

Land-Use Inventories for Sustainable Transportation Scenarios

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A future, truly sustainable system for providing energy to the United States transportation fleet requires that energy be generated from truly renewable sources such as sunlight, wind or biomass. Furthermore, the renewable energy must be converted to, and stored as, a fuel that is useful to vehicles, and especially to small vehicles. Of the various scenarios postulated for meeting these two requirements, three primary paths stand out as the most likely candidates for implementation:

1. Renewable electric generation --> hydrogen production --> fuel cell-electric vehicles
2. Renewable electric generation --> battery-electric vehicles
3. Biomass production --> liquefaction --> combustion-electric hybrid vehicles

Currently the transportation sector consumes roughly one-third of the nation's total primary energy consumption. Hence, even with substantial improvements in vehicle efficiency, any foreseeable transportation scenario based on renewable energy will entail very large land use impacts. *Land-Use Inventories for Sustainable Transportation Scenarios* will estimate minimum and maximum expected land areas affected by the three sustainable transportation scenarios. The minimum and maximum for each scenario will be determined by technology forecasts for system efficiencies, and in addition the minima and maxima for all scenarios will further be influenced by available forecasts of future energy demand of the U.S. transportation system.

The paper will conclude with a discussion of life-cycle impact assessment methodologies available for comparing the three scenarios' land use impacts to each other.