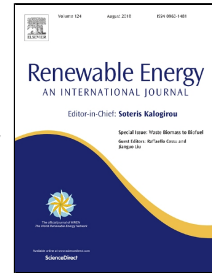


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# Identification of Prospective Significance Levels for Potential Geothermal Fields of India

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## Abstract

This study aims to predict prospective significance levels of potential geothermal fields already identified by Geological Survey of India (GSI) and National Geophysical Research Institute (NGRI) by field investigations. Wide range of criteria's are considered in determining the relative significance level of each geothermal field in terms of cumulative score. These criteria's include useful resource base ( $URB_{field}$ ), Areal extent ( $A_{field}$ ), Minimum temperature as per geothermometry ( $T_{min}$ ), Maximum temperature as per geothermometry ( $T_{max}$ ), Utilization score ( $US_{field}$ ), Cumulative discharge of thermal springs ( $Q$ ), Minimum electrical resistivity ( $R_{min}$ ), Maximum electrical resistivity ( $R_{max}$ ) and Representative reservoir temperature as per Gas thermometry ( $T_{gas}$ ). Fuzzy Analytical Hierarchy Process (Fuzzy AHP) is used to study the dominance of each geothermal field, evaluated over the aforementioned criteria to find cumulative score.  $URB_{field}$  depends on possible extraction temperature of reservoir estimated by COMSOL Multiphysics<sup>®</sup> modelling and simulation software. The geothermal fields are conceptualized as shallow homogenous reservoirs with injection and extraction wells. The attributes of remaining criteria are collected from published works of NGRI and GSI. The results of this study ratify that Puga geothermal field is the most significant site among the identified potential geothermal fields, to conduct further developmental works and for commercial extraction of geothermal energy.

**Keywords:** Potential geothermal fields; Extraction temperature; Criteria; Alternatives; Useful resource base; Significance level

## Highlights

- Potential geothermal fields as alternatives.
- Criteria identification to evaluate potential geothermal fields.
- Extraction temperature of reservoir by COMSOL Multiphysics<sup>®</sup> simulation
- Estimation of useful resource base ( $URB_{field}$ ) of reservoir.
- Estimation of cumulative score of geothermal field by Fuzzy AHP.
- Prospective significance level of potential geothermal field

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