

The efficient solution for electricity and heat – **Bosch combined heat and power units (CHP)**

BOSCH
Invented for life

Welcome to Bosch.

For well over a hundred years, the name Bosch has stood for first-class technology and exemplary innovation. Forward-looking CHP units are one of the many areas of expertise at Bosch Thermotechnik. As one of the leading providers worldwide, we support you with our wide range of products and services used for indoor climate, hot water and decentralized energy management. Whether it be condensing boiler technology, solar thermal energy, heat pumps, biomass boilers or combined heat and power, for private households or large industrial firms, our innovative solutions and outstanding quality ensure that you can generate heat and hot water in an efficient and environmentally friendly way. Bosch – a name you can trust.

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Bosch CHP units – efficiency at the whole new level
Simultaneously generating both heat and electricity – with this technical concept, our Bosch CHP units are definitely out to impress. Powered by a gas Otto motor, the generator of the complete module supplies electricity and heat to a heating system – boasting particularly high efficiency levels. In this way, you can considerably reduce your energy consumption in comparison with conventional, separate energy supplies. Even the environment benefits as climate-damaging emissions are minimised.

Bosch – a strong brand, top quality
It is not only our CHP units that stand out for their high quality, but also the wide variety of other products and services we offer. We owe this to you. Meeting your needs and expectations is our top priority. It is exactly for this reason that we call upon all our knowledge and experience. We measure ourselves against international standards and our own strict guidelines to which each of our employees feels a personal commitment. This enables us to reaffirm our brand's promises every day.

Bosch – we live innovation
New ideas have a long tradition at Bosch. This is thanks to thousands of researchers, engineers and technicians, who consistently help us to progress with their know-how, dedication and creativity. We focus our attention equally on developing new products and systematically optimising our existing products. The number of patent applications Bosch submits worldwide is just one indicator of our position as an international leader in innovation.

Benefit from double the efficiency straight away!

Rising energy prices make it harder to afford both heating and electricity costs. Therefore, with t he Bosch CHP units, you can now save energy in two ways. This means that your investment in a Bosch CHP unit will have paid itself off just after a few years.

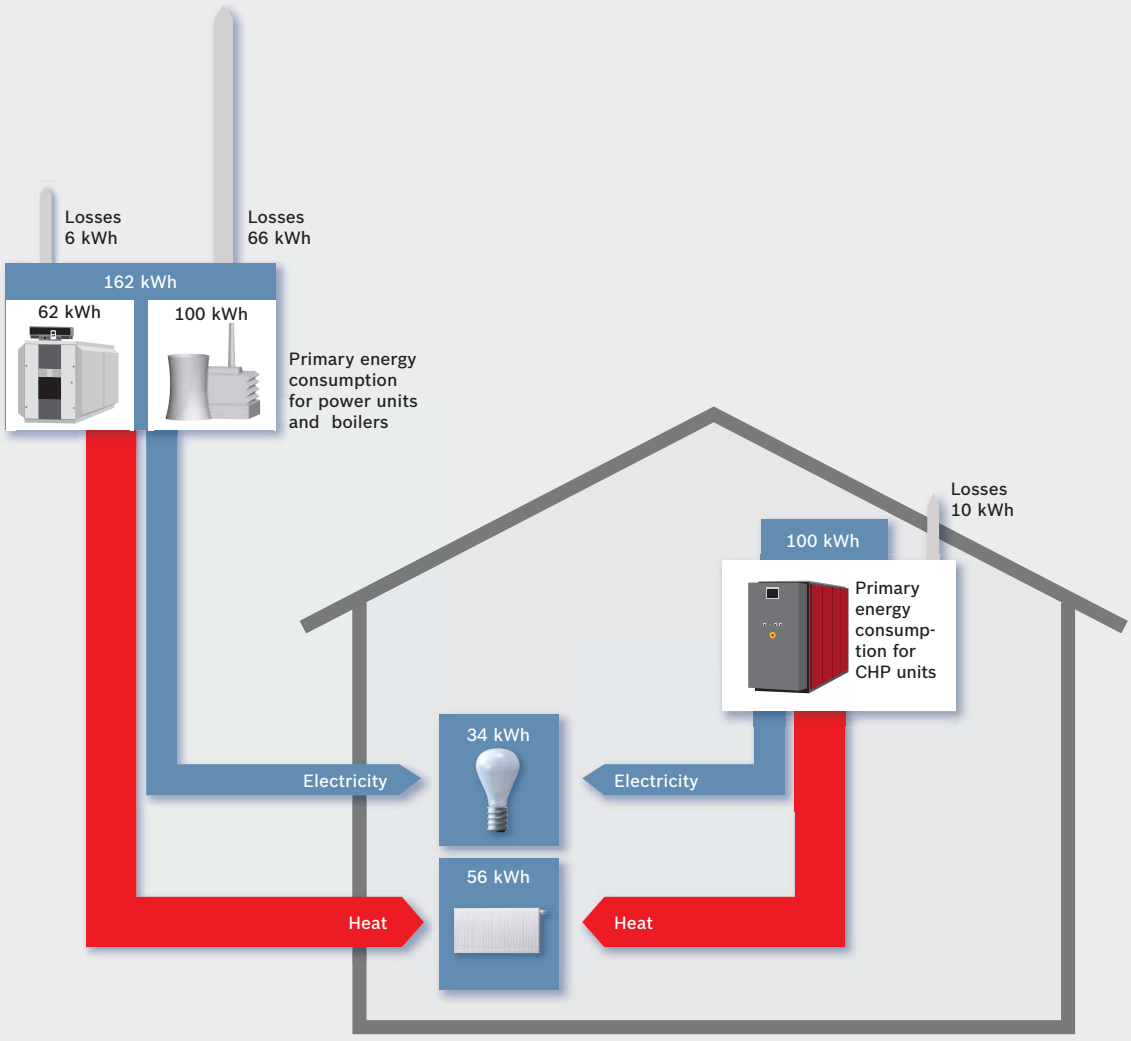
Performance that you can count on
Bosch CHP units are available with outputs ranging from 19 to 400 kW_{el}. The primary energy savings in comparison with a conventional solution can amount to 40 %. Our CHP units achieve a total efficiency of up to 105 %. To draw a comparison: when generating electricity using conventional power units and producing heat from boilers, a total efficiency level of only 56 % is achieved. Due to the high levels of efficiency guaranteed, your investment will have paid off just after a few years. Our CHP units are also highly reliable. This means you not only benefit from low energy costs, but also from a reliable supply of heat and electricity.

Good for both the environment and climate
Bosch CHP units not only protect your financial resources, but also our environment. This is because, ultimately, less gas is required to generate the same output as conventional solutions, and so emissions are also lower. This not only applies for CO_2 emissions; nitrogen oxide and carbon monoxide emissions are also well below the legal limits.

Innovative technology that makes assembly easy
You receive the Bosch CHP unit as a complete module, ready for installation. The base frame includes an engine, attachment parts, a generator, heat exchanger and cooling circuits. The complete electrical switch-board is already integrated. The module is elastically supported and it is equipped with effective sound insulation. All components are perfectly compatible in order to guarantee optimum efficiency in operation. The module can be effortlessly combined with a Bosch boiler. This enables you to implement your individual energy concept for supplying heat, hot water and electricity using technology from a single source – installation and start-up made easy!

The benefits:
- Especially low energy costs thanks to improved efficiency when combining electricity and heat generation
- Outputs ranging from 19 to 400 kW_{el}
- Protects the environment due to lower carbon dioxide, carbon monoxide and nitrogen oxide emissions
- Can be used as a safety power supply
- Ideal for cooling using absorber systems
- Can be effortlessly integrated into Bosch heating systems using technology from a single source
- May be incorporated into modern Bosch control technology hassle-free

Energy balance of a CHP unit in comparison with separate energy supply



In our example, the CHP unit generates 34 kWh of electricity and 56 kWh of heat from 100 kWh of primary energy (loss: 10 kWh). For separate energy supply (electricity generation in a power plant, heat generation in a boiler), a total of 162 kWh of primary energy must be consumed in order to supply the same quantity of electricity and heat (total loss: 72 kWh).

Perfectly designed, right down to the last detail

The Bosch CHP unit provides innovative and efficient technology with compact and space-saving dimensions. By combining optimum components, perfect hydraulic tuning and intelligent Bosch control technology, a future-proof solution is provided that meets your needs both today and tomorrow.

Efficiency in large quantities

The high-performance, reliable engines are mass-produced and have already proven themselves many times over. The dimensions of the combustion chamber, the suction area and the exhaust area have been optimised. A cooling water heat exchanger uses the heat in the waste gas for your heating system and transfers the heat directly to the hot water. The CHP variant, with an output of 19 kW_{el}, is equipped with a plate heat exchanger; the higher-performance variants with an output of 50 kW_{el} or higher are fitted with a smooth pipe heat exchanger. Lubricating oil consumption is pleasantly low. This is to your advantage maintenance intervals are longer.

Safety guaranteed by a synchronous generator

The synchronous generator ensures that you can use the solution in the high-performance CHP variants (with an output of 50 kW_{el} or higher) as required, both in isolated operation and in parallel with the main power supply. Moreover, the synchronous generator prevents reactive current from being supplied from the power supply.

It can be operated simply and conveniently by using the touchscreen

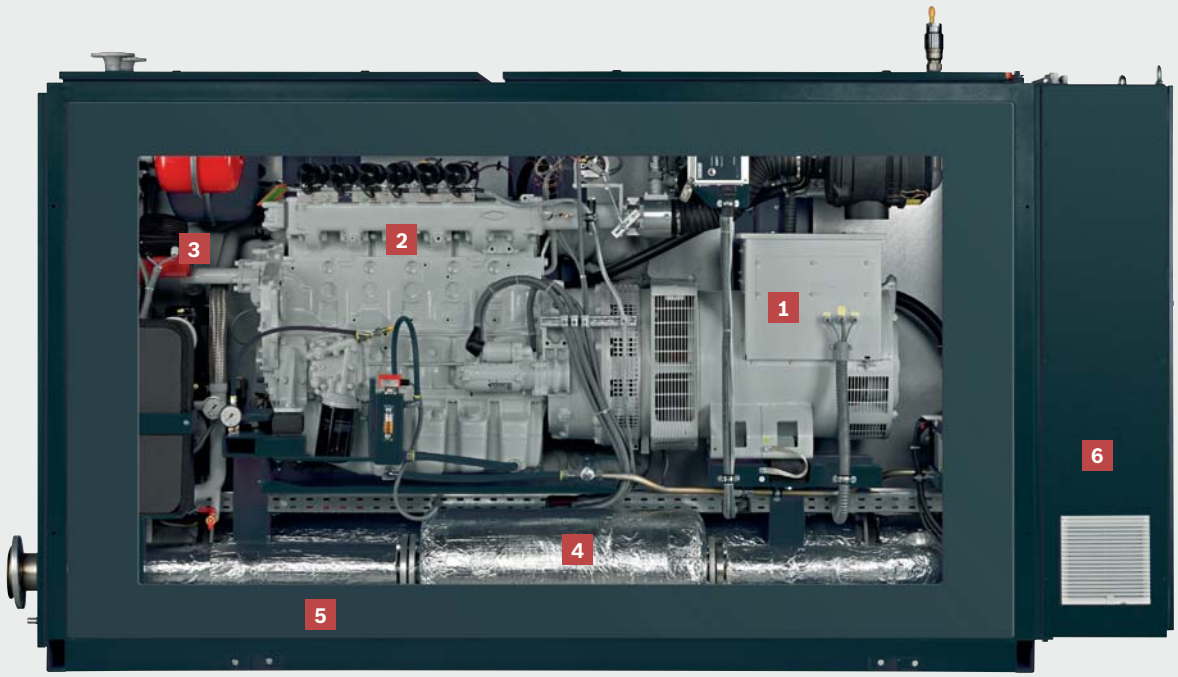
An easy-to-use control device has already been integrated into the CHP unit. The control device regulates and monitors the operation, start-up and stoppage phases of the engine, as well as synchronisation with the main power supply, and it also controls the auxiliary drives. An easy-to-use touchscreen serves as both a display and operating tool, which also allows you to make any adjustments directly and easily by simply touching the screen.

Condensing boiler technology for optimum energy yield

The waste gas heating heat exchanger makes an important contribution to the high level of overall efficiency. It also allows the heat of the condensed steam contained in the waste gas to be used, and in doing so, optimises the thermal yield. For the variant with an output of 19 kW_{el}, the waste gas condensing heat exchanger has already been integrated into the CHP module; for the higher performance variants, it is available as an optional accessory for external connection.

The colourful touchscreen allows convenient and easy operation. All adjustments can be made hassle-free by simply tapping the touchscreen – from synchronisation to maintenance.

Bosch CHP unit



1 Synchronous generator (for variants with an output of 50 kW_{el} and more)

2 Gas engine

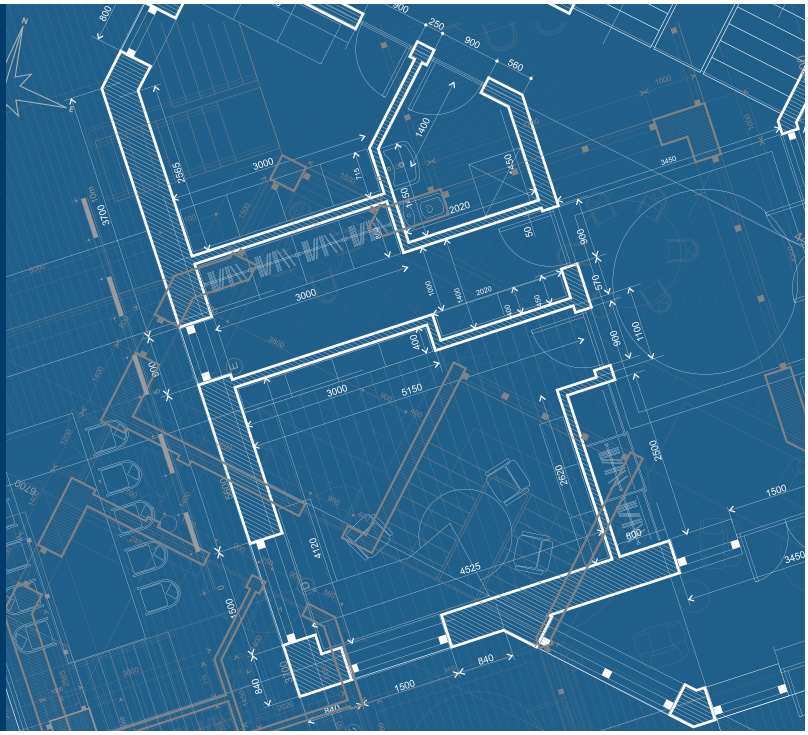
3 Heating hydraulics with a heating circuit pump, a 3-way valve with actuator, an expansion tank, safety valve and controller

4 Integrated primary sound absorber

5 Closed base tray

6 Integrated switchboard for controlling and monitoring

Technical data on Bosch CHP units – an overview



Type	CHP CE 19 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	80/60
Electrical output in kW_{el}*	19
Thermal output in kW_{th}	31
Fuel consumption in kW**	54
Modulation range in kW_{el}	9.5 – 19
Electrical efficiency level in %	35.1
Min./max. return temperature upstream of module in °C	30/60
Maximum permissible operating pressure in bar	6
Standard heating in K	20
Number of cylinders/arrangement	4/row
Operating weight in kg	1115
Unit dimensions:	
Length in mm	1900
Width in mm	900
Height in mm	1300

*Output must not be overloaded
**Output specifications according to DIN ISO 3046-1; values for continuous output in mains parallel operation

Type	CHP CE 50 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	50
Thermal output in kW_{th}	80
Fuel consumption in kW**	148
Modulation range in kW_{el}	25 – 50
Electrical efficiency level in %	33.8
Min./max. return temperature upstream of module in °C	50/70
Maximum permissible operating pressure in bar	6
Standard heating in K	20
Number of cylinders/arrangement	4/row
Operating weight in kg	2350
Unit dimensions:	
Length in mm	2930
Width in mm	960
Height in mm	1730

Type	CHP CE 70 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	70
Thermal output in kW_{th}	109
Fuel consumption in kW**	204
Modulation range in kW_{el}	35 – 70
Electrical efficiency level in %	34.3
Min./max. return temperature upstream of module in °C	50/70
Maximum permissible operating pressure in bar	6
Standard heating in K	20
Number of cylinders/arrangement	6/row
Operating weight in kg	2800
Unit dimensions:	
Length in mm	3275
Width in mm	960
Height in mm	1730

*Output must not be overloaded
**Output specifications according to DIN ISO 3046-1; values for continuous output in mains parallel operation

Type	CHP CE 140 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	140
Thermal output in kW_{th}	212
Fuel consumption in kW**	384
Modulation range in kW_{el}	70 – 140
Electrical efficiency level in %	36.5
Min./max. return temperature upstream of module in °C	50/70
Maximum permissible operating pressure in bar	6
Standard heating in K	20
Number of cylinders/arrangement	6/row
Operating weight in kg	4000
Unit dimensions:	
Length in mm	3730
Width in mm	1160
Height in mm	1930

Type	CHP CE 240 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	240
Thermal output in kW_{th}	374
Fuel consumption in kW**	669
Modulation range in kW_{el}	120 – 240
Electrical efficiency level in %	35.9
Min./max. return temperature upstream of module in °C	50/70
Maximum permissible operating pressure in bar	6
Standard heating in K	20
Number of cylinders/arrangement	12/V
Operating weight in kg	5200
Unit dimensions:	
Length in mm	4380
Width in mm	1510
Height in mm	1980

*Output must not be overloaded
**Output specifications according to DIN ISO 3046-1; values for continuous output in mains parallel operation

Type	CHP CE 365 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	365
Thermal output in kW_{th}	478
Fuel consumption in kW**	955
Modulation range in kW_{el}	185 – 365
Electrical efficiency level in %	38.2
Min./max. return temperature upstream of module in °C	50/65
Maximum permissible operating pressure in bar	6***
Standard heating in K	20
Number of cylinders/arrangement	12/V
Operating weight in kg	6500
Unit dimensions:	
Length in mm	4900
Width in mm	1660
Height in mm	2470

Type	CHP CE 400 NA
Generation of three-phase current in V/Hz	400/50
Flow/return of heating energy in °C	90/70
Electrical output in kW_{el}*	400
Thermal output in kW_{th}	500
Fuel consumption in in kW**	1038
Modulation range in kW_{el}	200 – 400
Electrical efficiency level in %	38.5
Min./max. return temperature upstream of module in °C	50/65
Maximum permissible operating pressure in bar	6***
Standard heating in K	20
Number of cylinders/arrangement	12/V
Operating weight in kg	6950
Unit dimensions:	
Length in mm	4900
Width in mm	1660
Height in mm	2470

*Output must not be overloaded
**Output specifications according to DIN ISO 3046-1; values for continuous output in mains parallel operation
***With the option of system separation heat exchangers

Intelligent teamwork
with renewable energy sources

If you are planning a new heating system with a Bosch CHP unit, you should also factor renewable energy forms into your plans. This is because the intelligent combination of different heat generators creates multivalent regenerative multi-component systems which not only guarantee excellent total efficiency levels, but also ensure that energy costs remain low for the long term.

Optimally combining the benefits of various technologies

The Bosch CHP unit allows electricity and heat to be efficiently produced from gas. Integration into a heating system and the additional use of renewable energy forms creates a multivalent regenerative multi-component system, which enables you to improve efficiency even further. For example, it could be that: you add a Bosch gas condensing boiler and an air to water heat pump to the CHP unit. In addition to combined heat and power, you also have the advantage of free environmental heat, which is supplied by the heat pump. This is not only extremely economical, but it is also favourable for the environment, as fossil fuels are spared and fewer emissions are produced.

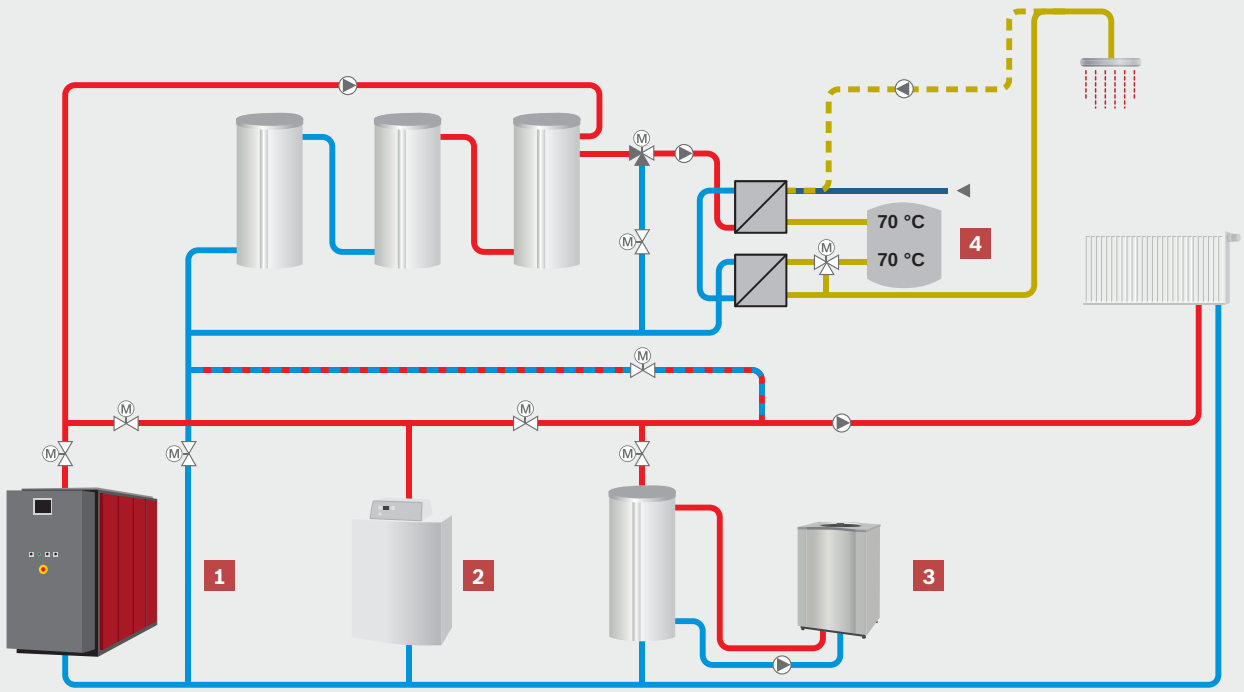
Easily installed, perfectly regulated

Thanks to standardised connections on the upper side, the Bosch CHP unit can be quickly and easily integrated into a multivalent regenerative multi-component system. The thermally actuating shut-off device and the solenoid stop valve, that closes without the use of an electrical current, are also mounted externally for the gas connection. Connecting a Bosch gas condensing boiler is quick and hassle-free. Furthermore, a heat pump can be integrated into the overall system in just a few simple steps. Even at relatively low outdoor temperatures, it still supplies heat for the hot water. In this way, Bosch's high-performance energy management system without doubt represents the perfect combination of all components of the entire system – no matter what time of the year.

The benefits of a multivalent regenerative multi-component system at a glance:

- Ideal for both the new construction of large objects and for modernising old builds
- Significant energy savings and reduced CO_2 emissions thanks to efficient fuel consumption and the use of renewable energy sources
- Thermal heat supplied by a heat pump even at low outdoor temperatures
- Optimum control of system components by means of intelligent control technology
- Easy installation and maintenance

Example of an hydraulic system



1 Bosch CHP unit

2 Modern Bosch gas condensing boiler

3 Bosch air to water heat pump

4 Energy and storage management

Perfectly planned with optimum support

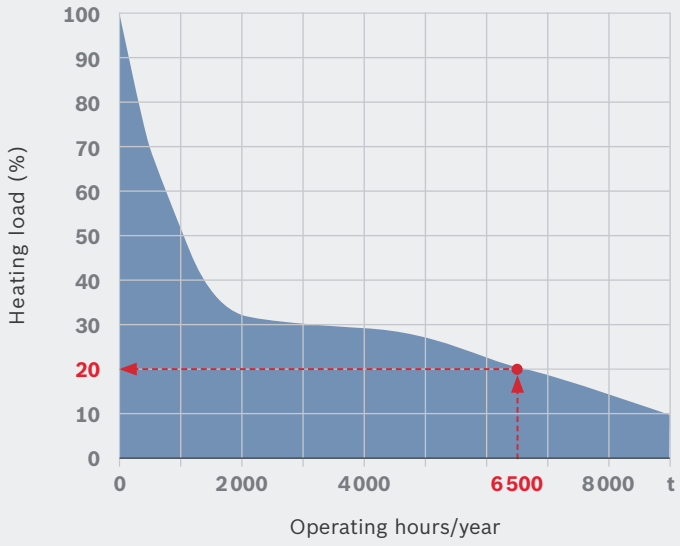
A prerequisite for the successful use of CHP units is thorough planning. We would be glad to advise you on your project and offer you additional, comprehensive services for the planning phase.

Exact configuration as a basis for your success
Hotel, business park or industrial application: our CHP units cater for a wide range of applications and enable you to save energy more easily. Our large selection of suitable heating systems and switchboards allows your system to be tailored exactly to your individual requirements, thereby guaranteeing maximum economic efficiency, so that your investment in a CHP unit pays off in just a few years.

If your CHP units primarily supply heating to a residential building, the capacity is calculated to be between 10% and 20% of the heating load. A conventional boiler system then covers the heat peaks. Alternatively, you can use the CHP unit primarily for generating electricity. With an electrical output of 50 kW or higher, the use of an emergency power system is recommended. This way you won't need to buy the otherwise necessary generator. If the heat generated cannot be used immediately, it is often worthwhile installing an adequately sized buffer storage tank. Moreover, you can also use the CHP unit in buildings with air conditioning in the summer in order to supply an absorption cooling machine.

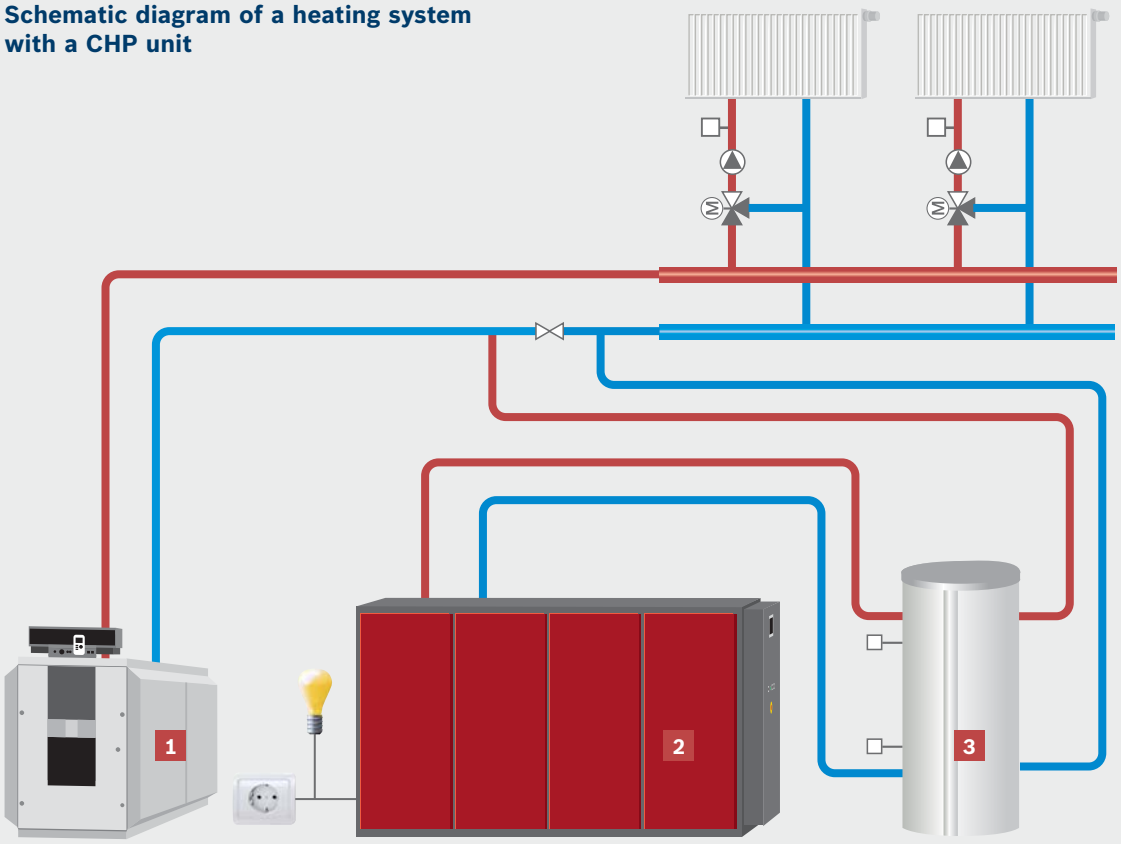
Efficiency even at the consultation stages
The question of whether heat or electricity supply is the decisive factor when deciding on a CHP unit is not an issue at Bosch. Thanks to our wide range of services, we can make sure you receive the best advice and the perfect solution to meet your individual needs. In addition, in the planning phase, we can support you by providing high-quality services – from cost comparison, to setting up your system configuration to optimised planning software. Simply ask us and benefit from our extensive Bosch expertise in the field of thermotechnology.

Ordered annual duration curve (example)



If the CHP unit is set to generate 20% of an object's heating load (dotted lines), the unit will account for base load in heat production relability and efficiently during heat production. In other words, this means: the unit is optimally used for the majority of the year (6500 operating hours). Connection to another conventional boiler system is only required for covering heat peaks.

Schematic diagram of a heating system with a CHP unit



1 Peak load boiler

2 Combined heat and power unit

3 Buffer storage tank

For which tasks is the CHP unit suitable?

Area	For example:	Energy requirement		Energy costs	Suitability of CHP unit
		Heat	Electricity		
building heating (individual supply)	apartment buildings	o	+	+	limited
	hotels and conference facilities	+	+	+	yes
	restaurants and guest houses	+	+	+	limited
	residential and nursing homes	++	+	+	yes
public facilities (object supply)	administrative buildings	o	+	–	limited
	sports facilities or schools	o	o	–	limited
	indoor and outdoor pools	+	+	+	yes
	hospitals	++	++	o	yes
process heat (industrial heat generation)	commercial enterprises	++	+	–	limited
	industry	++	+	––	limited
	absorption cooling	+	o	+	yes
local heating wide-area supply	local heating supply	+	o	+	yes
	terraced housing	o	o	+	limited
	residential areas	+	+	+	yes

++ very high + high o moderate – low –– very low

Bosch Thermotechnik GmbH
Sophienstrasse 30 – 32
35576 Wetzlar
Germany

info@bosch-industrial.com
www.bosch-industrial.com