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TITLE: ECOLOGICAL PAYBACK IN NATIONAL ENERGY MATRIX: ANALYSIS OF WIND ENERGY EXPANSION

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ABSTRACT:

Sustainable development concern has become subject of recurrent discussions over the last years due to the duet large greenhouse gases emissions and world growth, especially in developing countries. Electrical sector is one of the major segments responsible for greenhouse gases emissions, but also the one in which modern society depends the most for life standard maintenance, economic and social activities. A renewable source considered in Brazilian energy sector expansion is wind power, which has a 143 GW potential. As such, the paper aims to estimate environmental impacts (CO₂ emission) involved in wind power plants construction phase and return time for compensating these emissions during operation. Ecological payback is developed through CO₂ emission analysis of different energy sectors required as inputs in construction and final emission reduction due to this "clean" power plant operation in national electrical matrix. Estimation of economic and environmental impacts is based on input-output methodology, using a 2004 matrix for Brazilian economy. Results point out for a maximum payback period of 4 months in worst case scenario, and major pollution contribution of Steel and Products Manufacturing during construction.