Combining Energy and Environmental Considerations in a Megareforestation Plan for Brazil

José Otávio Brito

Text available at www.iea.usp.br/english/journal

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IEA/USP has recently advanced a proposal for megareforestation in our country for the chief purpose of absorbing excess CO_2 in the atmosphere. The proposal states clearly that reforesting the target 20 million hectares will only make sense in terms of its goal if definitive actions are adopted on the use of alternative energy sources like hydrogen, solar energy, and nuclear fusion. However, the latest data indicate that oil will still be the number one world source of energy into the first half of the 21st century. Likewise, fossil coal will retain or increase its role. In spite of their environmental significance and benefits, there are strong signs that alternative energy sources will not gain a predominant share of the world energy supply in the near future. In addition, as indicated by Floram Project itself, the time horizon available to revert atmospheric CO_2 levels is extremely short for changes in the current energy supply, particularly in view of the costs and other impacts resulting from such changes.

We therefore think that on the issue. of combining energy and environmental concerns, Floram Project might look into a different and perhaps unprecedented goal. By this we mean the opportunity to launch the idea of focusing on and strengthening the use of forest biomass for energy generation linked to megareforestation.

First of all, megareforestation would ensure considerable volumes of timber for continuing and sustained supply of energy to the country free from external dependencies. Secondly, the desired equilibrium would be struck between the amount of CO_2 released by wood burning for several power-generating purposes, and the amount of CO_2 absorbed by the very forests planted for the same reason. The CO_2 balance in the atmosphere would be restored, unlike the current situation with the use of fossil fuels which are primarily CO_2 emitters.

It should be noted that in our country particularly, the use of forest biomass for energy would produce significantly less impact than the changes and costs involved in adopting so-called new energy sources. Brazil has a historical expertise in the use of forest

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* This text has been extracted from the special issue of *Estudos Avançados* on Floram Project, published in English in 1995. The original version, in Portuguese, was published in no. 9, May-Aug. 1990.

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biomass for energy. Only minor technological improvements and optimization would suffice, and there are in fact already available in our country.

As an illustration, let us examine what would happen it the above ideas were taken up by Floram Project.

The Project quotes data indicating that 7.7 t of carbon per year on average can be trapped per hectare of planted forests through CO_2 consumption during photosynthesis. This carbon is fixed in the tree at a rate of 50% of its dry matter. Consequently, the total amount of resulting dry matter would be 15.4% per hectare of newly planted forests. If only tree shaft is taken into account, the output would be 10 t of dry matter/ year per hectare. If this wood is used to generate energy, the potential CO_2 release would be at the rate of 5 t of carbon/year per hectare of planted forest. This figure is fully consistent with the CO_2 uptake capacity in photosynthesis outlined above, provided that trees are replanted at the rate as they are used. This would ensure a balance between emission and uptake in the CO_2 cycle. Theoretically, if all the timber in the 20 million hectares foreseen under Floram Project were exploited for energy generation purposes, and considering a 5-year forest rotation cycle, it would be feasible to cut 4 million hectares of trees annually. Based on the assumption above, of harvesting 10 t of wood a year per hectare, 40 million tons or 80 million solid cubic meters of wood would be obtainable per annum. This amount of wood would be channeled to energy generation in order to sustain the CO_2 balance in the atmosphere. For comparison purposes, this volume would ensure about 50% of the current Brazilian consumption of fuel wood, or the equivalent of 20% of the domestic consumption of fossil fuels like oil, fossil coal, coke, and natural gas.