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BEYOND CARBON NEUTRAL – GREENHOUSE GAS BENEFITS OF BIOMASS POWER GENERATION

Biomass energy provides significant greenhouse gas benefits. Biomass power is “carbon neutral”, therefore displacing fossil fuel generation with biomass power lowers greenhouse gas (GHG) emissions. In addition, biomass energy reduces GHG emissions further by avoiding alternative means of biomass disposal which generate significant quantities of methane.

It is well accepted that energy produced from fossil fuels (coal, oil and natural gas) removes carbon from permanent geological storage and adds new carbon to that already present in the atmosphere, resulting in ever increasing carbon dioxide levels. In contrast, energy generated from biomass is recognized as carbon neutral by the environmental community, including regulators in the European Union and the U.S. This is because the carbon released by biomass power generation is already a part of the carbon circulating between the atmosphere and the biosphere (i.e., trees and plants). Thus, like other types of renewable energy including wind, solar, geothermal and hydro, biomass energy production displaces GHG emissions that would have been produced had that energy been generated from fossil fuels.

Additionally and uniquely among renewable energy technologies, biomass energy also reduces net GHG emissions in a second way. The use of biomass for energy generation avoids the higher GHG emissions associated with alternative means of biomass disposal. If not used as fuel, biomass could have several different fates – decaying in the forest, open burning, landfilling, composting or other means of disposal. Each of these alternatives has a greater greenhouse effect than does biomass power generation because they produce and release significant quantities of methane, which is 25 times more potent as a GHG than carbon dioxide. The controlled combustion of biomass for electrical power generation converts essentially all of the carbon into less potent carbon dioxide.

Using data from the California biomass power industry, GHG benefits (measured in tons of CO₂ equivalent) from biomass power generation total 1.61 tons per megawatt-hour (MWh) generated. This figure is comprised of two parts: 0.80 tons/MWh from avoided fossil fuel use and 0.81 tons/MWh from avoided biomass decomposition or open burning.

Thus, biomass power generation has roughly twice the GHG benefit as other forms of renewable energy because it both displaces fossil fuel usage and avoids alternative disposal fates for biomass which have greater GHG emissions.

Source: Bioenergy and Greenhouse Gases, Gregg Morris, PhD, Pacific Institute, May 2008