

Site selection process for new nuclear power plants - a method to support decision making and to improve the public participation

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Introduction

The Brazilian Energy Plan (PNE 2030) that guides the Government in formulating its strategy for expanding energy supply by 2030 highlights the need for the Brazilian electrical system have more than 4,000 MW from nuclear sources by 2025. Therefore, the Government presented a proposal to build four more nuclear power plants with capacity of 1,000 MW each, at first: two in the Northeast and two in Southeast. The selection and the site assessment are key parts of the installation process of a nuclear plant and may significantly affect the cost, the public acceptance and the safety of the facility during its entire life cycle. The result of this initial stage could seriously even affect the success of the program.

Mistaken decisions in the process of the site selection may also require a financial commitment **for higher planned** in a later phase of the project, besides causing extensive and expensive downtime. To Select the location where these units will be built is not a trivial process, because it involves the consideration of multiple criteria and judgments in addition to obtaining, organizing and managing a diverse range of data, both qualitative and quantitative, to assist in decision making and to ensure that the site selected is the most appropriate in relation to safety and technical, economic and environmental feasibility.

This paper presents an overview of the site selection process and its stages, the criteria involved in each step, tools to support decision making that could be used and difficulties in applying a formal process of decision making. Also, it discussed ways to make the process more transparent and democratic, increasing public involvement as the way to improve acceptance and to reduce opposition from various sectors of society, trying to minimize the expense and time involved in the implementation of undertakings of this kind.

Discussion and conclusion

Due to the magnitude of delays and/or stakes and potential consequences related to any decisions about the location of the installation, it is important to conduct a formal analysis that could assist the professional intuition of the decision maker. This analysis should help to understand what characterizes the "best" site as well as to provide the necessary information for regulatory processes. For this formal analysis structure is needed to integrate and to incorporate information on the selection criteria to the value judgments of stakeholders in order to establish a comprehensive and transparent assessment of the global implications of each alternative. Historically, most analysis of the site selection did not happen of this way. The story of the nuclear energy use is full of cases that demonstrate how the absence of a formal analysis, the lack of a solid database on the characteristics of the site and no account of judgments and opinions of stakeholders can lead to breakdowns, delays and even preventing of nuclear projects. The use of a formal analysis, transparent and participatory has been the approach used in recent work of the site selection for a variety of facilities. In this context, Spatial Multicriteria Decision Analysis allows the effective implementation of stakeholder participation in decision-making through the use of weights assigned to the selection criteria or, as mentioned above, by identifying relevant criteria for stakeholders and ways to measure them. As shown previously, assigning weights to criteria, they could be done by using various tools as: Analytic Hierarchy Process, Brainstorm, and Delphi among others [1].

References

- [1] MARTINS, V. B.; CUNHA, T. S.; LAMEGO SIMÕES FILHO, F. F.; LAPA, C. M. F.. Site selection process for new nuclear power plants – a method to support decision making and improving public participation. In: International Nuclear Atlantic Conference, 2011, Belo Horizonte. Nuclear Energy. New Jobs for a Better Life. São Paulo: ABEN, 2011. v. DVD.