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Biomass Energy Resource Center

CARBON DIOXIDE & BIOMASS ENERGY

Perhaps the greatest environmental benefit of burning biomass for energy is its positive impact in moderating climate change

Carbon dioxide (CO_2) buildup in the atmosphere is one of the leading causes of global warming. When biomass is used sustainably to displace fossil fuels, the net impact is a lower CO_2 level in the atmosphere.

This is because burning fossil fuels takes carbon that was locked away underground (as crude oil, gas, and coal) and transfers it to the atmosphere as CO_2. Wood combustion, however, recycles carbon that was already in the natural carbon cycle, the net effect being that no *new* CO_2 is added to the atmosphere as long as the forests from which the wood came are sustainably managed.

Most biomass fuel is produced within an average human lifetime, and is therefore considered an active component of the global carbon cycle, a process that transports carbon in various forms throughout the earth's natural systems. Significant quantities of CO_2 are absorbed by plants through photosynthesis, and then released through plant decay. Removing biomass fuel from forests using sustainable forestry practices stimulates the growth of replacement wood. This replacement growth absorbs approximately the same amount of CO_2 as was released during combustion.

The US Environmental Protection Agency reports, "CO_2 from this source [biomass] is generally not counted as greenhouse gas emissions because it is considered part of the short-term CO_2 cycle of the biosphere." Fossil fuels, such as coal, oil, or natural gas deposits, are produced within a geologic timeframe. The carbon in these long-term deposits is considered 'sequestered' from the global carbon cycle, and, when used for energy, add to the cycle additional new carbon that would have remained underground.

If a gas or oil heating system is converted to wood, net CO_2 emissions are reduced by 75-90 percent, depending upon how much of the fossil fuel use is displaced. For this reason heating with wood is a powerful tool for an institution or community interested in meaningfully addressing climate change and renewable energy through its energy use.

A large percentage of the biomass that is burned to generate energy is waste from the forest products industry, such as sawmill waste. This waste would also release CO_2, often along with methane (a greenhouse gas that is more potent than CO_2), while decomposing in landfills and waste piles. Therefore, using biomass waste to produce energy minimizes methane emissions while also both displacing fossil-fuel use and contributing no net CO_2 to the atmosphere.

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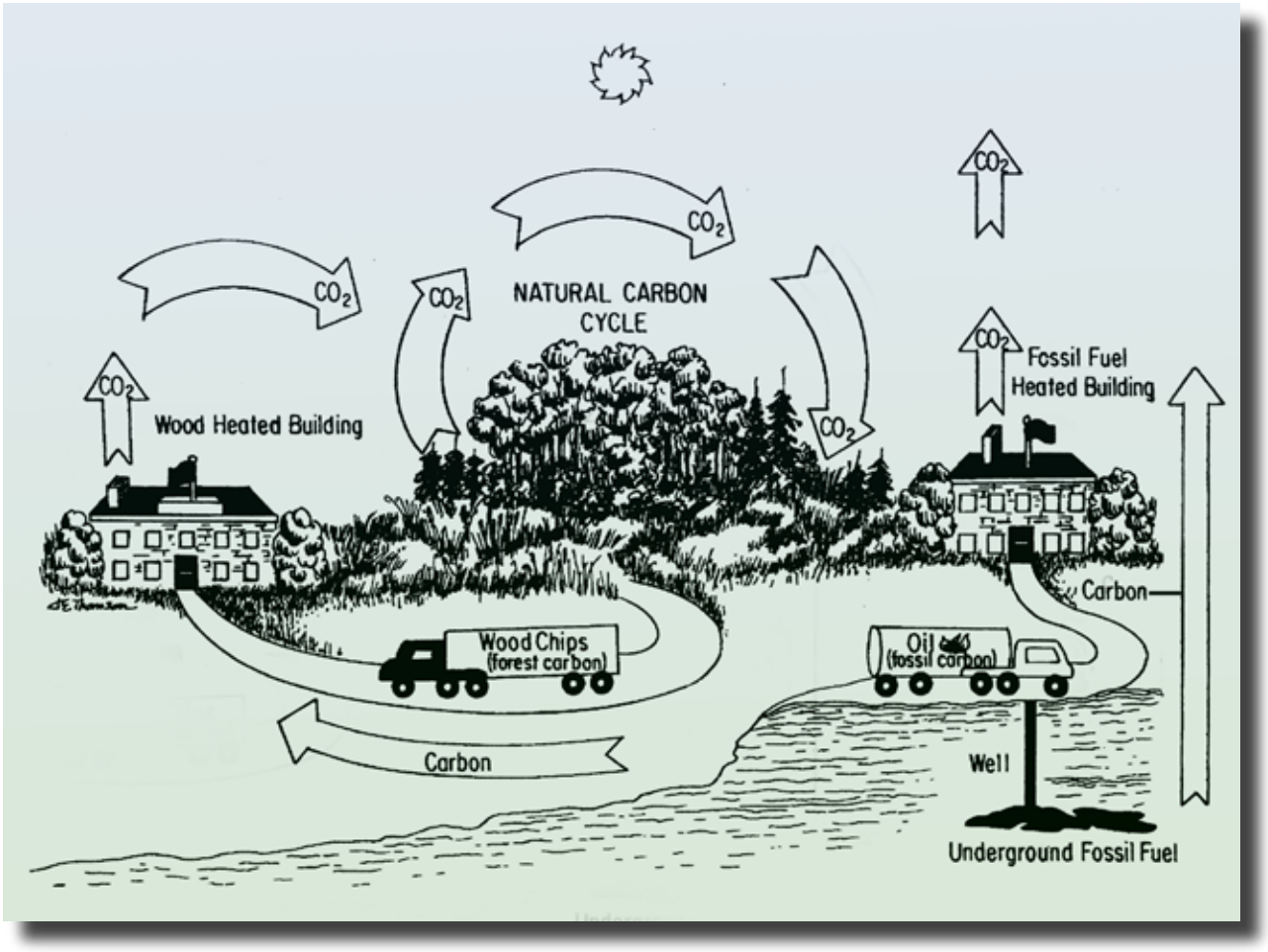

Above: Comparison of carbon flows for fossil fuel and biomass heating systems

The forest absorbs CO_2 from the atmosphere where its carbon is stored in wood. When trees are harvested for energy, the wood is chipped, transported to the wood-heated building, and burned, with its carbon released back into the atmosphere as CO_2. When a building is heated with a fossil fuel, the fuel carbon is realeased to the atmosphere as CO_2. Unlike the case of wood heating, fossil fuel CO_2 emissions are not part of a natural process.

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