SMALL SCALE COGENERATION INCLUDING AUTOMOTIVE APPLICATIONS- II

Residential

Micro-CHP systems in homes are especially useful in that the extra electricity produced and not needed by the house, can be resold to the electrical utility (4). This electricity is useful in the way that it is instantly disturbed and used over the electrical grid. If enough electricity is produced by multiple micro-CHP systems, there would be a smaller demand for electricity produced by the electrical utility. This would directly affect the amount of fuel needed to produce the demand for over all electricity. Another positive to this system is it being fairly easy to configure. An electrical meter would now not only measure the power entering the home, but also the power being redistributed by the micro-CHP system. In the United States, many federal and state laws require utility operators to compensate anyone adding power back to the electrical grid. Micro-CHP systems can be used in other ways in houses other then re-selling electricity back to utility companies. The micro-CHP systems can produce heat and electricity simultaneously. While the electricity can be used to run household appliances such as lights, TV, computers, kitchen appliances, etc. Whereas the heat produced can be used to provide hot water, and heating in some cases to the house. The engines used in these systems to produce electricity can be either internal combustion or Stirling engines. Most of these systems run on either propane, natural gas, or in the case of the Stirling engine concentrated solar energy and biomass. The by-product of the electricity generated is heat. One 6-kW unit provides 10 gpm of hot water at 140 to 150°F (5). This heat can be used for heating the home, or even used for a spa. The efficiency of one of these systems can be as high as 90%, compared to 30% when receiving electricity from a central power station.

The ultra-quiet MCHP unit produces 3.26 kilowatts of heat and 1.2 kilowatts of electric power.

Advantages and Disadvantages

Advantages

Financial:

Tax efficient investment with claimable Enhanced Capital Allowances
Lower fuel costs that come with using less fuel
Excess electricity generation can be sold to the utility company

Operational:

unit can be used as a standby generator when the electricity grid fails
Unit can be used as a standby boiler if the boiler goes out of service

Unit can produce Heat, Electricity and Cooling simultaneously
Reduces site fuel costs
Very quiet

Environmental:

More work with less fuel means lower pollution output
Improves energy efficiency
Reduces greenhouse gas emissions (in particular CO2
Lower SOX emissions with the use of natural gas as a fuel
Best use of natural gas resources

Disadvantages

The main disadvantage for using cogeneration is that the demand for steam and electricity must occur simultaneously. This is not a crippling disadvantage in that it can be remedied. Electricity, produced by a cogeneration system in a home, that isn't being used, can be sold to the electric company. Also when heat is not required, as in the summer months, the heat produced by the cogeneration system can be used to run a steam-powered air conditioning system. These systems are initially more expensive than the normal electric units, however, in the long run the system makes up for the cost difference. One other disadvantage is that a decent amount of cogeneration systems still use fossil fuels as their main fuel source. While a CHP system will cut back on the amount of fuel needed, there is still a concern for air pollution any time fossil fuels are being burned. Finally, some CHP systems do not capture as much waste heat as others. This means some systems are not as efficient as others. One such example would be diesel engines, due to the fact they do not have as high of an efficiency in some CHP systems as others.

Source : http://me1065.wikidot.com/small-scale-cogeneration-including-automotive-applications