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ENERGY ECONOMICS AND ASSESSMENT IN THE INTEGRATED ENERGY RESOURCES PLANNING PORTFOLIOS APPLIED TO THE BRAZILIAN REGION OF SÃO PAULO STATE

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ABSTRACT

This paper describes the model developed to design energy resources portfolios within the Integrated Energy Resources Planning. This model is based in different planning steps such as, procedures for the regional characterization, evaluation of energy potentials, prioritization of resources, environmental inventory, local mapping local, building of scenarios, integration of resources and, finally, presentation of an analytical model for the design of energy resources portfolios within the IRP.

The characterization of energy resources involves the survey of socioeconomic and environmental characteristics, the profile of those involved and interested in the energy sector and the listing of local energy resources (water, wind, solar, nuclear, geothermal, biomass, fuel cells among others). Constructive features have also been raised for existing technologies that can be incorporated into the energy matrix of the region under study.

The process of the evaluation of energy potentials involves the calculation of theoretical energy potentials of each existing energy resource in the region. After the assessment of potentials, these resources are prioritized through pre-established criteria in two different assessments: Deterministic Full Costs Accounting (DFCA) and Holistic Full Costs Accounting (HFCA). The software Decision Lens (DL) based on the method of Analysis of Hierarchical Process (AHP) was used to generate both rankings. The crossing of assessments results in an overall ranking of energy resources, used to build energy resources portfolios.

In the valuation of energy resources, environmental, social, technical-economic and political attributes are taken into account, as factors that may affect the formation of efficient portfolios within the IRP in the long term. The result of the valuation process is the achievable energy potential of the region under study.

For this potential, the analytical model for the design of energy resources portfolio is applied. The indicators considered in this model are the ranking of resources, the volume of investments, environmental attributes (emissions), social attributes (IDH, number of jobs, land occupation), political attributes (government incentives, taxes) and all the technical-economical parameters related to technologies selected for the utilization of each energy resource. The incorporation of these variables in the model leads to simulations in order to obtain optimal portfolios for the construction of a Preferential Plan within the Integrated Energy Resources Planning.

The Methodology include the use of a tools like PAH (Hierarchical Analysis Process), LEAP (Long-Term Alternatives Planning), linear programming.

RESULTS AND CONCLUSIONS

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economical parameters related to technologies selected for the utilization of each energy resource. The incorporation of these variables in the model leads to simulations in order to obtain optimal portfolios for the construction of a Preferential Plan within the Integrated Energy Resources Planning.

Model developed allows you to evaluate the environmental variables, social, political and technical-economical simultaneously in the context of Integrated Planning of long-term energy resources, getting optimal portfolio of energy resources with efficient frontier and next built by Markovitz method.