

Biomass Heating – Should You Consider It for Your Campus?

By Abbe Bjorklund, Chip Lederer, and Rich Ney

In their search for sustainable energy sources and operating cost reduction, many colleges and universities are considering biomass (typically wood chips) as an alternative fuel source for heating their campuses. Depending upon your campus' situation, there may be compelling reasons for biomass, but also some challenges to be addressed.

WHY BIOMASS?

Renewable Energy Resource: Biomass fuel comes from a renewable/sustainable resource base. Fossil fuels will eventually run out, but with proper resource management practices, the biomass resource base can be sustained indefinitely.

Economic Fuel Source: Depending upon the type and cost of your current fuel sources, converting to biomass fuel sources can have attractive economics, especially if you are displacing fuel oil.

For example, to provide the equivalent BTUs of wood chips at a delivered cost of \$50/ton and a LHV of 4,500 Btu/lb, the #2 oil price would have to be less than \$0.83/gallon, #6 oil would have to be less than \$0.78/gallon, and natural gas would have to be less than \$5.55 Dtherm.

The unit price and heating value of wood chips will vary in relation to the characteristics of the delivered wood fuel in terms of size of chips, type of wood, and moisture content. The proximity of the fuel source to point of use is also a factor in the delivered price of wood as a fuel. Currently we are seeing wood chip delivered costs ranging from \$35/ton to \$65/ton depending upon the location and the chip characteristics.

Biomass fuel pricing has historically been less volatile than gas and oil prices, so many campuses look to utilizing biomass as a way to stabilize their future energy costs. Because biomass fuel prices are not linked to national or global energy markets, over the last 15-20 years biomass prices have stayed level or decreased, while oil and gas pricing have dramatically fluctuated.

Net Zero Carbon?: Historically, in the discus-

predicted. Against the backdrop of this uncertainty, EPA is currently undertaking a study of biomass in an effort to determine the appropriate accounting rules for greenhouse gas emissions within the



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sion regarding greenhouse gas balances, biomass has been treated with a 'net-zero' approach; assuming that there are zero net carbon dioxide emissions because the carbon released during combustion was removed from the atmosphere by the biomass source as it grew (small amounts of methane and nitrous oxide are also emitted). More recently, however, some life cycle analyses have pointed to the potential that large-scale biomass production may in fact be a net emitter of carbon dioxide, due to land use changes and disruption of natural sequestration processes. The assumptions used in these studies have tremendous influence on the magnitude of the carbon balances

federal New Source Review permitting program. EPA's decision is expected by 2014.

Local Sourcing: Depending upon your campus' location, local biomass fuels may be abundant and available from local sources. As opposed to fossil fuels, biomass fuel dollars can stay in the local, state, and regional economy, and increasing the use of biomass helps the local tax base and builds tax revenue.

TECHNOLOGY OPTIONS

There are two different biomass wood technologies. One is a simple wood burning boiler (Stoker) that converts wood chips directly to heat energy for steam or

hot water generation. Another approach is a wood conversion process or gasification (Gasifier) which produces a synthetic gas that is used to operate boilers and potentially other equipment. Some biomass boilers can be furnished with natural gas capability, which may also be considered to provide fuel flexibility.

CHALLENGES

Some of the challenges associated with biomass systems, include:

Location/ Space Requirements – Biomass fuel sources require space and facilities for delivery, storage, and fuel handling. Unlike a gas pipeline, biomass fuels will need to be delivered to your plant, in most cases by truck. Depending upon the season and your campus loads, you may be looking at the delivery impact of 3-7 truck loads/ day or more to your site. These space and delivery requirements

restrict the feasibility of biomass for many urban campus settings.

Permitting/Emissions - Permitting of biomass systems can often be more challenging than traditional fossil fuel systems. Emissions from biomass combustion falls somewhere between those emitted from natural gas combustion and emissions from coal combustion, but the lack of a deep pool of historical data regarding emissions from various biomass technologies and fuels can slow the permitting process, or result in the agency being conservative in their approach. Regulation of emissions from solid fuel biomass boilers under the recently issued Boiler MACT rules will require particulate emission controls: use of an electrostatic precipitator at a minimum, and quite possibly requiring a filter.

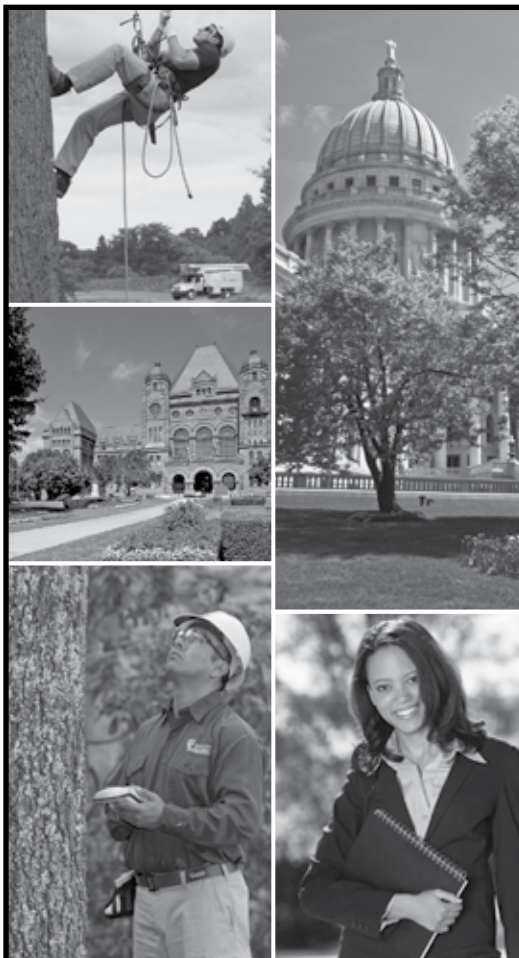
In summary, biomass could provide a renewable, economically viable, local fuel

source for your campus. Careful evaluation of technology options, fuel sources, and permitting requirements will help mitigate the risks and ensure that you achieve a reliable, successful plant. ☺

REFERENCES

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