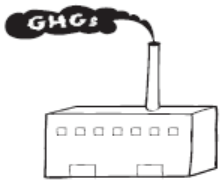

GREENHOUSE GASES

EFFECTS OF RECYCLED FIBER USE ON GREENHOUSE GAS EMISSIONS

Fossil Fuel-Related Emissions Avoided through Use of Paper-Derived Fuels

Used paper can be used as a fuel with significant heating value—10.5 to 15.9 MMBtu/short ton (USEPA 2012). This fuel value is one-half to three-quarters or more of that of coal. As a result, the effects of increased recycling on overall GHG emissions depend on whether the recovered paper would otherwise have been burned for energy and whether this is considered to have avoided use of fossil fuels.

In the studies examined by Finnveden and Ekvall (1998), 18 scenarios found lower fossil fuel use for systems where used paper packaging was burned for energy while eight found lower fossil fuel use in systems where used paper packaging was recycled. In comparing the studies, they found that the results depended primarily upon assumptions about what type of fuel was displaced by the paper-based fuel. Where paper-based fuel was assumed to displace fossil fuel, this was found to require less fossil fuel than a system involving paper recycling. Otherwise, the recycling system was found to have lower fossil fuel use. The researchers indicated that the same results would perhaps not hold for newsprint because of the large differences in energy intensity between virgin and recycled newsprint.

The Paper Task Force (2002) study assumed that paper-based fuel would displace fossil fuels. Except for the case of newsprint, the fossil fuel-related energy required for the system involving recycling was 6 to 9 MMBtu/ton of recovered paper greater than the system wherein used paper was burned for energy. In the case of newsprint, recycling and burning for energy required approximately the same amount of fossil fuel.

The results of the USEPA (2012) comparison of burning and recycling to landfilling is shown in the following table. USEPA's analysis shows greater benefits for recycling compared to burning for energy across all grades. This is primarily because USEPA's analysis includes large estimated forest carbon benefits for recycling whereas other studies do not. These benefits, however, are admitted to be very uncertain.

Table R11

Product	Net GHG Emissions from a Landfilling System (metric tonnes of CO_2 equivalents per wet short ton of material)*	GHG Emissions from a Recycling-Based System (metric tonnes of CO_2 equivalents per wet short ton of material)	GHG Emissions from a Burning for Energy-Based System (metric tonnes of CO_2 equivalents per wet short ton of material)**
Corrugated containers	-0.05	-3.11	-0.48
Magazines/Third class mail	-0.47	-3.07	-0.35
Newspaper	-1.01	-2.78	-0.55
Office paper	1.17	-2.85	-0.47

(Continued on next page. See notes at end of table.)

Table R11 (Continued)

Product	Net GHG Emissions from a Landfilling System (metric tonnes of CO_2 equivalents per wet short ton of material)*	GHG Emissions from a Recycling-Based System (metric tonnes of CO_2 equivalents per wet short ton of material)	GHG Emissions from a Burning for Energy-Based System (metric tonnes of CO_2 equivalents per wet short ton of material)**
Phone books	-1.01	-2.65	-0.55
Textbooks	1.17	-3.11	-0.47

*Includes consideration of oxidation of generated CH_4, offset of utility generated power, and carbon stored in landfills
**Biogenic CO_2 from combustion is not included

In summary, burning used paper as a substitute for fossil fuels reduces total (life cycle) GHG emissions compared to landfilling for corrugated containers, office paper, and textbooks, whereas landfilling has a greater GHG benefit for magazines/third class mail, newspaper, and phone books (USEPA 2012). Most studies suggest that the GHG benefits from recycling newsprint are greater than those from burning newsprint for energy, but the results for other grades of paper and paperboard vary depending on the boundaries of the study and other assumptions, especially those regarding carbon storage in forests attributed to increased recycling.

References

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