



REFERENCES

Efficient energy systems for breweries





## Economical energy supply – make your brewery competitive for the future too.

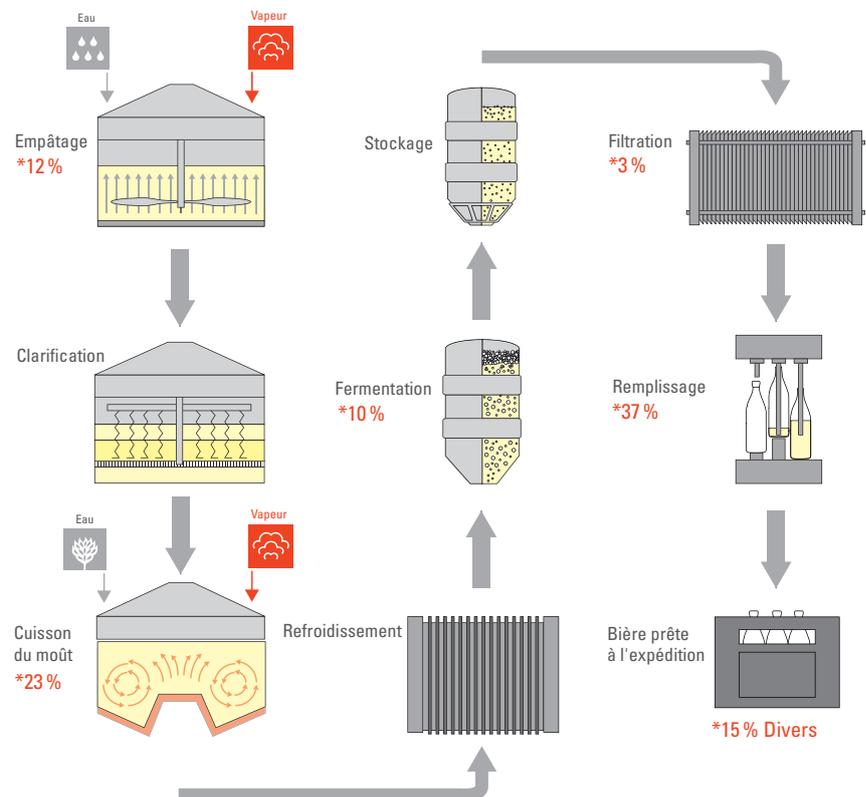
Beer is a natural product with a manufacturing process which traditionally treats raw materials sparingly. Many breweries have committed to producing their product in a sustainable and environmentally friendly manner. Beer, with its massive power and heat requirement for production, is one of the most energy-intensive food products. That's why the construction of an energy system which continually improves efficiency and spares resources, is an important competitive factor for the brewing process.

"Brewing, fermentation, storage and bottle cleaning are very energy-intensive processes, and therefore represent a major cost item for beer production", states the German Brewers Federation. Depending on the size of the company, energy costs can represent between ten and fifteen percent of total costs. To remain competitive, all potential optimisation

has to be utilised. The steam boiler plant, as an important component of every brewery, plays a key role: Steam is used everywhere: for mashing, boiling and for bottle and barrel cleaning.

Of the total energy consumption 45 % is used for the brewhouse and fermentation departments alone. The greatest potential for cost reduction is thus in the operation of the boiler plant which provides the energy for these processes. A modern boiler plant permanently reduces energy costs and thus makes economical and sustainable beer production possible.

Steam is required at numerous points during the brewing process.



\* Distribution of heat demand in a model brewery with beer sales totalling 1 million hl and 70 % reusable bottles. Source: statistical survey by „The Brewers of Europe“, 2002.

## Viessmann steam generators – for efficient steam supply for your brewing process



Viessmann steam and hot water generators are characterised by high efficiency.

Pricing and competitive pressure in the drinks industry is particularly high for breweries. Increasing energy and production costs are pivotal. Around 72 million euros for power and heat energy in the drinks energy can be saved each year.\* Many breweries are still working with old steam production plants which no longer meet the technical, economical and legal requirements. Also, these boilers can no longer comply with the emissions regulations (MCPD; TA-Luft and BImSchV). At this point at the latest, it is essential to replace or modernise the boiler plant in order to remain competitive.

### Modernise and reduce operating costs

Optimised energy provision offers breweries the highest potential savings in the long term. High plant availability and the efficiency of the boiler plant are important criteria for an effective steam supply for the brewing process. Fuel costs make up the greatest part of the costs of a steam boiler during its service life. They make for almost 76 percent of total costs. Investment in an efficient plant made with state-of-the-art technology is always worthwhile because fuel savings outweigh the costs of procurement.

### Customised solutions

If the steam boiler needs to be replaced, this is a fundamental decision which affects numerous processes in the daily production routine. We provide you with comprehensive consultancy services to develop a suitable tailor-made complete solution for your operation. The plants feature a high level of automation, and are thus easy to operate and maintain. They are also characterised by particularly low emission values. As a Viessmann customer, even in the event of malfunctions you can rely on competent consultancy and comprehensive service.

### Act sustainably – reduce emissions

Keeping energy consumption low and causing as few emissions as possible protects the environment and shows that you act sustainably.

### Our tip

**Viessmann Khlsysteme GmbH** is a manufacturer of cooling chambers and cooling aggregates for trade and industry.

Visit [www.viessmann.com](http://www.viessmann.com) for more information on refrigeration systems.

\* Source: Siemens Industry Sector, Customer Services Division

## Individual solutions which help you brew sustainably

The provision of steam in a way which saves energy and is low in harmful substances, and high operational reliability and availability are the essential criteria for an efficient brewery operation.

Viessmann energy plants for industry and commerce provide the right solution for a number of fuels. The user can choose from steam and hot water boilers, waste heat boilers and combined heat and power unit systems with a high level of efficiency. Viessmann steam boilers – thanks to the way they are engineered and equipped – provide efficient steam supply for your brewing process.

### The Viessmann comprehensive product range comprises:

- Industrial boilers / industrial boiler plants for steam up to 120 t/h, for power up to 50 MW, for heat up to 120 MW
- Biomass plants for steam up to 50 t/h for power up to 15 MW and for heat up to 50 MW
- Combined heat and power units for power up to 530 kW, for heat up to 660 kW

The boilers are supplied in a modular design, from the basic version to a fully customised plant. Matched accessory packages and complete system solutions – all from a single source – make for clear added value thanks to the efficiency of the plants.

### The equipment options include:

- Various heat exchangers for higher efficiency and lower fuel consumption
- Turbulators for higher efficiency levels with the same nominal heating area

- Wear and maintenance-free burner entry point
- Low NO<sub>x</sub> versions
- Main girder as boiler support
- Non-slip boiler cover
- Boiler platform

### Environmentally friendly thanks to low NO<sub>x</sub> emissions

Strict emissions requirements which already apply in Switzerland or the Netherlands, are already met by all common burner brands. No output reduction is required.

### Wear and maintenance-free burner entry point

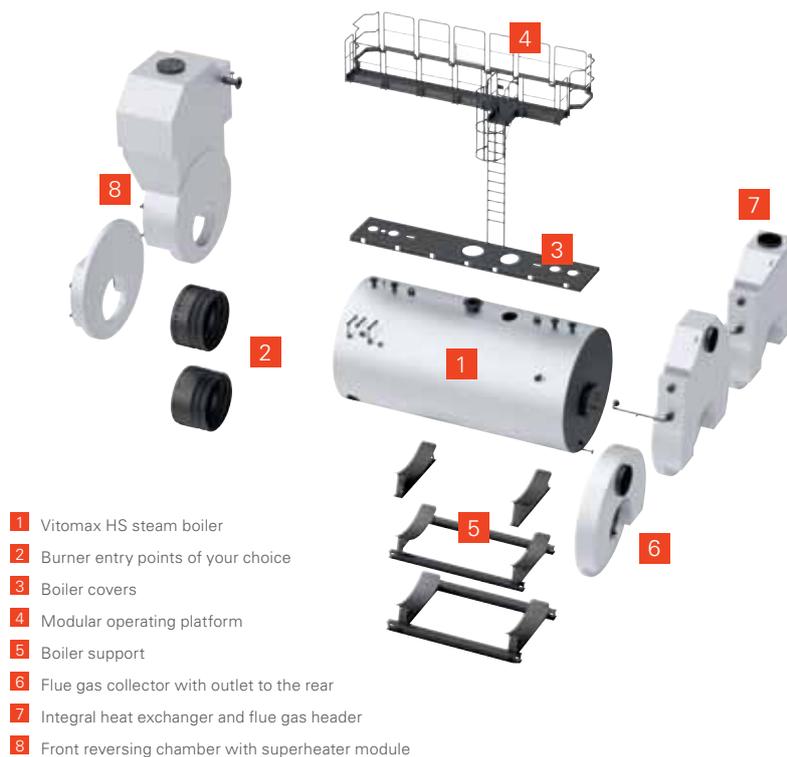
No concrete is used for the optionally available innovative burner entry point of the Vitomax boiler. Thus it is wear

and maintenance-free, and does not need to be replaced throughout the entire service life of the boiler. There are no longer any unscheduled downtimes which are otherwise required for drying processes or repairs to concrete masonry. This makes for noticeably lower operating costs and higher availability.

### Safe accessibility

The walkable, non-slip boiler cover makes installation work easier and provides excellent operating convenience. Inspection openings and fittings on the top of the boiler are easily accessible. Subsequent retrofitting of the boiler platform is not a problem thanks to the integrated mounting points.

Equipment versions for economical steam generation with Vitomax HS, 0.26 to 31.5 t/h





#### BENEFIT FROM MANY ADVANTAGES:

- + Modular boiler with equipment options for every requirement – tailored to your needs
- + Insensitive to load fluctuations – high operational reliability during the brewing process
- + Economical energy consumption thanks to high efficiency – low operating costs
- + Optional wear and maintenance-free burner entry point – low operating costs, high operational reliability
- + High steam quality with low residual moisture – high process reliability and product quality

## Matched system technology and comprehensive service – one-stop shopping for clear added value

Viessmann is the technical pacesetter for efficient energy systems. Matched components and systems are developed by a single source for each individual customer, and extended with a comprehensive range of services.

Viessmann industrial/commercial boiler technology means perfectly matched system technology. This includes:

- Control/monitoring systems
- Instrumentation and control technology
- Combustion systems with fuel supply
- Water treatment
- Feed water tank with thermal degasification
- Pipeline systems and flue systems
- Heat recovery systems
- Water analysis

### Digital networking and plant management

With the new PLC controllers for steam, heat and hot water generators, Viessmann provides your industrial plant with the ideal basis for digital alignment of your company. The controllers, with their network connection and plant management, help to operate your plants economically and efficiently. Analysis and evaluation of measured values and consumption values provides reliability for optimum and efficient operation.

### TWA-V water treatment system

The TWA-V water treatment system makes for constant steam quality and ensures that boilers and components have long service lives thanks to the provision of thermally treated feed water. Harmful components in water

(e.g. oxygen, carbon dioxide etc.) are thus eradicated early on, and do not even enter into the boiler or your plant.

### Our range of services

Using our product configurator, we can put together your individual plant in just a few steps – while we are still talking to you. You can include your needs and requirements directly in the planning of the plant, and a quotation with all the specific boiler and plant accessories can be produced immediately.

Even after the plant has been constructed, we are there for you with our service team: A broad range of services for industrial boiler and power plants are provided – from maintenance, repair, delivery of spare parts and repairs to replacement and retrofitting.



TWA-V water treatment system



Vitocontrol for maximum and reliable boiler plant output

### YOUR BENEFITS:

- + Simple plant planning, thanks to components which are already perfectly matched, reduces the coordination requirement
- + Optimised and reliable plant operation
- + We provide you with support for your project at all times with comprehensive consultancy and multiple services

## Generating heat and power simultaneously through cogeneration



Viessmann combined heat and power units achieve a total efficiency of up to 95 percent.

Primary energy is usually only used once, for example, in order to generate heat or power. With combined heat and power generation, the energy is used twice: Combined heat and power units (CHP units) supply power and heat simultaneously.

### Using heat almost loss-free

Unlike with central power plants, the heat produced by a CHP unit is not lost. The currents of hot exhaust gas can be supplied to a heating network or a waste heat boiler. Cooling requirements can also be covered completely or partially with the connection of an adsorption or absorption cooling unit.

The use of process and waste heat as a "waste product" from industrial processes reduces operating costs by saving fossil fuels.

With more than 25 years of experience in this field of products, Viessmann supplies efficient gas-driven systems for combined heat and power generation. Alongside series products with an output range of 6 to 530 kW<sub>el</sub>, special customised CHP units are also manufactured. Viessmann combined heat and power units are engineered specifically for commercial use and show their strengths anywhere where power and heat are required.

Make efficient use of process or waste heat with a waste heat boiler and reduce running costs.

**Waste heat boilers use exhaust heat from CHP units**

Waste heat boilers utilise the heat from exhaust gases from the combustion processes of CHP units or from other currents of exhaust air from the processes. A downstream waste heat boiler can be used to utilise the exhaust heat generated by processes for generating heating water or saturated steam.

As a result of the economic and legal situation, and increasing energy costs, large numbers of waste heat boilers are used in combination with combined heat and power units or gas turbines.

Two different types of Viessmann waste heat boilers are available:

— **Waste heat boiler (WHB) without additional firing**

In this case, only the exhaust gases/ currents of exhaust air are used to generate saturated steam

— **Steam generator with waste heat utilisation and firing**

These are conventionally fired boilers that make additional use of waste heat

The conditions of use dictate when which type of boiler is used.



Waste heat boiler (WHB) without additional firing



Hot water or steam generator with waste heat utilisation and firing



#### Our tip

#### Viessmann Holzfeuerungsanlagen GmbH

is the specialist for production of energy from biomass. Visit [www.viessmann.com](http://www.viessmann.com) to see the complete range

## Wood-fired systems – Steam and hot water generators from biomass for a considerable contribution to climate protection

An ever increasing number of industrial and commercial enterprises are turning to wood for fuel. Wood is subject to lower price fluctuations than fossil fuels, it needs not be imported and, as a renewable and CO<sub>2</sub> neutral energy source, it makes a major contribution to environmental protection and sustainability.

Viessmann supplies steam plants from the biomass sector with an output range from 850 kW. The high-pressure steam generators are engineered for an operating pressure of 6 to 25 bar.

The following systems are used as wood-fired systems:

#### **Vitoflex 300-FSR flat push grate firing system**

The major benefits of flat push grate combustion (type FSR) are the ability to use different fuels and a low particulate content in the flue gas, due to the static fuel bed.

#### **Vitoflex 300-SRT step grate firing system**

The step grate firing system is particularly suited to combustion of wood fuels with a high water content of up to 60 % and ash content of 10 %. These conditions enable flexible use of affordable fuels, such as woodchips from forestry work, green cuttings, bark and wood from countryside

management, without need to dry or season them. The Vitoflex 300-SRT wood-fired system with step grate is engineered for up to 8000 hours per year. Thus power generation in biomass heating plants is also recommendable.

Both systems are characterised by modulating operation, i.e. they adjust the system output to the actual heat requirement. Modulating operation of up to 25 % of the nominal heat output is possible depending on the fuel.

## Examples for use of steam plants in breweries

### Puntigam brewery in Graz

Beer has been brewed in the Puntigam district of Graz since 1478. The brewery has been operating a boiler plant for the generation of process steam for several decades. In 2016 the ageing old boiler was replaced with a Vitomax HS high pressure steam boiler. In addition to the integrated Economiser, a further exhaust gas heat exchanger was used for preheating the combustion air.



- Steam mass flow: 15 t/h
- Operating pressure: 10 bar
- Safety pressure: 13 bar
- NO<sub>x</sub> emission values
  - Gas operation: < 80 mg/Nm<sup>3</sup>
- Efficiency: 97,2 %
- Exhaust gas temperature: < 80 °C



### Wernesgrüner brewery in Wernesgrün

The new Vitomax HS high-pressure steam generator has been in operation since 2016. It replaces two steam generators in order to generate energy for the production unit of the Wernesgrüner brewery in a more energetic and sustainable way. The efficiency of the boiler improves by ten percent and the already low emissions are further reduced. The brewery thus operates in a more climate-friendly and sustainable manner.

A further added value, alongside energy efficiency, is the less intensive inspection of the boiler. With the predecessor an inspection had to be carried out every 24 hours. With the new steam generator the boiler operator only has to inspect the boiler every 72 hours.

- Steam mass flow: 8 t/h
- Operating pressure: 10 bar
- Safety pressure: 13 bar
- NO<sub>x</sub> emission values
  - Gas operation: < 80 mg/m<sup>3</sup>
  - Oil operation: < 150 mg/m<sup>3</sup>
- Efficiency: > 95 %
- Exhaust gas temperature: < 110 °C





## Modernisation of the steam boiler plant during ongoing production

Brauhaus Riegele was founded in 1386 and is thus one of the oldest breweries in the world. It currently employs more than 100 people and, with over 200,000 hl and annual turnover of more than 20 million euros, it is the largest private brewery in Augsburg.

### Active environmental protection

A dedication to the art of brewing and a respectful attitude to nature are amongst the values of the family business. The brewery therefore works with efficient heat reclamation and uses power from its own photovoltaic system. The vehicles run on environmentally friendly Bluetec technology. The brewhouse is a champion of the

multiple use recycling system and has introduced its own manifesto against genetically modified grain. The brewery has EMAS environmental certification as a result. The raw materials are all procured locally, meaning there are no long transport routes.

### Initial situation

The old boiler plant from 1966 with heating oil firing no longer met the technical, economic and legal requirements. The exhaust gas/heat exchanger (Economiser), which is commonplace nowadays, was a particular absence. It preheats the boiler feed water with the heat from the exhaust gas and thus makes a considerable contribution to energy savings.

For modernisation, a solution was required which would affect ongoing operation as little as possible and with which it would be possible to react flexibly to any problems. This way, production downtimes and the associated costs were to be prevented.

#### Implementation:

A decision was quickly made in favour of a Viessmann plant. „For us, as a medium-sized business, the contact with the service provider, the problem solving ability and flexibility are a decisive factor for projects of this size“, says master brewer Frank Müller in justification for the decision.

The Vitomax 300 HS high-pressure steam generator with integral ECO 200 Economiser impressed thanks to its high efficiency of 95.8 percent and the low flue pollution. Further benefits include the ideally matched burner system with its very low power consumption, and the integrated suction silencer which makes for lower noise pollution. Furthermore, the boiler, with its three hot gas flues and the generously dimensioned burner chamber geometry, complies with the strictest emissions requirements. At the Riegele brewery the boiler generates up to six tonnes of steam per hour.

To ensure that the process ran smoothly, a loaned boiler was installed for provisional connection to the existing process. This way, production could continue while the new boiler was installed and commissioned.

#### The result

Modernisation of the plant meant that the exhaust gas temperature could be reduced from 250 to 110 °C. Thanks to the associated savings the plant will amortise within the next 6-7 years.

The new 24/7 monitoring of the plant from a remote control room is a further improvement. It means the Viessmann service team can access the plant management system immediately, optimise operation and eradicate faults as and when required.



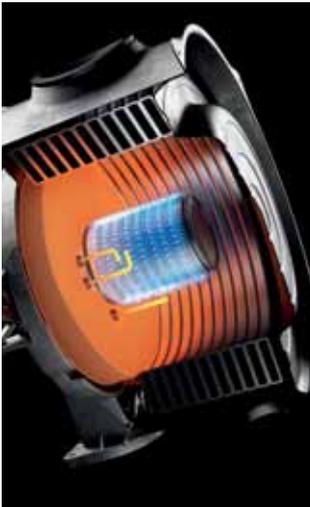
Clear energy cost savings thanks to modernisation of the steam boiler plant



The Economiser makes for efficient use of residual heat from exhaust gases.

#### Framework data

- Project duration: February to October 2015
- Vitomax HS Low-NO<sub>x</sub> (NO<sub>x</sub> class 3 < 80 mg/m<sup>3</sup>)
- Downstream exhaust gas heat exchanger
- Vitocontrol PLC plant controller
- Viessmann system maintenance contract
- Connection for operating data via modem to VIM I&S and WATTx



Matrix Plus burner

### Comprehensive range from the Viessmann Group

- Boilers for oil or gas
- Combined heat and power generation
- Hybrid appliances
- Heat pumps
- Wood combustion technology
- Plants for producing biogas
- Biogas treatment plants
- Solar thermal
- Photovoltaics
- Electric heating and DHW systems
- Refrigeration systems
- Accessories

### Milestones of heating technology

As an environmental pioneer and technological trailblazer for the heating sector, Viessmann has for decades been supplying exceptionally clean and efficient systems for heating, refrigeration and decentralised power generation. Many of the company's developments are recognised as milestones of heating technology.

### Acting in a sustainable manner

As a family business Viessmann takes the long view and places great value on acting responsibly; sustainability is firmly enshrined in the company's principles. For Viessmann, sustainability in action means striking a balance between economy, ecology and social responsibility throughout the company; meeting current needs without compromising the quality of life of future generations.

With its strategic sustainability project, Viessmann demonstrates at its own head office in Allendorf (Eder) that the energy and climate policy goals set by the German government for 2050 can in fact be achieved today with the help of commercially available technology.



We create living spaces for generations to come.

### Practical partnership

As part of its comprehensive range, Viessmann also offers a wide selection of complementary services. These services include a comprehensive training and further development programme for trade partners at the well equipped training facilities of the Viessmann Academy.

With its new digital services, Viessmann offers innovative solutions such as the operation and monitoring of heating systems by smartphone. Users benefit from greater reassurance and convenience, whilst contractors can keep a constant eye on the systems for which they are responsible.



Number 1 Trade Partner for the 14th consecutive time



Viessmann is one of the leading international manufacturers of efficient heating, industrial and refrigeration systems.

#### VISSMANN GROUP IN NUMBERS

1917

— Viessmann was founded

12 100

— employees

2,37

— billion euros Group turnover

55

— percent export share

23

— production companies in

12

— countries

120

— sales offices worldwide

74

— countries with sales companies and branches



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