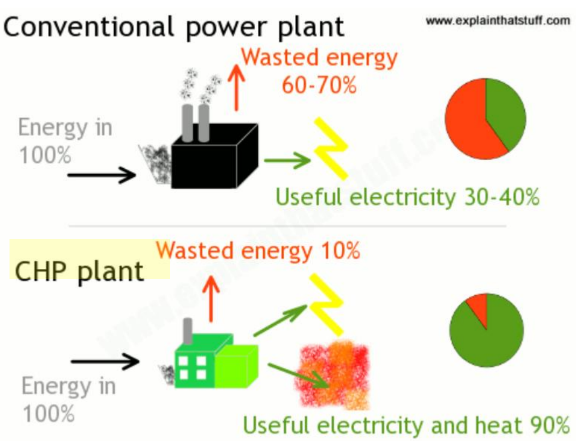
Gas generator sets

MTU gas generator sets are fueled by natural gas, biogas or other gases and are perfect for a wide range of applications. Whether it's continuous, standby or prime power, power generation or combined heat and power production (CHP), MTU is the solution

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Combined Cooling Heat and Power / Co-generation

Southern California Gas Company



INTRODUCTION

Cogeneration with gaseous-fueled engine-generators has delivered substantial benefits for many years. In Europe and North America, it provides extremely cost-effective electricity and heating in numerous commercial and industrial settings. In Asia and elsewhere in the developing world, it provides a steady source of electricity where utility power reliability and quality are inconsistent – while also delivering heat for process industries that help drive economic growth.

Today, the future of cogeneration looks brighter than ever. Shale gas development made possible by hydraulic fracturing (fracking) has driven North American natural gas prices down to levels not seen since the 1990s. Average wholesale prices fell 31 percent in 2012[1], and recent prices generally have ranged from $3 to $5 per MMBtu. This helps enable attractive payback on the front end of cogeneration projects. The longer-term outlook is favorable as well: Current forecasts call for natural gas prices to increase by just 2.1 percent per year through 2035[2].

Meanwhile, utility electricity prices continue to escalate, and advances in technology are pushing the efficiency boundaries of reciprocating engine-generators – adding to the appeal and financial return of engine systems. As a result, a widening variety of cogeneration applications have moved squarely into the mainstream. Cogeneration today goes well beyond the classical picture of simultaneously generating electricity and hot water or steam. Today's usable engine outputs also can include:

- Heated air
- Chilled water produced by way of absorption chillers
- Carbon dioxide from purified exhaust

In other words, a single engine-generator can produce two, three or four useful outputs at once. With today's generating technologies, electrical efficiencies up to 45 percent and total resource efficiencies upwards of 90 percent are achievable. And cogeneration systems do not necessarily need to operate full-time at full load to be cost-effective – low-cost and low-intensity configurations can bring attractive returns in many settings.

AN ECONOMIC DECISION

Every cogeneration project comes down to a question of economics: Will savings on energy costs and revenue from electricity generated provide adequate return on the investment in equipment? In general, the outlook is most favorable where:

- The utility electricity cost is relatively high
- The fuel price is relatively low
- The system will operate with a high electrical and heat load factor
- Electric and thermal loads coincide during a typical day
- The site requires high reliability and power quality
- The cogeneration system can double as a standby power source

The availability of a low-cost "opportunity fuel," such as anaerobic digester or landfill gas, generally improves the economics. Digester gas-fueled cogeneration in particular is a key contributor in a growing quest for energy self-sufficient wastewater treatment plants.

In exploring project design alternatives, engine fuel efficiency is just one of many considerations. For example, capacity factor – the percent of total theoretical output the generators actually achieve – may far outweigh fuel savings. Furthermore, if high efficiency comes at the cost of increased downtime from more frequent maintenance or engine sensitivity to fuel variability or quality, or if performance is degraded at higher ambient temperatures, then project economics are compromised. Other engine capabilities like low emissions or fast response to block loads may also be more important than fuel economy in some settings.

The major cost components are:

- Fuel – typically the largest item at 60 to 80 percent of project operating cost (unless an "opportunity fuel" is available)
- Capital recovery – principal and interest on the equipment investment
- Operations and maintenance – staffing, components and supplies for daily operations, periodic service and repairs

In the analysis, it is essential to understand utility electricity costs in detail, including on-and off-peak energy prices, on- and off-peak demand charges, standby charges and any non-availability penalties, and existing or pending cogeneration incentives from the local utility or government entities.

Ideally, a project should be developed in a cooperative relationship with the local utility. For example, a project that reduces the user's overall energy costs while helping the utility limit peak demands on its grid provides a win-win – and may even benefit from utility incentives that enhance economic payback.

Another benefit of a cogeneration system is that it can function as a standby power source (although not for life-safety electric loads such as hospital operating suites where diesel standby with on-site fuel storage is required). In today's emission-conscious environment, demand is growing rapidly for gas-fueled standby generators. Such systems, installed for utility-parallel cogeneration and operated for extended hours or continuously, provide electric power security while also generating revenue.

The time is right

Seldom if ever have market conditions been more favorable for on-site gas-fueled power cogeneration. The time is right for industrial and commercial facilities, institutions, utilities, food processing facilities and other large power users and producers to explore the economic possibilities of cogeneration with today's gas engine technology.

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