



When you use an engine to drive an alternator, to generate energy, the process is less than 40% efficient. The remaining 60% of the energy is lost as hot air and exhaust.

Now, we can harness this lost energy, and put it to good use, making the process over 80% efficient!

What is CHP?

CHP or Combined Heat and Power, is the simultaneous production of heat and electricity from a single source, close to where they are to be used. This means that the heat and electricity generated can be used extremely efficiently because there is no energy wastage or loss during transportation to another site.

Genelec is at the forefront of new micro-CHP technology development. Our systems are ideal for use in houses or smaller commercial settings. These systems may also be implemented in larger scale power plants, either as a retrofit, or as a new build, particularly suitable in commercial or industrial establishments needing both hot water and electricity, such as hotels, hospitals, factories... We also provide complete Diesel and gas powered power generation plants, CHP ready.

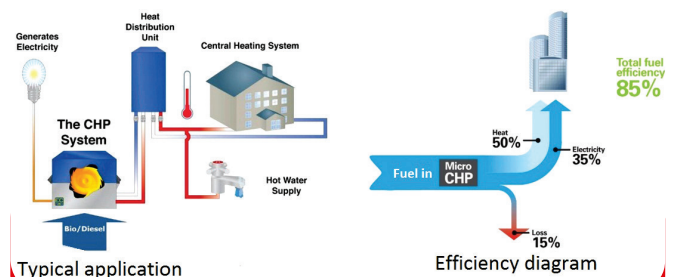
How it Works

Heat demand drives the operation of the micro-CHP system. The electric power thus becomes a by-product, being produced at very low cost. The main advantage of micro-CHP is that the energy in the fuel is almost fully utilized. This stands in contrast to conventional power plants, where substantial amounts of heat are lost into the atmosphere or in cooling water.

Where required, it is also possible to use the hot water produced through waste heat recovery, in order to generate cold water, using a special process. This cold water can then be used to feed an industrial process, refrigerators or fan coil units, for air conditioning purposes. This practice is called tri-generation or CHP.

The Benefits of Micro-CHP

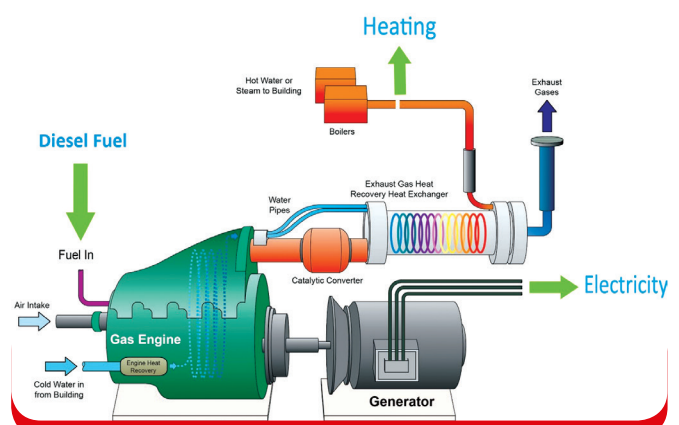
- **Carbon savings.** By generating electricity on-site you could be saving carbon dioxide compared with using grid electricity and a standard heating boiler.



- **Installation is easy.** If you already own a genset, fitted in a soundproof canopy, or in a dedicated generator room, it is highly likely that we can retrofit it with a heat recovery system. Electrically, there will be no change to your installation. With the addition of the CHP equipment, we need to have access to your old boiler installation. Our equipment will connect to it easily.

Implementation

Genelec Micro CHP systems meet the needs of single- and multi-family homes, hotels and hospitals and other commercial applications. The technology is scalable, so theoretically, there is no limit to the amount of heat, or electricity which may be produced by the system. Contact us for a site survey and complete energy audit, so we can assess your needs and put together a customised solution. Imagine heating your home for free, while generating electricity!



CHP Applications

Diesel fuel is used to drive a generator which provides electricity for use within the home; the cooling water from the engine is used to heat the home. In the case of engine-based micro CHP a total of around 70 - 80% of the energy value of the fuel is converted into heat, principally in the form of hot water which is used for space heating and domestic hot water production as in a normal central heating system. Between 10 - 25% is converted into electricity, and the remainder (5 - 15%) is lost in the flue gases.

CHP technology also exists in a wide variety of energy-intensive facility types and sizes globally, including:

- Industrial manufacturers - chemical, refining, ethanol, pulp and paper, food processing, glass manufacturing
- Institutions - colleges and universities, hospitals, prisons, military bases
- Commercial buildings - hotels and casinos, airports, high-tech campuses, large office buildings, nursing homes
- Municipal - district energy systems, wastewater treatment facilities, schools
- Residential - multi-family housing, planned communities

Single Family System

One of the primary applications for the Genelec micro CHP system, is heat and electricity generation for single family residences.

- A key element in making Genelec micro CHP systems work efficiently is having adequate demand for building heat and hot water. If your home uses hot water derived heat (boiler and hydronic delivery system) then your residence is suitable. The system also works in forced air heating applications. Domestic hot water, swimming pools, etc.
- Generally speaking, larger homes (> 230 sq. m) have a better chance of justifying a cogeneration unit because of their higher energy usage. Very large homes can be designed with multiple units.
- By utilizing the CHP system, the need for another hot water heater is eliminated - thus saving energy. A separate tank is needed.

Trigeneration

Trigeneration or combined cooling, heat and power (CCHP), is the process by which some of the heat produced by a CHP system is used to generate chilled water for air conditioning or refrigeration. An absorption chiller is linked to the combined heat and power system to provide this functionality.



Absorption chillers provide an economical and environmentally friendly alternative to conventional refrigeration. Combining efficiency, low emission power generation equipment with absorption chillers allows for maximum total fuel efficiency, elimination of harmful refrigerants and reduced overall air emission.

Trigeneration systems supply energy in three forms:

1. Electricity
2. Heat
3. Chilled water

Benefits of Trigeneration

- Reduced fuel and energy costs
- Lower electrical usage during peak summer demand
- Engine heat can be used to produce steam or hot water for onsite use
- Significant reductions in greenhouse gas emissions
- No harmful chemical pollutants since water is used as the refrigerant
- Temperatures of 4 - 5 Celcius may be achieved, to drive fan coil units for refrigeration or air conditioning purposes
- Production of electricity that can be fed into the power grid or used to cover the plant's electricity requirements
- During the cold seasons, the heat can be utilised to cover the heating requirements
- Absorption chillers have no moving parts, therefore there is no wear and maintenance costs are low.
- Absorption system has noiseless operation
- Low operating costs and lifecycle costs
- Using water as a refrigerant replaces the use of ozone damaging substances.

We provide these systems as a turn key solution, either together with a brand new energy system, or as a retrofit to your existing power plant.

Black Box Lebanon

Acar Bldg, Arz Street, Saifi, Beirut
P.O.Box: 175304, Gemmayzeh - Beirut
T: +961 1 443773 - M: +961 76 559952 - F: +961 1 445795
Email: sales@acarglobal.com | www.acarglobal.com

Black Box KSA

93 Prince Hathool Bin Abd El Aziz St., King Fahd District - Riyadh
P.O.Box: 10438 Riyadh 11432, Saudi Arabia
T: +966 11 2107737 - M: +966 50 3163582 - F: +966 11 2106930
Email: salesksa@acarglobal.com | www.acarglobal.com