The 216th IDEC ASIA Seminar
JASID Hiroshima Chapter Seminar

How much land is required to reduce CO2 emissions from cars in Japan and Brazil using biomass?

Date/Time: March 22 (Tue.), 2011 / 16:30-18:00
Venue: Room 204, IDEC

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This presentation briefly introduces the emission profiles of Japan and Brazil and focus on the uniqueness of the Brazilian energy matrix. A more detailed discussion on the use of biomass as an energy source in Brazil is presented, which entails a discussion on the use of sugarcane as an energy source. The carbon budget of the sugarcane program in Brazil has been assessed including various carbon flows and stocks. The result shows a positive balance of up to 128 metric tons of CO2 per ha. Looking ahead, the mitigation potential in 2039 corresponds to 836 tCO2 per ha. Although biofuels have been considered as a carbon mitigation option in the transport sector such an approach has triggered concerns with land use change impacts. Other option that might also reduce emissions in the transport sector is electricity based on renewable energy sources such as biomass.

This work considers that a sugarcane biorefinery jointly produces ethanol and electricity, and both energy carriers are used in private owned cars. Only technology that is currently available and cost competitive for energy production and end-use is considered. Technologies considered include a mix of internal combustion engines, hybrid vehicles, and electric motors. Results demonstrate that the land required to power our current mobility needs is lesser than it is usually stated. According to our results, based on 2010 values, 2 million ha are enough to power the Brazilian fleet, and 3 million ha are enough to power the Japanese fleet. This corresponds to less than the current sugarcane cropped area in Brazil. Japan already imports ethanol from Brazil and this relationship might be enhanced in the future. Finally, a business plan to trade Japanese electric vehicles for ethanol is briefly introduced.

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