Make the most of fuel

Combined Heat and Power portfolio

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Add more value to your business

Widely available electricity and heat are what make our modern industrial civilization possible. Today, more than ever before, the challenges posed by climate change, environmental protection laws, and fluctuating prices mean that future-oriented businesses must strive for energy efficiency. Not only by investing in renewables, insulating their buildings, and improving industrial processes, but also by exploring the advantages of Combined Heat and Power (CHP).

**Efficiency**
Putting resources to the best possible use is crucial, but most plants only utilize a fraction of their fuel’s energy. CHP, also known as cogeneration, is a very efficient, established technology for simultaneous output of usable heat and power.

**Sustainability**
It makes sense to invest in sustainable technology. Not only to significantly minimize CO₂ emissions and comply with regulations, but also to make the most of the resources at hand. CHP plants feature cutting edge combustion technologies and may even allow you to switch to a lower-carbon fuel.

**Availability**
To remain successful, each industry needs stable production processes and, ideally, zero downtime. Energy reserves must be readily available, and reliable power supply is essential. In modern CHP designs, redundant layouts and remote diagnosis ensure that your productivity remains consistently high.

**Turnover**
CHP plants fit the bill, offering fuel savings of up to 40 percent. By investing in CHP, you can lower your energy costs – and possibly generate additional income by exporting electricity to the grid.

Are you ready to give your business a boost?
With a comprehensive portfolio of gas and steam turbines and extensive plant construction expertise, Siemens is a leading player in the CHP market, and field-proven in thousands of plants worldwide. Our references span from industrial applications to utilities.
A wide range of applications

Each industry needs energy – but each one is unique. So it’s not enough to develop a “one size fits all” approach or a standard CHP. Take advantage of our 130 years of experience – together, we will identify and develop the ideal solution for your specific business case.

When selecting and designing a CHP system, the first questions to answer are:

• What fuel(s) are available?
• Which of these is the most economical choice?
• How much flexibility is required?

Let’s talk! Together, we’ll find the solution best suited to your needs.

Industrial power generation (power users)
- Chemicals and plastics
- Textiles
- Building companies and infrastructure
- Mining and minerals
- Metals, ceramics, glass
- Independent power producers
- Municipalities
- Food and beverages
- Auto and parts
- Oil and gas industry
- Tissue
- Sugar and refined sugar
- Utility

Electric power industry (power producers)
- Power producers
- Independent power producers
- Municipalities

High-quality fuel or low-cost fuel?

High-quality fuel
If gas or oil is your fuel of choice, a high efficiency layout featuring a gas turbine and a heat recovery steam generator (HRSG) may be the best solution.

Low-cost fuel
If you prefer a less cost-intensive fuel (e.g. wood, waste), a direct fired boiler can be combined with a downstream steam turbine.

Heating steam or process steam?

Process steam (high temperature)
If process steam with high temperatures (>300 °C) is called for, the steam may be extracted directly from the steam generator.

Heating or process steam (low temperature)
If the primary goal is heating or you need low temperature steam for your process, it’s recommended that the steam in a steam turbine is expanded. This maximizes the electrical efficiency of the plant.

Independent power and heat production?

Heat supply without power generation
Heat storage enables supplying the heating system even when the power generation equipment is shut down.

Highest operational flexibility
A condenser enables expansion of the steam in the steam turbine even when no process or heating steam is required.
A competitive edge in textiles
Grupo Kaltex, Mexico

Textile manufacturing is a very competitive market. To cut electricity costs and improve process quality, Kaltex switched from a two-phase process (power from the public utility grid, steam from gas-fired boilers) to a CHP solution, combining an SGT-750 gas turbine with an electrical generator and a heat recovery steam generator (HRSG). The results: reliability up, costs down, market advantages gained.

Fuel: natural gas
Live steam: 242 °C and 17.5 bar
Maximum heat output: 40 MWth
Maximum power output: 35 MWel

Putting wood chips to good use
Simmering, Austria

The Simmering biomass power plant is particularly eco-friendly – it burns waste produced when cultivating forests. And cutting-edge combustion technology saves close to 144,000 tons of CO₂ each year. Thanks to CHP, the plant makes optimum use of the wood chips, providing about 41,000 Viennese households with power and 17,000 households with district heat.

Fuel: biomass (wood chips)
Live steam: 520 °C and 120 bar
Maximum heat output: 35 MWth
Maximum power output: 24.5 MWel

There’s more than one proof of real competence
A record-breaking powerhouse
Stadtwerke Düsseldorf, Germany

The powerful heart of this power plant is an SGT5-8000H gas turbine. Together with the downstream steam turbine – an SST5-5000 model – it generates 603.8 MW of electrical power. To supply the city of Düsseldorf with district heating, steam is extracted from the low-pressure section: up to 300 MWth in CCGT operation.

Fuel: natural gas
Live steam: 600 °C and 175 bar
Maximum heat output: 300 MWth
Maximum power output: 604 MWel (in current mode)

CHP expertise in New York City
Riverbay Co-op City, USA

At Co-op City, the world’s largest cooperative housing development, two SGT-400 gas turbines and one SST-300 steam turbine produce around 40 MW of electricity, up to 16 MW of which can be exported to the grid to increase revenue. Steam generated by exhaust heat keeps residents warm in winter and – via absorption chillers – cool in summer, too.

Fuel: natural gas
Live steam: 399 °C and 59 bar
Maximum heat output: 19 MWth
Maximum power output: 40 MWel

Efficient turbines for productive pulp
Klabin, Brazil

Two turbines supply electricity and process steam to a factory producing 1.5 million metric tons of pulp annually. The SST 800 is one of the largest steam turbines used in the pulp and paper industry worldwide. Approximately 150 MW of electricity, or more than half of the total of 270 MW produced, is fed into the national power grid.

Fuel: wood, biomass
Live steam: 498 °C and 100 bar
Extraction steam pressure: 10 bar / 145 psi
Exhaust steam pressure: 5.4 bar / 78.3 psi
Maximum power output: 190 MWel

Wise use of precious resources
Amata B.Grimm, Thailand

Natural gas reserves power a large portion of the Thai economy. But these resources are limited, so making the most of fuel is essential. With two combined cycle cogeneration plants, each featuring a pair of Siemens SGT-800 gas turbines and one SST-400 steam turbine, Amata B.Grimm provides highly efficient power and steam to the local industrial area.

Fuel: natural gas
Live steam: 525 °C and 76 bar
Maximum power output: 2 x 166 MWel

Combined Heat and Power | Make the most of fuel
Our products set standards worldwide

The Siemens CHP portfolio is an invitation to our customers to choose the most suitable solutions and components and, if applicable, integrate them in existing systems. Our experts are happy to support you and your project as extensively as you wish. From consultation, to plant design, to a full turnkey solution.

Power plants
As one of the world’s leading OEM-EPC providers, Siemens has more than 130 years of experience in constructing turnkey power plants. Our tailor-made, integrated solutions ensure maximum compatibility of all components and hence extremely high efficiency levels and low emissions. Because time is money, we worked towards even faster implementation. The highest environmental and health and safety standards are an integral part of our projects.

Gas turbines
With our gas turbines’ capacities ranging from 4 to 450 MW, we can provide appropriately sized models for all operational applications. Whether it is about candy production or city lighting – our turbines’ superior efficiency, fuel and operational flexibility, as well as environmental compatibility, ensure the best performance in a vast range of contexts.

Steam turbines
By setting industrial standards from the beginning, Siemens has established itself as a global leader with over 20,000 steam turbines delivered across the world. Their operational flexibility makes them an ideal choice for cogeneration.
Engine-based solutions
CHP systems don’t need to be full-sized industrial giants. Siemens provides fully packaged CHP systems (also containerized), designed around the highly efficient Siemens engines. Individual CHP engine systems range from 300 kWe to 2,000 kWe. Any gas-fueled Guascor® engine can be specially configured for applications involving heat recovery: greenhouse farming, district heating, hospitals, data centers, municipal facilities, sewage plants, and more.

Generators
Siemens offers a comprehensive portfolio of generators for the 25 to 2,235 MVA power range. They achieve efficiency levels of up to 99 percent. Generators of our SGen series are operating around the globe with an installed fleet of more than 2,500 units.

Heat recovery steam generator (HRSG) and boilers
NEM Energy is a globally leading supplier of custom-made solutions in the field of heat recovery steam generators, industrial and utility boilers, and related equipment. NEM’s HRSGs take up the largest portion of the company’s activities. It has powered over eight hundred steam generators on all continents for many different industries and a wide variety of applications. NEM also delivers direct fired boilers, process boilers, and components for power plants like diverters and dampers, as well as engineering and maintenance services.

Instrumentation, Controls and Electrical
The Siemens Power & Process Automation (SPPA) family has been designed to maximize the potential of individual plants as well as entire fleets. We cover the full spectrum of CHP plant instrumentation, controls, electrical engineering, and IT solutions. SPPA installations have been supplied to more than 2,700 plant facilities worldwide, contributing immensely to optimizing operational processes.

Services
Thanks to our full-service portfolio, we have all the necessary in-house capabilities to make your cogeneration project a success. Our tailor-made services help increase the reliability, availability, and profitability of your assets. Maintenance solutions are geared towards increasing efficiency and ensuring your technical equipment remains state-of-the-art. Using the latest in digital tools, we are able to transfer our deep, technology-rich knowledge base to increase your competitiveness. And remote monitoring centers staffed by experts offer immediate support 24 hours a day.
Tailored financial solutions to drive business models of the future

Financing
Major plant upgrades or improvements need to be supported by secure financing and reliable risk management. Siemens Financial Services provides years of experience in the assessment of financial viability, as well as in providing equity and debt capital. The close cooperation with other Siemens units enables reliable long-term planning and opens up synergies most other companies cannot provide.

- Sovereign risk insurance
- Senior loans: construction, term, and revolving
- Financial advisory
- Junior capital products: subordinated loans, holding company loans, mezzanine debt
- Equity investments (preferred and common)
- Project development

The best foundation for a powerful business?
A strong partnership

For over 130 years, we have been helping companies make the most of fuel - in all countries and for the most varied requirements. Whatever your challenge is, we are with you from the start, focusing on your overall business success by increasing turnover, reducing costs, and ensuring reliability. Whether you require a simple or a combined cycle solution, and whether you’re an industry client, a utility, or an independent power producer, we’ll help make your plant more flexible, reliable, and efficient.