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## **Fossil Fuel Energy Savings, Carbon Sequestration, and Biodiversity Conservation through Innovative Wood Construction and Diverse Forest Management**

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Wood use has been proposed as sustainable energy mechanisms through both direct combustion for energy and wood construction. Others advocate leaving the forest unharvested for carbon and biodiversity protection. Recent analyses show that wood use for construction can be the most effective way of avoiding fossil fuel energy and carbon dioxide (CO<sub>2</sub>) emissions, especially if the residual wood scraps are then burned efficiently for wood energy. Fossil fuel savings and CO<sub>2</sub> emissions reductions result primarily from avoiding the high energy expenditures in steel and concrete manufacture and assembly, with some additional carbon stored in the wood products. Innovations in construction are enabling mid-rise (10-to20 story) buildings, heavy-duty bridges, and long-span roofs to be made from wood. These structures are long lasting and highly resistant to earthquakes and fires. The world could use much more wood and still sustain its forests, since only about 20 percent of the world's forest growth is currently harvested each year—or one percent of the standing forest volume. And, only 30 percent of the current harvest is used in construction, with the rest used for paper and subsistence fuel-wood. Asia, Africa, and South American economies are expected to develop in the next four decades, with an associated need for an infrastructure of buildings and bridges. The world could both sustain its forests and reduce its annual consumption of fossil fuel by 12 to 19 percent and its CO<sub>2</sub> emissions by 14 to 31 percent if wood construction were used to avoid 50% of the energy currently used for steel, concrete, and brick construction—and the residual wood scraps were used for energy. Fossil fuel use and CO<sub>2</sub> emissions can be reduced and biodiversity enhanced with a combination of intensive plantations, integrated forest management areas, and reserves arrayed across a landscape and over time.

**Keywords:** energy, wood construction, wood energy, sustainable forestry, carbon sequestration, biodiversity