IMPORTANCE OF MULTIDISCIPLINARY RESEARCH ON ENERGY GENERATION WITH LOW ENVIRONMENTAL IMPACT IN THE AMAZON

Welbson do Vale Madeira. PhD in Socio-Environmental Development (NAEA-UFPA). Professor at the Department of Economics and the Postgraduate Program in Socioeconomic Development (PPGDSE-UFMA}. Phone: (55) 98 98201 9695. E-mail: welbson.madeira@ufma.br

Francisco Lima Mota. PhD in Geography (UNICENTRO-PR). CAPES Post-Doctoral Scholarship in the Postgraduate Program in Socioeconomic Development (PPGDSE-UFMA). Phone: (55) 99 985135335: email: franciscocesiuema@gmail.com

Overview

When it comes to the production of electrical energy in the Brazilian Amazon there are situations that differentiate it markedly from other regions of Brazil and that, therefore, require specific ways to deal with the issue. Three main elements mark these particularities: the region is home to six of the ten largest hydroelectric plants in the country, being essential for supplying energy for various business projects; it is the one with the largest number of isolated systems, without connections to the National Interconnected System (SIN), running on diesel and highly carbon emitting; It has one of the largest energy supply potentials with the lowest environmental impact in Brazil. Combined with the social and environmental complexity of the region, this situation justifies a multidisciplinary research effort, in which different concerns are addressed. This paper presents a concrete research experience in this direction and still in force, based on the partnership between four postgraduate programs at the Federal University of Maranhão.

This research is financed by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and has the participation of postgraduate programs in Chemical (PPGQUIM), in Energy and Environment (PPGEA), in Electrical Engineering (PPGEE) and Socioeconomic Development from the Federal University of Maranhão (PPGDSE). As a unifying element, the objective was agreed to carry out studies related to energy production in existing or potential systems in the eastern part of the Amazon, in order to contribute to making them work with modern technologies and with minimal negative impact on local populations and the environment. PPGQUIM is prioritizing studies on energy generation and storage from electrochemical systems. PPGEA is contributing to the development of management models aimed at the energy production, storage and transmission sectors. PPGEE is contributing through research on the operation, planning and control of electrical energy systems, smart grids and renewable energy sources. The PPGDSE has promoted studies on the feasibility and economic, environmental and social adequacy of energy projects in the Amazon, considering factors such as adequate production scales, degree of dependence on products and technologies external to Brazil and positive and negative externalities arising from projects.

The joint effort of these programs is resulting in the qualification of more researchers focused on the topic, in contributing to regional debates, in offering technical solutions for companies and in dialogue with the public sector, in this case with the perspective that effectively considers possible economic, environmental and social problems and alternatives related to energy production.

Methods

The main subject of this paper is the importance of multidisciplinary research when it comes to energy production in the Brazilian Amazon, due to some regional particularities. The systematization resulted from the analysis of the initial intentions of the project in common with four postgraduate programs, the capacity for dialogue between them and the specific contributions of each one. To this end, studies of documents and scientific publications related to the project were carried out from its beginning, in 2021, until the first quarter of 2024 and interviews were carried out with researchers and institutional representatives from UFMA linked to the postgraduate system at that university.

Results

At the time of systematizing this article, the research was beginning its last year, out of a total of four planned years. Therefore, considering that it has not yet been finalized, it is possible to present only preliminary results. It was found that all postgraduate programs managed to contribute to the important points they set out to achieve. This fact was expressed in the training of more masters and doctors, in post-doctoral internships, in the publication of scientific articles, in contributions to technical improvements aimed at energy production with less environmental impact, in studies on economic and social activities in the surrounding area of a hydroelectric in the municipality of Estreito and in a wind energy production park, both in the state of Maranhão, in promoting debates open to society and in technical reports with the potential to be used in the promotion of regional public policies aimed at energy production. On the other hand, there was also an inequality in the capacity to produce technical and academic products between programs and in the limits to establish dialogues between researchers with very different backgrounds. Regarding the first point, the formally structured programs for technical contributions in the energy area stood out. For others, the main gain in general terms was precisely the greater inclusion in the topic, a fact that resulted in the engagement of new researchers and the structuring of new lines of research.

Conclusions

Monitoring the energy production conditions of systems with obvious negative impacts from an environmental and social point of view in the Amazon is absolutely essential. Likewise, it is essential to deepen studies on the region's energy generation capacity with the lowest possible environmental impact, in line with what is formally indicated by various governments, companies and multilateral institutions. For both perspectives, multidisciplinary research has great potential for contribution, especially if we consider the generic notion of sustainable development, from which current generations must worry about the world they will leave for the next. Based on the experience presented in this article, however, we conclude that many efforts are still needed so that different areas of knowledge and researchers with different backgrounds can have a more promising dialogue. It is essential that the first steps in this direction are encouraged, as is being done in the research effort referenced in this article.