

■ Combined-Cycle Power Plants

High-Efficiency Combined-Cycle Power Plants are widely used for electricity generation, mostly using natural gas.

How does it work?

As the gas is burnt in a turbine (1), it drives a generator (2) that produces electricity. Then, the heat carried in the exhaust gases of the gas turbine is recuperated in a Heat Recovery Steam Generator (HRSG)(3), which boils water like in a thermal power plant. This steam is then sent through a steam turbine (4) connected to the generator (2), thus producing additional electricity.

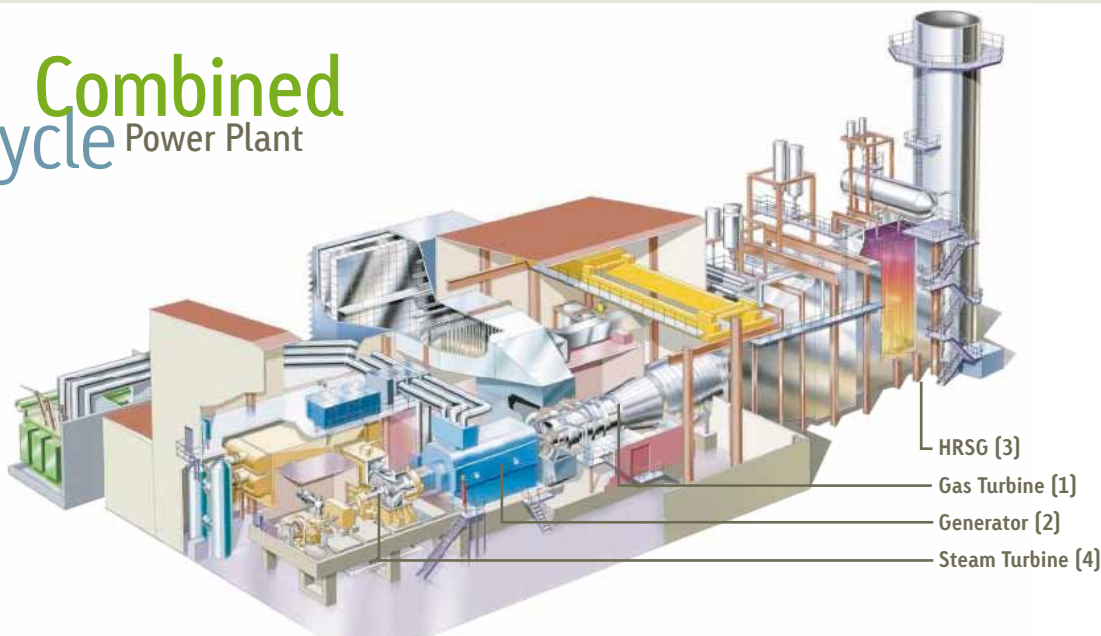
■ Efficient and green

Combined-cycle power plants are the most efficient fossil-fuel power-generating facilities. They have the ability to transform close to 60% of the energy contained in their fuel (in a car, less than 20% of the petrol burnt actually moves the vehicle) into electrical energy, thus emitting less CO₂/kWh than any other fossil-fuelled plant.

CO₂ emissions could be further reduced by more use of waste heat and by the addition of Carbon Capture and Storage technology, which would make the power plant a near zero Carbon Dioxide emitter.

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**Combined
Cycle Power Plant**



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**Thermal Power Plants
Combined Cycle Power Plants**



European Power Plant Suppliers Association

Thermal Power Plant

■ Thermal Power Plants

Thermal power plants (biomass, coal and gas) have been the backbone of world electricity generation for decades. They have proven to be a reliable source of electricity, available at virtually all times and their technology continues to improve.

■ Coal and Biomass Plants

A classic thermal power plant uses the energy contained in biomass or coal in order to provide heat for a boiler [1]. This boiler then sends high pressure steam through a turbine [2], causing it to turn. This turbine is connected to an electricity generator [3]. Flue gases are cleaned [4] before exiting the stack [5].



■ Coal and Biomass Supplies

Coal is the most abundant fossil fuel on Earth. It is estimated that coal reserves will last for the next 200 years, or more than 3 times as long as the calculated natural gas reserves. Furthermore, it is easy to access / stockpile and European supply is secure. Approximately half of the coal consumed in the EU comes from member states, and the other half is imported from a wide range of stable sources. This is in stark contrast with the oil or gas markets.

Biomass is a sustainable renewable resource mainly used for comparatively small-scale electricity generation [typically 5-20 MW].

■ Increased Plant Efficiency

Carbon Dioxide (CO₂) emissions are an unavoidable consequence of using fossil fuels. Increasing the efficiency of the power plants will lead to a reduction in emissions. This is the first target of EPPSA members.

Better use of fossil fuels means cheaper and less polluting energy while conserving natural resources. It is the quickest and easiest way to reduce CO₂ emissions from power plants. Increasing European coal-fired power plants efficiency drives all of EPPSA's members' efforts.

■ Zero-Emission Plants

The ambitious EU guidelines on the reduction of CO₂ emissions demand lower-carbon electricity. EPPSA believes it will be possible, within less than a decade, to have a safe, highly reliable and near zero carbon emitting energy source by combining State-of-the-art thermal power plants with Carbon Capture and Storage (CCS). The first steps, increasing the operating efficiency of power plants and boosting CCS research, development and demonstration can be taken immediately if sufficient financial resources are available.