



# Academic<sup>th</sup>

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ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION TOWARDS A SUSTAINABLE TRANSITION”

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## Contribution to the Electric Matrix of Brazil in 2050 - Decentralized, Cleaner, Efficient and Renewable

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### Abstract

There is an aggravated prospect in the Brazilian electricity production, due to a shortage of affluent energy in the hydric production, requiring a greater thermal use. For the future, the insertion of hydroelectric power plants predominantly without reservoirs will make this need even more evident. Due to the thermal structuring, there will be more emissions of greenhouse gases (GHGs) and consumption of fossil resources per unit of electricity produced. A model that does not align with the search for sustainable development. The objective of this paper is to present an alternative future scenario, elected 2050, of electricity supply in the country, beacons on the acceleration in the use of renewable sources, premise postulated in alignment with the pursuit of sustainable development for the country. The "research, analysis and synthesis" is adopted, with a systemic approach, and applying the indicators elected the paramount to reach the goal. Part of author's doctorate thesis is synthesized, this systematized from data and information from different types of documents produced by international and national authors and organizations as well as governmental plans of expansion of electric energy production. From the theoretical and methodological framework adopted, the results obtained have shown that it is possible to establish a long term plan, based on the use of the available resources, with decreased social and environmental pressure, fossil consumption, and emission of GHGs per unity of energy produced. A greater participation of renewable sources is achieved, while the participation of hydric sources, the emissions of GHGs and consumption of oil-fuels are reduced. There is no increase in the production costs. The result is a decentralized, hybrid system with larger expansion of renewable thermal, wind and solar sources, larger participation of independent production – co-generation, auto-generation and distributed generation – and a diminished load on the transmission network, compared to the current scenario.

**Keywords:** *renewable energy; sustainable development; energy planning; energy efficiency; emissions of greenhouse gases.*

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