐。由特殊的模板制造。
轻质的鋼筋混凝土的容器可用於 8 至 20 米的高度。

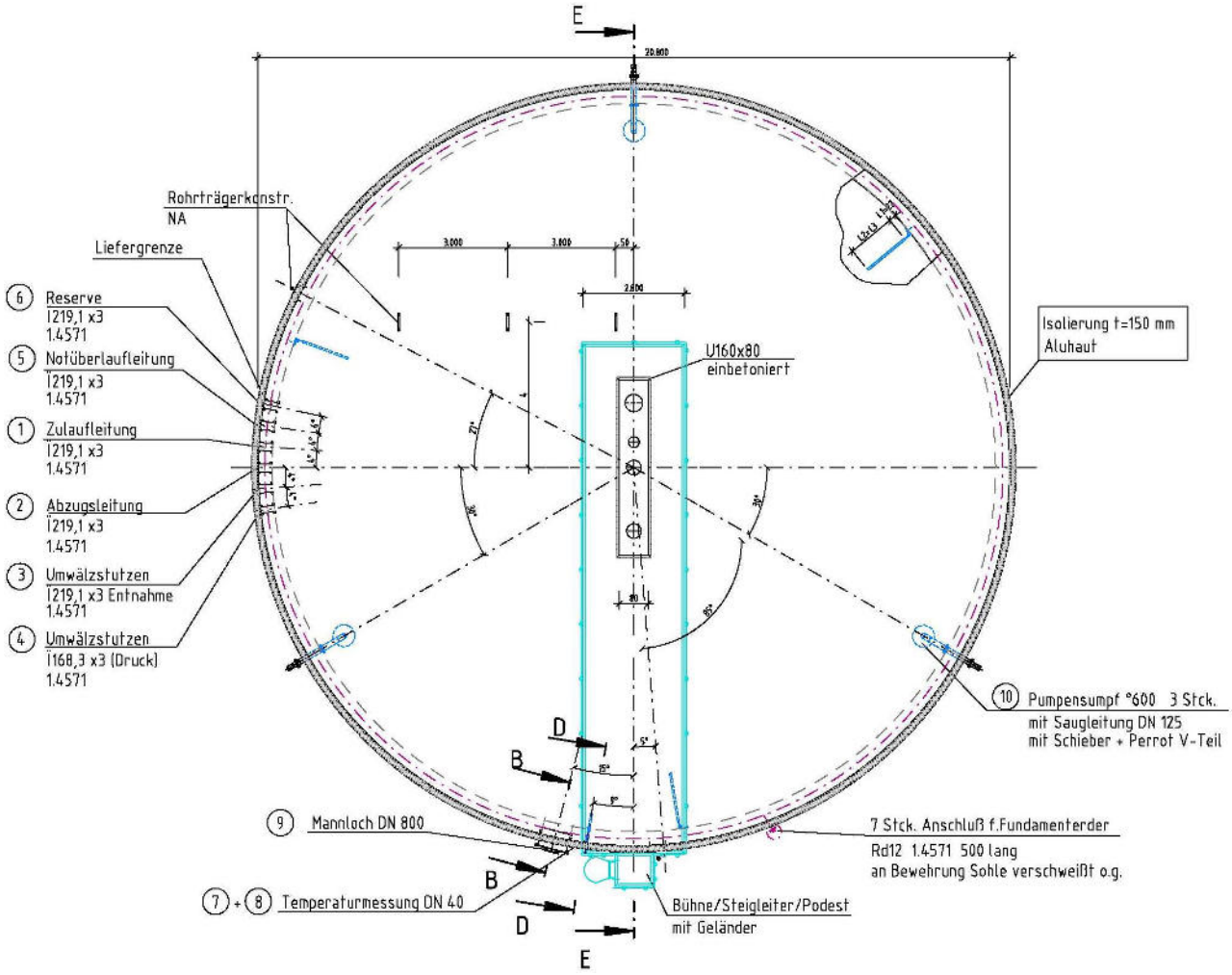
它是用鋼筋混凝土或不銹鋼板建造。容器的天花板或頂盖结构是不透氣和封閉的。
頂盖可以在維護或修理的情况下使用。可以检查所有發酵罐的重要的安全设施和機械設備。

Fermenter with vertical stirring work

發酵罐 / 垂直攪拌器



Roof of fermenter example /屋顶发酵罐的例子



The safety and machine technical equipments of the container are essentially in the gas cathedral which is installed in the roof structure. The withdrawal of the

容器的安全和機械設備主要分佈在安裝在頂部结构的气室里。
对沼气的額外抽取发生在沼氣罐气室的上方。

biogas takes place in addition over this gas cathedral from the fermenter. Optional two different radical change systems provide a sufficient radical change and by mixture of the container contents. The first system is the radical change with a vertical stirring work which is installed over the gas cathedral in the roof structure. The concrete used for our reinforced concrete containers is a high-quality special concrete which is constant against attacks by a variety of aggressive media. A special PE-high-density coating which effectively protects the concrete from sulphur corrosion is in addition attached in the gas room of the bad container.
On the outside the fermenter is thermally insulated and with trapezoidal sheet covered with mineral wool. Work platform and ladders are in the extent of supply. Connections for the supplying and eduction of the mud and the gas are included like the vertical stirring work for an effective by mixture. The warming of the mud is carried out via a double tube heat exchanger lying on the outside.

可选择两种不同的基础交换系统通过容器内物质的混合提供充足的基础交换。
第一個系統是一個带有垂直搅拌作用的基础交换。它被安装在位于屋顶结构的气室的上方。
用于建造鋼筋混凝土容器的混凝土是一种高质量的特種混凝土。它可以长期抵抗各種腐蝕性介質的攻擊。
此外，一種可有效保护硫对混凝土腐蝕的特殊的高密度聚乙烯塗層被附着在消化罐的气室里。
發酵罐的外部由石棉複盖的梯形薄板隔熱。
工作平台和梯子是在可提供的范围内。
供应和发酵基质的培养， 以及包括气体在内的通过垂直搅拌操作的有效混合的連接。
基质的升溫通过雙管式換熱器进行。

B.9. SLIM STYLE

In comparison with fermenters in a flat style bad containers stand out due to the following advantages in a slim style:
Roof structure
By the relatively small diameter of the containers stable roofs have to be established easily. Stirring appliances working effectively can be integrated in stable roofs. Heat losses can want to a good insulation be made minimised also in the roof there. With a good insulation the warmth of one's own need of the bad container is minimised so that the warmth can be used economically and increases the yield of the biogas plant. In comparison with thin membrane roofings the heat losses are up to 75% lower. The slim style is the prerequisite for an optimal homogenization of the bad container contents.
The relationship height: Diameter = 1:1 is advisable for a good by mixture of the contents. The surface is smally, through this be able to sink and swim stack be fought better. A good distribution of the warmth and the fresh fermenting good is obtained with that with a low expenditure of energy, this is an essential prerequisite for an optimal bio gas-production. This can be much more simply and more safely to operate reached unlike fermenters in a flat style. At a disturbance the stirring appliance can be dismantled without the one emptying of the fermenter becomes necessary.

B.9. 小型建筑风格

相比發酵罐的平板的建设特點，消化罐的輕薄設計由于以下優點脱颖而出：
顶部结构
由於相對較小直徑的容器穩定的頂部结构更容易建造，。搅拌设备的工作可以有效地在稳定的顶部结构内进行。
在那样一个很好的保溫隔熱的頂部结构内，熱損失可以減少到最低限度。
具有良好的隔热的消化罐，减少了其自身需要的热量，热能会被经济地使用，并增加了沼气厂的热能产量。

相對於哪些用橡胶薄膜做的頂部结构，我们钢筋混凝土的顶部结构将发酵罐熱量的損失降低了 75 %。 轻薄风格設計的先決條件是发酵罐的物质有一個最佳的同質化。

相关的高度：直徑= 1:1 有利於有一個良好的物质的混合。
由于表面小，物质可以更好的下沉，漂浮的堆积物质被更好地粉碎。
一個好的熱量分配和使用低的能源消費获得新鮮發酵物质。
這是一個最優沼氣生產必不可少的先決條件。
不同于平板式的发酵罐，這种消化罐的操作更简单和更安全。
在發生故障时，該攪拌器可被去除，不需要清空發酵罐。

B.10. SUBSTRATUM SUPPLYING

The substrata made of which the biogas can be won are very various. A biogas plant can be operated with liquid

B.10. 基质供应

产生沼氣的基质有多种物质

substrata like dung, dried straw powder, sewage, sludge, and other bio-wastes. An adapted supplying technology is therefore an indispensable necessity for a trouble-free operation. The supplying and preparation of the substratum takes care that the substances are brought in liquidly into the Bio gas fermenter to obtain an effective operation.

一个沼氣厂可使用养殖场的液體粪便，屠宰场和食品加工厂废水，污水处理厂的污泥，或其它生物质废弃物，农林废弃物来运作。
要做到无故障操作。先进和与发酵原料适应的技术是不可缺少的和必要的.
基质的供應和准备要確保液体物质被送入沼氣发酵罐，以保证有效的運作。

B.11. FERMENTING SUBSTRATUM RESIDUE

The mud which leaves the Biogasfermenter is still a valuable substance. Only the carbon has been withdrawn from the liquid manure from the keeping of cattle for the biogas extraction. Furthermore nitrogen, phosphorus and the further plant nutrients are available and n can be used optimally for the manuring in the agriculture. The fermenting remains are therefore stored in a store bin which can take a stock of 180 days. Particularly the nitrogen is in the ground wholesome ammonium form and can be used effectively in the growing season.

B.11. 发酵基质残渣

从沼氣池中排出的发酵残渣仍然是一种寶貴的物质。在沼氣提取中，碳是唯一被去除的。氮，磷和其他植物的營養物質仍然存在于残渣中，可在农业上作为生态（ 绿色和无公害）有机肥料被最大限度地利用。

發酵残渣可以在存储容器中儲存 180 天。

特别是氮是在地面以銨的形式得到。可有效地用于种植季节的施肥。

B.12. GAS CLEANING

The biogas which leaves the fermenter still must be processed for the use in the gas engine, so that the engine has a long life time. Condensate (water) must essentially be removed from the gas. As well the hydrogen sulphide which is contained in different concentrations in the biogas must be removed. Hydrogen sulphide is poisonous and very corrosive. The HÖBA corporate group has extensive experiences and techniques for the effective elimination of pollutants of gas. A pressureless gas carrier serves the even supply for the block-type thermal power station to guarantee an uninterruptable operation. A need torch rounds off the gas cleaning and provides an environmentally favourable and sure disposal of the gas in the disturbance case.

B.12. 沼气净化

离开发酵罐的沼氣依然需要进行加工后才能被用于气体发动机。
以便发动机能有长时间的工作寿命。
凝结水必须全部地从沼气中去除。
同樣，不同浓度的沼气中含有的硫化氢也必须清除。
硫化氫是有毒的和有非常强的腐蝕性。
对有效地清除沼气中的污染物，赫巴集團公司有著豐富的經驗和技術。
一个没有压力的气体运输罐为热电联产发电站提供供应服务以確保设备不間斷運行。
需要有一个点火器来圆满结束气体的清洁，并提供一个良好的环境和保证在有故障的情况下气体的安全处置

B.13. COMMUNAL HEATING/POWER STATION

The block heating work changes the biogas in electric current and warmth, two energy forms are valuable secondary energies which gain large proceeds and make the biogas plant profitable that way. Block-type thermal power stations can be delivered in all sensible sizes. For the fast assembly the block-type thermal power stations can prefabricatedly be delivered into containers. An assembly in buildings is also possible. The current from the block-type thermal power station is escorted and tempered correspondingly about a transformer station after the conditions of the energy-feeding in law into the public power supply system. The warmth can be used variously e.g. to the heating of buildings and hothouses in the fish farm or too technical processes like the drying of wood or other goods.

B.13. 热电联产发電站

该热电联产发电站把气体转化为电流和热能。
该兩種形式的能源是寶貴的二次能源。并可以获得大的收益，使沼气厂盈利。
可提供有各種合理規格的熱電聯產发电站。熱電聯產发电站可被快速预先装配在集装箱内交付。
安装在建築物内也是可能的。从熱電聯產发电站产生的電流將由一個變電站根據法律規定的电能溃入条款进入公共電力網。
熱能可以用於不同的项目，例如建築物内的供熱和溫室，养鱼场 或干化技術過程， 如乾燥木材或其他物品。

BIOGAS PLANT FOR PROCESSING CHICKEN MANURE

处理鸡粪污水的沼气厂

PLANT DESCRIPTION

沼气厂概述

Function

The biogas plant is used to produce biogas from manure from laying hens.

The biogas is used as fuel for gas motors to generate electricity and heat.

功能

沼气厂是利用蛋鸡排泄物产生沼气。
沼气被用作发电机燃料产生电能和热能。

Size

The biogas plant is designed for an electrical output of 4,200 kW. From the faeces of laying hens, a gas flow rate of 1,350 m³ / h resp a maximum of 11.066 million m³ / year can win.
Intended are three gas Otto motors with 1,413 kW each, brand Jenbacher.

规模

沼气厂的设计规模是4200千瓦的电力输出。

蛋鸡的粪便发酵后可产生沼气的气体流量达到每小时1350 立方米。最高可得到每年大约1106.6万立方米。

Feature

Solid residues, such as chicken manure and uneaten food are collected on a concrete slab. The solid residues are automatically mixed in a container with a floor conveyor with the special pump fermentation substrate and pumped into the fermenter.

特点

固体废弃物,如鸡粪和其它生物质垃圾被收集在一起,
废弃物通过特殊的泵传送带自动混合在一个容器中,发酵基质被泵入发酵罐。

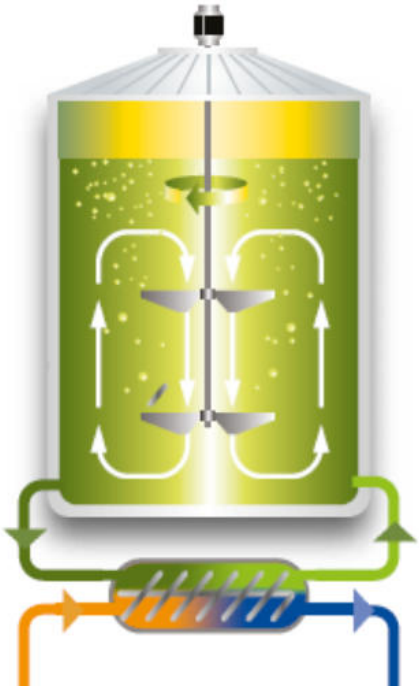
The mixture is passed through a heat exchanger and introduced into the fermenter. The overall technique for the pumps and the heat exchanger are installed in a compact machine building.

混合物（发酵基质）通过一个热交换器被引入到发酵罐。
泵和热交换器的整体技术设备被安装在一个小型的机器装备内。

The biogas plant consists of the digester. The fermenter is a vessel with a high ratio of height to diameter of about 1:1 executed. The mixing is carried out by a powerful vertical agitator. The fermenter thus operates as a continuous stirred reactor. This ensures a high degree of process stability and the avoidance of floating and sinking layers.

沼气厂由发酵罐组成。发酵罐是按照高度与直径约为1:1的高度比例执行建造。

发酵基质由一个功率强大的垂直搅拌器进行混合。因此，发酵罐是一个在连续搅拌的反应器中的操作。这确保了运行过程的高度稳定性以及避免了漂浮物和下沉层。



Glass enamelled steel plates /玻璃漆包的钢板

The fermenter has a constant level, the displacement of the fermentation substrate via a siphon.

发酵罐中有一个恒定的液面，发酵基质的位移是通过虹吸管。

The fermenter is constructed of bolted, enameled steel panels on site. This design allows for quick installation. The corrosion protection, which is generated by the enamel of the steel sheet ensures a long service life.

发酵罐采用螺栓、搪瓷钢板在现场建造。

这种设计可实现快速安装。搪瓷钢板的防腐蚀保护，保证了发酵罐很长的使用寿命

Besides the agitator is apart from some pipes, no other components present in the fermenter. It is heated by an external heat exchanger. All components that are subject to wear are, easily accessible outside of the fermenter.

除了搅拌器, 除了一些管道，发酵罐内没有其他部件。
它是由一个外部的热交换器进行加热。所有容易受到磨损的组件, 都在发酵罐的外部，因此容易维护。

The biogas is fed into an external gas reservoir with a volume of 2,000 cubic meters. The gas storage is used to balance the uneven gas production and the uniform

沼气被送入一个外部的，有2000立方米容量。的储气罐储存。
储气库是用来平衡均匀所生产的气体，以及均衡燃气发动机对燃气的消耗量

gas consumption by the gas engines.

The biogas is dewatered, contacted with a centrifugal fan to the required operating pressure; an activated charcoal filter removes the hydrogen sulfide, and is then combusted in the gas engines.

沼气被脱水，及连接到一个离心风机得到所需的操作压力， 通过一个活性炭过滤器去除硫化氢，然后，在燃气发电机中燃烧发电。

The technique for the substrate support and the gas conditioning and switchgear for the control of the biogas plant will be assembled and installed in the nacelle.

基质支持和气体调节技术装备以及控制沼气工厂的开关设备将被组装和安装在发动机舱内。

The biogas is effectively refined in modern CHP plants with high efficiency into electrical energy and heat.

在现代化的高效率的热电联产发电机组内，沼气被有效地提炼并转化成电能和热能。

Dung and processing concept 糞便和污水處理概念

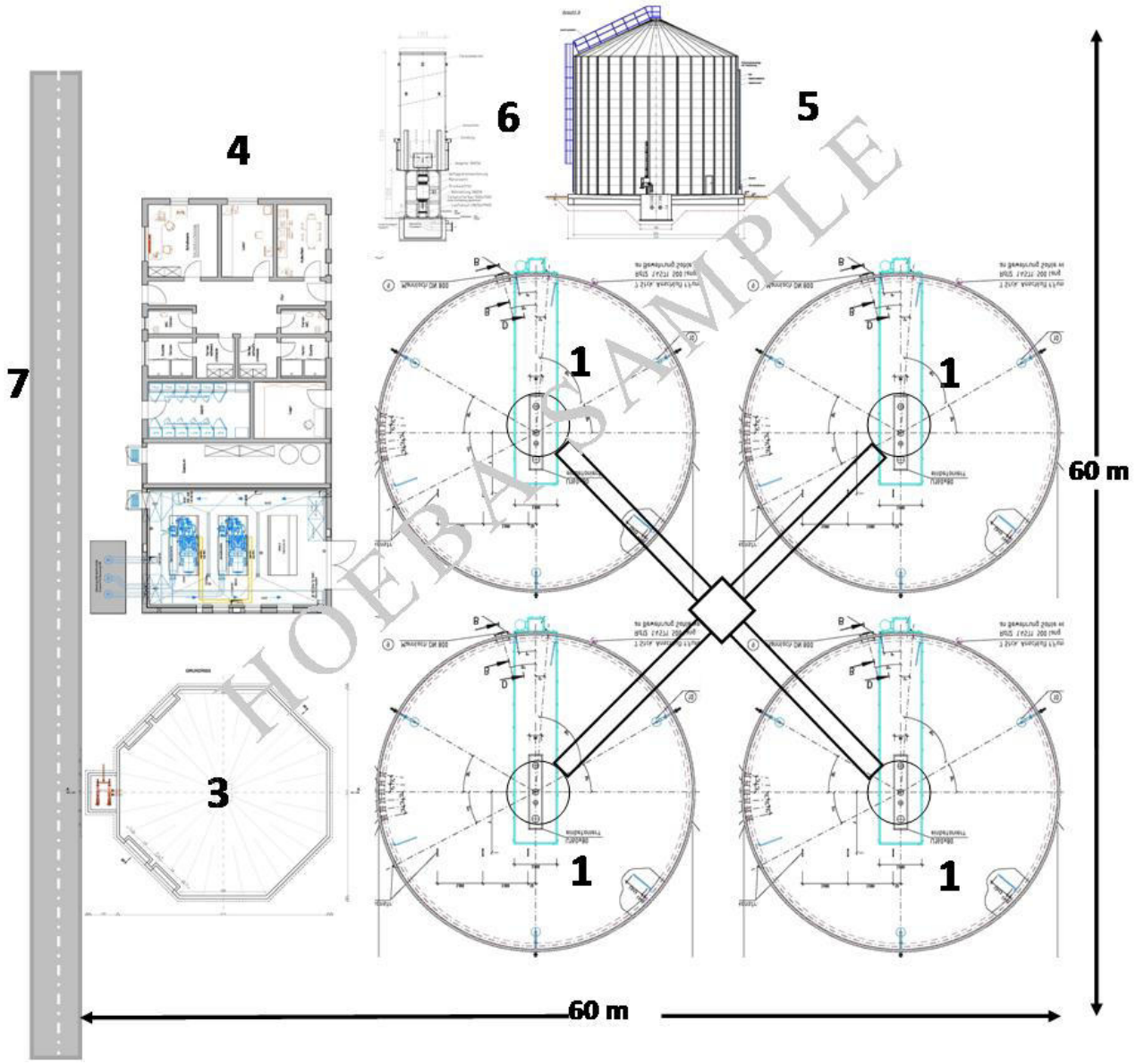
SUBSTRATES FOR THE FERMENTATION BIOGAS PLANT
沼气发酵厂的基质

Substrate 基质	unit 單位	laying hens 蛋鸡	Water 水	Recirculated 重新循环	Total 总数量
Amount 总数	Mg/ a[1] 吨/每年	64.042	46.125,00	102.500,00	212.667
	kg/d 公斤/每天	187.440,000	135.000,000	300.000,000	622.440
Relative proportion 相对比例	% （百分比）	30,1	21,7	48,2	100
Dry solids 固体总量	% （百分比）	45,0	0,0	2,9	14,9
Organic dry solids 有机固体总量	% （百分比）	36,0	0,0	2,3	11,9
yield of Gas 产气量	l/kg ods	480,00	0,0	0,0	480
Methane content 甲烷含量	% by volume 与总体积的百分比	65,00	0,0	0,0	65
Ds-freight 固体总量-运输	kg/d 公斤/每天	84.348	0,0	8.700	93.048
Ods-freigh 有机固体总量-运输	kg/d 公斤/每天	67.478	0,0	6.750	74.228
Bio Gas production 沼气產量	m_n^3/d 立方米/每天	32390	0,0	0,0	32.390
	m_n^3/h 立方米/每小时				1.350
	m_n^3/a[1] 立方米/每年				11.066.458
Methane production 甲烷生产	m_n^3/d 立方米/每天	21.053			21.053
relative proportion 相对比例	% （百分比）	100	0,0	0,0	100
mass Bio Gas 沼气数量	kg/d 公斤/每天				39.015
Biogas production 沼气生产	m_n^3/1000 kg FM 立方米/ 每吨液体发酵原料	172,8	0,0	0,0	52,0
Ods-freigh digestate 有机固体总量-运输 发酵残渣	kg/d 公斤/每天	29.961	0,0	6.750,0	36.711
Ods-content digestate 有机固体总量-运输	% （百分比）	20	0,0	2,3	6
Ods - reduction 有机固体 - 减少	% （百分比）	55,6	0,0	0,0	50,5
Fermentation - product 发酵的 - 的产品	kg/d 公斤/每天	149.922	135.000	300.000	584.922,00
Fugatfaktor	_	0,80	0,00	1,00	0,92
Calorific value 热值	kWh/a[1] 千瓦时/每年				71.723.372
Power, electrical 電能	kWh/a[1] 千瓦时/每年				30.108.000
Power, thermal 電能，熱能	kWh/a[1] 千瓦时/每年				29.680.750

[1] **8.200 hours of operation/yearly**
7.883 full hours of operation electricity generation
Material values of KTBL and LUA Brandenburg

PROCESSING PARAMETERS / 工藝參數

Operational mode Mesophilic 运作模式 中溫		
Operating temperature 操作溫度	°C（度）	38
Fermenter diameter 发酵罐直径	m （米）	19,64
Fermenter - Height (cylinder) 发酵罐 - 高度（圆柱体）	m （米）	19,63
Fermenter - Height (total) 发酵罐 - 高度（总高）	m （米）	22,48
Fermenter capacity -gros 毛發酵能力,	m³（立方米）	6.305
Fermenter capacity - net 净发酵能力	m³（立方米）	5.796
Piece of the Fermenters 发酵罐数量	Amount 总数	4
Fermenter capacity -gros (total)	m³（立方米）	25.222
Fermenter capacity - net (total)	m³（立方米）	23.182
Hydraulic detention time 水力停留时间	Days 天	38
Room - load 立方米-負荷	kg oDS/m³ x d 公斤/立方米×天	3,2
Drysubstance content in the fermenter	% （ 百分比）	9,1
Bio Gas production 沼气產量	m_n^3/d （立方米/ 天）	32.390
	m_n3/h（立方米/ 小时）	1.350
Middle Methane contingent 甲烷气体含量	Vol. % (占总体积的百分比)	65
Middle electrical power of the CHP 热电联产（CHP）的中温电力	kW/h (千瓦/ 小时)	4.248
Gas consumption of CHP 热电联产(CHP)的气体消费量	m_n^3/h （立方米/ 小时）	1.562
Gas consumption of CHP specific 热电联产（CHP）的具体气体消费量	kWh_{th}/kwh_{el} 千瓦时热能/千瓦时电能	2,36



E. FUNCTION GRAPH EXAMPLE

E. 功能图示

Jenbacher (颜巴赫热电联产发电机组)

OVERVIEW

Design parameters of the biogas plant
Scope of delivery

1. Substrate supply
2. Fermenter
3. Gas storage
4. Separator digestate
5. Guilding substrate promotion and gas processing
6. Substrate promotion
7. Gas Technology
8. Gas torch
9. Piping
10. Measurement
11. Switchgear
12. Electrical lines
13. Lightning Protection
14. CHP
15. Site works
16. Freight
17. Other services

Detailed planning:

- Fermenter
- Substrate supply
- Gas storage
- Gas Technology
- Plant control
- Pipelines
- Static calculation: for all buildings, auditable (German)

概述

沼气厂的设计参数
标准配置

1. 发酵基质（原料）供应
2. 发酵罐
3. 储气罐
4. 沼渣沼液分离器
5. 基质推进制导和气体处理
6. 基质推进
7. 气体处理工艺
8. 燃气火炬
9. 管道系统
10. 测量
11. 开关设备（ 接电装置）
12. 电气线路
13. 防雷装置
14. 热电联产装置
15. 工地工程
16. 运输
17. 其它服务

详细规划
发酵罐
基质供应
储气罐
气体处理技术
沼气厂控制系统
管道系统
所有建筑的静力计算

	审计（ 德国）
- Construction management and site supervision	施工管理和现场监督
- Cold start: completeness check, leak test,	工厂冷启动:完整性检查、泄漏试验,
- Function tests	功能测试
- Hot commissioning including briefing:	热调试（ 试运行）包括简报
- Inoculation of the plant	预备沼气厂发酵菌种
- (Provision of seed sludge is free of charge by the customer)	业主免费提供种子基质
- Starting up the plant, commissioning of individual components	工厂启动，各个组建的调试
- overall commissioning	整体调试
- Briefing: briefing by the plant operator during by the commissioning	简报：在调试时工厂操作人员做出简报
- Documentation: 2 times includes	文件：包括2次调试
- Procedure description	过程描述
- Maintenance Instructions	维护说明书
- Plans / schematics	计划/图表
TARGET PRICE 13.332.000 €	预估价格 **1333.2** 万欧元

BIOGAS PLANTS financing plan / profit and loss account / amortization (Example)

沼氣發電廠融資計劃/損益表/攤銷 (例子)

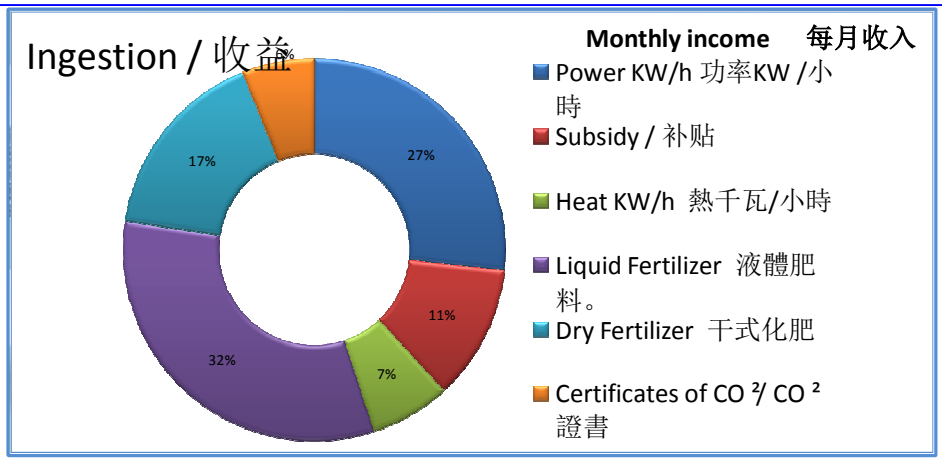
Property costs: 项目成本:	13.332.000 €
Cost of concrete and earth: 土建工程费用:	
Land cost: 土地成本:	
Processing costs: 處理費用:	
Total: / 總計:	13.332.000 €

Total investment: 總投資:	13.332.000 €
Of which equity: 其中股權:	- €
Long-term loans: 長期貸款	13.332.000 €

Loan amount: 贷款 :	13.332.000 €
Interest per year: 利息每年的:	6,00%
Duration years: 使用年限:	5
Start date of the loan: 该贷款的开始日期:	2013.8.1
Monthly Payment: 每月付款	257.744,91 €
Payment periods: 支付:	60
Total interest: 利息总额:	2.132.694,60 €
Total cost of credit: 总的信贷成本:	15.464.694,60 €

Ingestion / 收益

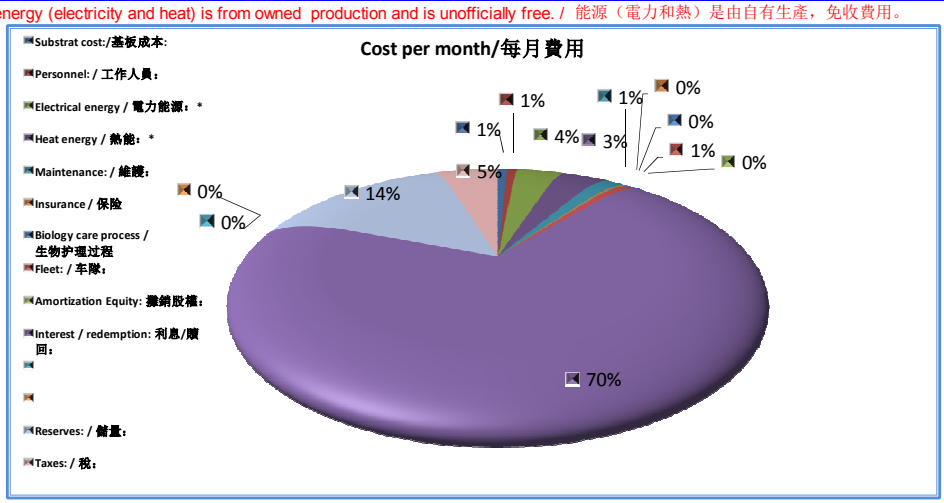
	Quantity / mkg/d 數量/每天	Price per unit 單位價格	Daily income 每日允許攝入量	Monthly income 每月收入	Yearly income 每年入息	Profit-loss 盈虧
Power KW/h 功率KW /小時	4.248	0,07 €	6.601,39 €	198.041,76 €	2.376.501,12 €	
Subsidy / 补贴	4.248	0,03 €	2.829,17 €	84.875,04 €	1.018.500,48 €	
Heat KW/h 熱千瓦/小時	3.765	0,02 €	1.671,73 €	50.151,92 €	601.823,05 €	
Liquid Fertilizer 液體肥料。	400	20,00 €	8.000,00 €	240.000,00 €	2.880.000,00 €	
Dry Fertilizer 干式化肥	120	34,00 €	4.080,00 €	122.400,00 €	1.468.800,00 €	
Certificates of CO ²/ CO ² 證書	100	15,00 €	1.500,00 €	45.000,00 €	540.000,00 €	
Total: / 總計:	12.881		24.682,29 €	740.468,72 €	8.885.624,65 €	8.885.624,65 €



Expenditure / 支出

	Cost per month/每月費用	Price per ton 价格每吨	Substrate ton per Day: 基板吨每一天:		Cost per year / 每年費用	
Substrat cost:/基板成本:	2.858,46 €	0,50 €	187,440		34.301,52 €	
Personnel: / 工作人員:	2.712,33 €	Energy for plant per hour/沼气厂每小時电量			32.547,95 €	
Electrical energy / 電力能源: *	13.060,05 €	255	kW/h Electrical/千瓦/小時電力		156.720,61 €	
Heat energy / 熱能: *	12.537,98 €	941	kW/h Heat/千瓦/小時熱		150.455,76 €	
Maintenance: / 維護:	5.555,00 €				66.660,00 €	
Insurance / 保险	849,60 €				10.195,20 €	
Biology care process / 生物护理过程	400,00 €				4.800,00 €	
Fleet: / 车隊:	2.500,00 €				30.000,00 €	
Amortization Equity: 攤銷股權:	- €	Depreciation Years: 折舊年限:	- €		- €	
Interest / redemption: 利息/贖回:	257.744,91 €	Duration years: 使用年限:	5		3.092.938,92 €	
Subtotal: / 小計:	298.218,33 €				3.578.619,96 €	5.307.004,69 €
Reserves: / 儲量:	53.070,05 €	Reserve rate / 準備金率 %:	1,00%		636.840,56 €	
Taxes: / 税:	17.690,02 €	Tax Rate / 比率 %:	4,00%		212.280,19 €	5.094.724,50 €

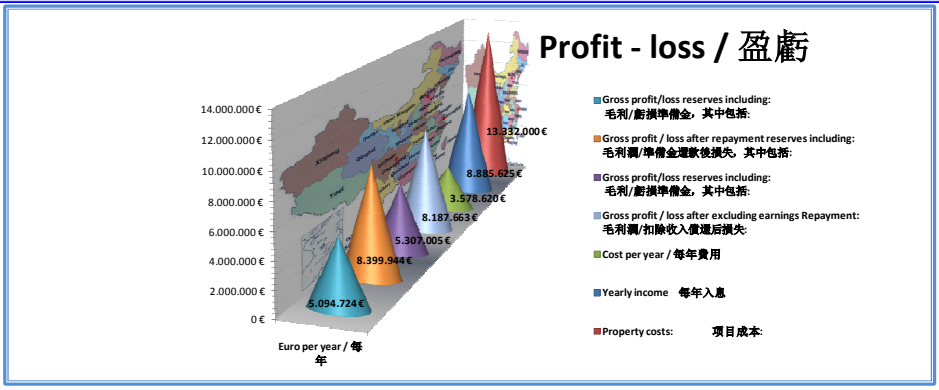
* Energy: / 能源: The energy (electricity and heat) is from owned production and is unofficially free. / 能源（電力和熱）是由自有生產，免收費用。



Profit - loss / 盈虧

Profit / loss from sales are calculated / 利潤/損失計算銷售

	Euro per year / 每年	Euro per month / 每月	% per year / 每年	Profit / loss from the investment calculated/ 利潤/損失的投資計算 % of investment per year / 每年的投資
Gross profit/loss reserves including: 毛利/虧損準備金，其中包括:	5.307.004,69 €	€ 442.250,39	59,73%	39,81%
Gross profit / loss without reserve: 毛利潤/无条件損失:	5.094.724,50 €	€ 424.560,37	57,34%	38,21%
Gross profit / loss after repayment reserves including: 毛利潤/準備金還款後損失，其中包括:	8.399.943,61 €	€ 699.995,30	94,53%	63,01%
Gross profit / loss after excluding earnings Repayment: 毛利潤/扣除收入償還后損失:	8.187.663,42 €	€ 682.305,28	92,15%	61,41%



To hear from you soon a positive response, we remain

Sincerely yours

我们殷切希望很快得到你们积极的回应。

致，

Johann Hoereth
赫列·约翰
President of
公司东主/总裁
hoeba j. hoereth gmbh
赫巴 约翰。赫列有限公司
Vice President of
江苏赫巴环保科技有限公司
jiangsu hoeba environmental technology co., ltd.

Creator: **承包者和創建者:**

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赫巴 约翰。赫列有限公司

kläranlagen 污水处理厂
biogasanlagen 沼气发电厂
hoch- u. tiefbau 高架和地下工程

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