

Combined heat and power units up to 401 kW_{el} and 549 kW_{th}





CHP units for heat and power

Tailor-made energy concepts for the provision of heat and power.

Combined heat and power modules (CHP modules) are compact energy generation units that provide a de-centralised (local) supply of heat and power with a consumer focus at an overall efficiency of around 90 %. Compared with a separate energy supply with power from a condensing power plant and heat from a boiler, primary energy savings of well over 30 % can be achieved. This is also linked to a corresponding reduction in pollution. Depending on the fuel comparison, this means the emission of up to 25 % less nitrogen oxide (acid rain) and around 60% less carbon dioxide (greenhouse gas).

An internal combustion engine is supplied with natural gas and combustion air from the installation room. This energy is converted into mechanical energy by the engine. A synchronous generator is powered via the coupling. This generates 400 V and 50 Hz three-phase current.

Via the integral control system, the generated current is routed in accordance with the relevant protection regulations to the on-site main distribution board. The waste heat from the engine oil, the engine coolant and the exhaust gas, is collected in the "internal cooling circuit" and made available to the heating system at a flow temperature of up to 90 °C.

CHP modules are primarily used to cover the heating base load and are complemented by peak load boilers. The generated power is used to cover own demand, whenever this is economical. However, in principle, a combined heat and power module means that there should be no power generation without heat consumption. And without power generation, there is no amortisation of investment and operating costs, which would therefore not be economical. The parallel generation of heat and power requires a simultaneous consumption of heat and power.



At the core of the CHP unit lies the gas engine.



When and where is the use of CHP beneficial?

The use of energy efficient engines makes CHP a powerful and high efficiency unit.

CHP unit viability

With the standard manufacture of CHP units powered by natural gas or biogas, Viessmann extends its comprehensive product range for applications requiring a medium output in municipal buildings and industrial and commercial enterprises. To ensure the economic viability of a CHP project operated with natural gas, it is recommended that the output is precisely matched to the heat and power demand.

CHP unit also with condensing technology

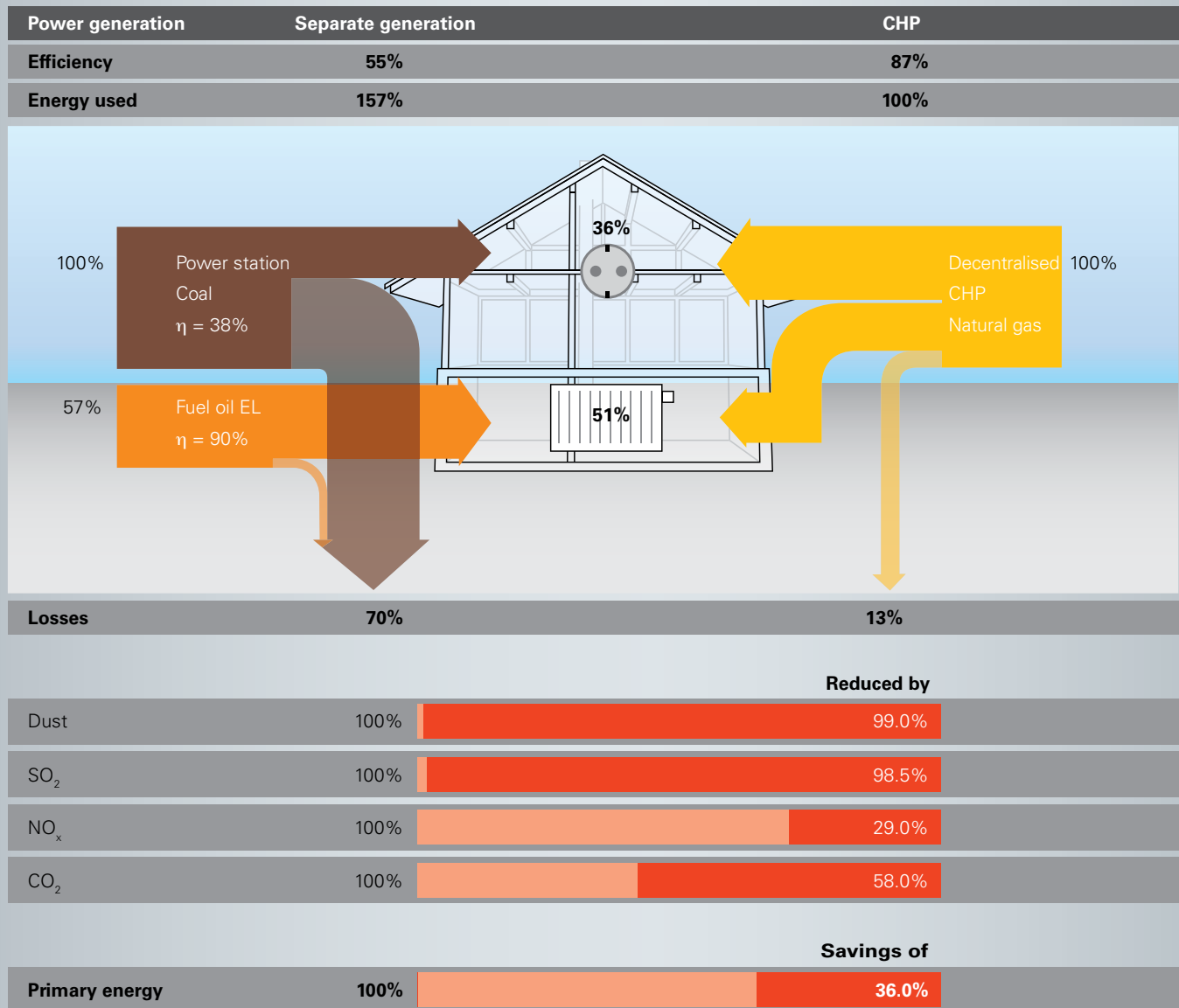
The Vitobloc 200, module EM-20/39, used in combination with a peak load boiler is ideal for residential complexes from 30 to 50 units, for medium-sized hotels, care homes and business showrooms, etc. With an overall efficiency of 94.9%, the CHP unit operates highly efficiently thanks to its condensing technology and is recommended both for new build and modernisation projects.

Operation in parallel mains and emergency power mode

All modules can be operated in parallel mains mode and optionally also in emergency power mode. This means that, in the event of a power grid failure, the Vitobloc 200 can supply the unit with power after a short start-up time.

Benefits at a glance

- High electrical efficiency through the use of energy efficient engines, resulting in the highest possible power bias for maximum economy
- All Vitobloc 200 units are capable of modulation
- Standard equipment level includes starting batteries and a synchronous generator. As a result, the CHP unit is equipped for mains substitution operation with no increase in the idle current demand
- Also suitable for demanding connection conditions, e.g. the $\cos \phi$ can be regulated
- Can be operated with natural gas, biogas, sewer and landfill gas
- Time and cost savings during engineering, installation, commissioning and operation through generous standard equipment level
- Longer service intervals through integral lubricating oil supply with optimised tank volume. Operating costs and idle times are reduced, as a result
- Factory tested units ready for installation; therefore minimum installation effort and tested output values
- Proven technology, with more than 2,000 installed systems worldwide
- Proven remote monitoring and automation systems
- Extensive service offer, e.g. different service options – from standard to full service



Source: ASUE

Combined heat and power units compared with conventional heating technology

Decentralised power generation

When power is generated in power stations (centralised power supply), heat is created that is often lost to the environment without being used. The utilisation of this heat, e.g. for heating buildings, reduces heat losses and

lowers emissions that are damaging to the environment. Combined heat and power generation enables up to 36% of primary energy to be saved and is therefore one of the most efficient energy-saving methods available today.

Attractive benefits to the user and environmentally responsible operation with high levels of efficiency

CHP units operate with great environmental responsibility. In addition to the primary energy savings of approx. 36%, CO₂ emissions are significantly lower compared to a conventional central power station. For this reason CHP technology will qualify for the exemption of the climate change fuel levy. It will also offer tax efficient investment delivering a helpful cashflow boost and a shortened payback period. In future it may reduce the potential cost impact of carbon reduction commitment legislation.

Top quality to retain high value

Only high quality components from well-known manufacturers are used in the manufacture of the CHP units. This guarantees high operational reliability, assured spare parts availability for many years ahead and consequently the system retains a high value.

The control panel is integrated into the CHP module for optimum space utilisation. The basic design of the CHP unit and control panel is identical in each module, and all components are easily accessible. This results in shorter servicing times and therefore reduced costs for the user.



As standard, the Vitobloc 200 is equipped with a synchronous generator and starting batteries.

Efficient heat and power supply with compact combined heat and power units

Vitobloc 200 CHP units are supplied with an electrical output from 5.5 to 401 kW_{el} and a thermal output from 11 to 549 kW_{th}

	<p>VITOBLOC 200</p>	<p>Module EM-6/15 Output: 6 kW_{el} 14.9 kW_{th} Fuel: Natural gas 3 cylinder gas engine, efficiency 94% (H_i)</p> <p>Module EM-9/20 Output: 8.5 kW_{el} 20.1 kW_{th} Fuel: Natural gas 3 cylinder gas engine, efficiency 95% (H_i)</p>
	<p>VITOBLOC 200</p>	<p>Module EM-20/39 Output: 20 kW_{el} 39 kW_{th} Fuel: Natural gas (biogas on request) 4 cylinder gas engine, efficiency 94.9% (H_i)</p>
	<p>VITOBLOC 200</p>	<p>Module EM-50/81 Output: 50 kW_{el} 81 kW_{th} Fuel: Natural gas (biogas on request) 4 cylinder gas engine, efficiency 90.3% (H_i)</p> <p>Module EM-70/115 Output: 70 kW_{el} 115 kW_{th} Fuel: Natural gas (biogas on request) 6 cylinder gas engine, efficiency 90.7% (H_i)</p>
	<p>VITOBLOC 200</p>	<p>Module EM-140/207 Output: 140 kW_{el} 207 kW_{th} Fuel: Natural gas (biogas on request) 6 cylinder gas engine, efficiency 90.4% (H_i)</p> <p>Module EM-199/263 Output: 199 kW_{el} 263 + 20 kW_{th} Fuel: Natural gas (biogas on request) 6 cylinder turbo charged gas engine, efficiency 89.6% (H_i)</p> <p>Module EM-199/293 Output: 199 kW_{el} 293 kW_{th} Fuel: Natural gas (biogas on request) 6 cylinder turbo charged gas engine, efficiency 89% (H_i)</p>
	<p>VITOBLOC 200</p>	<p>Module EM-238/363 Output: 238 kW_{el} 363 kW_{th} Fuel: Natural gas (biogas on request) 12 cylinder gas engine, efficiency 90.1% (H_i)</p> <p>Module EM-363/498 Output: 363 kW_{el} 498 kW_{th} 12 cylinder turbo charged gas engine, efficiency 89.7% (H_i)</p>
	<p>VITOBLOC 200</p>	<p>Module EM-401/549 Output: 549 kW_{el} 549 + 16 kW_{th} Fuel: Natural gas (biogas on request) 12 cylinder turbo charged gas engine, efficiency 92.7% (H_i)</p>

Comprehensive service for every system – from engineering to maintenance

Viessmann draws on extensive experience in commissioning and maintaining CHP units, offering flexible contracts to suit your requirements.

Payback and Government funding

Natural gas combined heat and power modules amortise within a few years - especially if they achieve long running operating times and the generated power is consumed.

The payback period on CHP will also shorten as electricity prices continue to increase, along with the price of gas.

To achieve the planned amortisation, CHP units must be serviced regularly to maintain the level of performance.

Commissioning and handover

Prior to despatch, each individual CHP unit is subjected to extensive tests on the in-house test bed. As part of these tests, specified output values for the unit are documented, keeping the effort when commissioning the system at the customer's premises to a minimum. Viessmann hands over these units fully tested and ready for use.

Each customer can assemble their own individual service package from several options according to their individual demands and requirements. This includes everything from commissioning and training, to complete operational management.

Maintenance contracts

Different maintenance contracts offer many options, allowing a flexible personalised contract to be found. A number of contract options are specifically tailored to public bodies.

100 Service Contract

The standard contract which is recommended to every customer. This includes regular maintenance as per the service schedule, labour and software support. The 100 Plus package also includes lubricating oil.

200 Service Contract

This contract includes additional overhaul repairs which go beyond the normal maintenance activity. Incorporating all 100 service package features, it is recommended for end-users who have little experience with CHP systems. The 200 Plus package also includes lubricating oil.

300 Service Contract

The 300 service contract includes all features from the 100 and 200 packages, along with unscheduled visits and replacement parts. This agreement is particularly useful for contractors and end-users who want absolute control of the overall operating costs. The 300 Plus service contract is equivalent to an extended warranty of up to 10 years.



Intensive test runs prior to delivery are, naturally, a must.

CHP powers Viessmann UK headquarters

Viessmann improves energy efficiency through the use of combined heat and power, by using a Vitobloc unit at it's UK base of operations.

In our goal to reduce the consumption of fossil fuels at our UK headquarters, we have installed a Vitobloc EM 18/36 CHP module to lower CO₂ emissions, as well as the carbon footprint of the site.

The building is headquarters to around 100 Viessmann employees and includes the UK training academy, technical services department as well as sales, marketing and product showrooms.

Providing power for the entire site, the unit is connected in parallel with the grid, adding it's own generated electricity to the building load. Heating from the Vitobloc EM 18/36 is fed into the buffer cylinder and injected into the main heating circuits. On site boilers provide additional heating if required.

- Vitobloc EM 18/36
- 7,000 run hours per year
- 115,000 kWh electricity generated per year
- 240,000 kWh free heat per year
- £7,000 total energy savings per year



Viessmann UK headquarters, Telford



Viessmann UK reception, Telford



CHP plant room, Telford

Reliability and economy: CHP units offer many advantages

Viessmann is a leader in the development and manufacture of CHP units with over 2,000 systems already installed.

Thanks to the comprehensive standard equipment level of its products, Viessmann can be proud of many satisfied customers.

Yarn Street, Leeds is a 1.75m residential project featuring 220 homes, a mixture of two to five bedroom houses and apartments.

In the two tier plant room, the Vitobloc EM70/115 CHP unit provides heating to all of the Yarn street properties. Working in conjunction with three Vitocrossal 200 condensing boilers and three 1,250 litre buffer cylinders.



Yarn Street residential project, Leeds

The overall system is operated as a local heating network:

- CHP:
Viessmann Vitobloc EM 70/115
- Boilers:
3 x Vitocrossal 200 CT2
- Heating water buffer cylinder:
3 x 1,250 litres

CHP units are not only the right choice for property developers of residential homes and housing estates; their efficiency and economy also make them equally attractive in many other applications. For example:

- **Commerce and industry**
Food processing, pharmaceutical and chemical industries, etc.
- **Tourism**
Pubs, hotels, etc.
- **Local and district heating associations**
Municipal authorities, contractors, etc



Worthing Pool, Worthing



BUPA care home, Luton

A comprehensive product range from the Viessmann Group



Boilers for oil
up to 116 MW heat or
up to 120 t/h steam



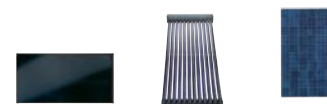
Boilers for gas
up to 116 MW heat or
up to 120 t/h steam



Solar thermal systems
and photovoltaics



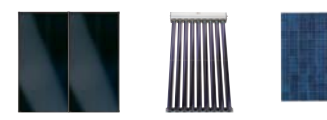
Detached houses



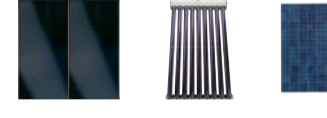
Apartment buildings



Industry/commerce/
municipal



Local heating networks



Individual solutions with efficient systems

The comprehensive range of products and services from Viessmann offers individual solutions with efficient systems for all fuel types and application areas. As one of the world's leading manufacturers, Viessmann offers intelligent, convenient and efficient systems for heating, air conditioning/ventilation, cooling and decentralised power generation. Viessmann products and systems are synonymous with the very highest efficiency and reliability.

Our comprehensive product range offers top technology and sets new benchmarks. By focusing on using energy efficiently, we can help cut costs, save natural resources and protect the environment.

Everything from a single source

The Viessmann range offers the right products and systems for every need. Our heating systems can be wall mounted or floorstanding and are suitable for detached houses, large residential buildings, commercial and industrial premises or local heating networks. Whether for modernisation or new builds, Viessmann is always the right partner for providing heating, cooling, steam and power.

The wide ranging expertise we have at our disposal in the group enables us to provide our market partners with perfect solutions. Our product portfolio is rounded off with a full range of services.



Wood combustion technology, combined heat and power generation and biogas production up to 50 MW



Heat pumps for brine, water and air up to 2 MW

Heating system accessories

Refrigeration technology



The comprehensive Viessmann product range: Individual solutions with efficient systems for all energy sources and application areas

The product range for all energy sources and output ranges

- Boilers for oil and gas up to 116 MW heat or 120 t/h steam
- Combined heat and power generation up to 50 MW_{el}
- Heat pumps up to 2 MW
- Wood combustion technology up to 50 MW
- Biogas production plants from 18 kW_{el} to 20 MW_{gas}
- Biogas upgrading plants up to 3000 m³/h
- Solar thermal systems
- Photovoltaics
- Accessories
- Refrigeration technology

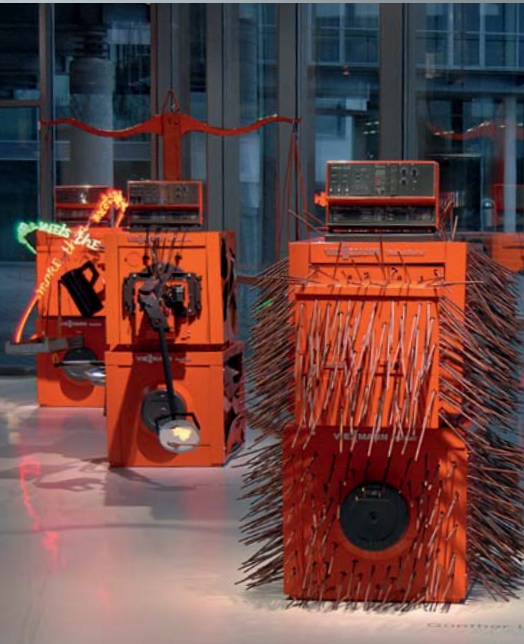
Maintenance and service

Whether it concerns commissioning, maintenance or troubleshooting – trade partners can count on the Viessmann Group for professional support. Our team will be more than happy to talk to you on the phone or in person. Our online tools can provide you with valuable tips, and if necessary spare parts can be delivered the next morning.

Training

The Viessmann Academy offers a wide range of courses, from business management seminars to technical training, designed to keep our trade partners abreast of the very latest developments in our industry.

The company



Viessmann – climate of innovation

Viessmann is one of the world's leading manufacturers of intelligent, convenient and efficient systems for heating, air conditioning/ventilation, cooling and decentralised power generation.

As a third generation family run business, Viessmann has been supplying highly efficient and clean heating systems for many decades.

A strong brand creates trust

Together with our brand label, our key brand message is an identifying feature throughout the world. "Climate of innovation" is a promise on three levels: It is a commitment to a culture of innovation. It is also a promise of enhanced product benefits and, at the same time, an obligation to protect the environment.

Acting in a sustainable manner

For Viessmann, taking responsibility signifies a commitment to acting sustainably.

This means bringing ecology, economy and social responsibility into harmony with each

other, ensuring that current needs are satisfied without compromising the quality of life for the generations to come.

We consider climate protection, environmental responsibility and resource efficiency to be key priorities throughout our company, which has more than 10,600 employees worldwide.

Example of Best Practice

With its strategic sustainability project, Viessmann demonstrates at its own head office in Allendorf (Eder) that the energy and climate policy goals set for 2050 can in fact be achieved today with commercially available technology. The results speak for themselves:

- Expansion of renewables to 60 per cent
- CO₂ emissions reduced by 80 per cent

The long-term goal is for the company to sustainably meet all of its own heating energy requirements.



2009/2011/2013:
German Sustainability Award for production, brand, efficiency with resources



Energy Efficiency Award 2010

Viessmann Group

Company details

- Established in: 1917
- Employees: 11,400
- Group turnover: €2.10 billion
- Export share: 55 percent
- 27 production companies in 11 countries
- Sales companies and representations in 74 countries
- 120 sales offices worldwide

The comprehensive product range from the Viessmann Group for all energy sources and output ranges

- Boilers for oil or gas
- Combined heat and power units
- Heat pumps
- Wood combustion technology
- Biogas production plants
- Biogas upgrading plants
- Solar thermal systems
- Photovoltaic systems
- Accessories
- Refrigeration technology



climate of innovation

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