

A PROMETHEE family based multi-criteria decision-making analysis for selection of optimum site location for solar energy conservation

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Abstract

PROMETHEE FAMILY (“Preference Ranking Organization Method for Enrichment Evaluation”) is one of the main technics for Multi Criterion Decision Making (MCDM) analysis providing a framework for evaluating the Solar energy conservation strategies by considering multiple, often conflicting, factors simultaneously. This approach helps decision-makers to systematically compare different options and select the most suitable energy sources evaluation, considering economic conditions, environmental situations and technical aspects. The family of the PROMETHEE methods can be used to evaluate criterion and alternative approach for selecting optimal sites for conservation of solar energy projects considering factors such as Solar Irradiance, Efficiency of solar panels and Energy yield etc. In this paper describes the steps of the PROMETHEE family technique, which are predictable as the most extensively utilized version of the method for choosing the optimal

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location for solar energy projects. Firstly, entropy techniques are used to obtain each criterion weight in selecting solar plants sites. This weight will be used in PROMETHEE methods to select the beneficial best project. The appropriate methodological frame work have been utilized to quantitative and qualitative approach for analyzing ranking of six types of solar power projects based on specific criteria. This result showed that the in promethee family BHADLA SOLAR PARK (JODHPUR DISTRICT) RAJASTHAN is the finest Solar power project amongst the six projects.

1 Introduction

A. Background on Promethee and Solar Energy Conservation Solar energy is the power obtained from the “sun” electromagnetic radiation, representing the most abundant and sustainable energy source available on Earth. Energy from Solar is renewable and versatile resource that may be used for a multitude of purposes such as agricultural processes and the production of electricity etc., With the continuous rise in global energy demand and the escalating concerns regarding climate change, Solar energy is now a vital component of a transition to a maintainable and low-carbon energy environment. By utilizing advanced technologies such as (PV) cells, (CSP), and solar thermal systems, solar radiation can be effectively converted into usable electricity. Solar power systems are generally categorized into active systems (for instance, solar panels and collectors) and passive systems (such as architectural designs and materials that maximize sunlight absorption). The foremost advantage of solar energy lies in its environmental sustainability—it generates no greenhouse gas emissions, reduces reliance on fossil fuels, and exerts minimal adverse impact on ecosystems. However, due to its intermittent nature, which depends on meteorological conditions and solar intensity, integrating solutions such as energy storage technologies or hybrid systems becomes imperative. With ongoing advancements in solar technologies and materials, solar energy is increasingly recognized as a cornerstone of future clean and resilient energy infrastructures.[13] The growing emphasis on solar energy arises from its significant environmental advantages, particularly its zero-emission operation and its capacity to substantially reduce dependence on fossil fuels. Moreover, solar energy systems are inherently modular, scalable, and increasingly cost-effective, owing to continuous advancements in materials science, manufacturing techniques, and energy storage technologies. Despite these advantages, large-scale solar energy deployment still encounters several challenges, including intermittency, land-use limitations, and high initial capital investment. Overcoming these barriers through enhanced

energy storage systems, improved grid integration, and supportive policy frameworks is crucial for fully realizing the potential of solar energy. Consequently, solar power remains a central pillar in the global transition toward sustainable and low-carbon energy systems.

In real-world Decision-Making analysis, predominantly in complex domains such as environmental, project selection, transportation planning, and energy system optimization, decision-makers are frequently confronted with problems involving multiple and often conflicting criteria. To address such challenges, Multi-Criteria Decision-Making (MCDM) method [10] have been generated to systematically evaluate and prioritize alternatives across diverse criteria. Among these, the Preference Ranking Organization Method for Enrichment Evaluations PROMETHEE stands out as one of the most robust and widely applied techniques. Introduced by Jean-Pierre Brans and Bertrand Mareschal in the early 1980s [2],[3]. PROMETHEE provides a structured frame for ranking and selecting alternatives based on preference functions and pairwise comparisons, thereby supporting transparent and rational decision-making in multi-criteria environments. PROMETHEE is the method allocates for a comprehensive ranking of alternatives based on a decision-makers preferences [1]. PROMETHEE does not require precise utility or preference assessment, in contrast to traditional utility-based approaches. Rather, it uses preference functions to indicate how much one alternative is preferred over another and relies on pairwise comparisons of alternatives across each criterion. Promethee Family contributions are included in this work. The correctness of each criterion weight of solar parks is first assessed using the appropriateness entropy approaches. However, it is worthwhile to consider the possibility of expanding the zones for future solar power plant advance development in order to get maximum power output at the lowest probable cost. The primary lends a partial ranking of each alternative according to optimal spatial site for solar energy production throughout India using the MCDM PROMETHEE FAMILY approach [6]. A number of aspects and criteria including scheduling and environmental requirements, were used to determine the optimum location for solar power plant development. The original and updated PROMETHEE family technique is used to solve a numerical problem right through the research. The subsequent steps with the article are systematized as follows:

Section 2 gives a brief of PROMETHEE family overview. A relevant Description of Criteria to assess solar energy conservation using both original and behavioural decision support methodologies is given in Section 3. The assumptions and procedures of the approaches were described in section 4. Section 5 examines the recommended process of outcomes. Section 6 Promethee Family Ranking diagram Section 7 Result and Discussion, Section 8 conclusions.

2 The PROMETHEE family overview

2.1 PROMETHEE I (Partial ranking)

The first phase of PROMETHEE present a partial ranking of alternatives [11]. It uses pairwise comparisons between the alternatives based on the criteria and generates a preference flows for each alternative. This flow indicates how much one alternative is preferred over another. However, PROMETHEE I only provide a partial order, meaning it does not always rank all alternatives definitely [4]. This version specifies a partial ranking of all alternatives based on positive flows, negative flows outranking flows. In these phases, the method calculates a preferences flow for each alternative based on pairwise comparisons across all criteria. It allows identification of incomparable alternatives when neither dominates the other completely, making it suitable when some ambiguity is acceptable.

2.2 PROMETHEE II (Complete ranking)

The second phase, PROMETHEE II, takes the results from PROMETHEE I and refines them into a complete ranking of alternatives. This phase incorporates the positive flows and negative flows preference for each alternative, PROMETHEE II combines the positive flow and negative flows into a single net flow called outranking, delivering a complete ranking of alternatives. It is the most widely used variant due to its simplicity and effectiveness in yielding a clear decision order. offering thorough ranking that completely arranges the options in order of greatest to developable one.

The main purpose of PROMETHEE II is to finalize the ranking process by calculating a more refined, overall preference for each alternative. And based upon this Promethee Family gave a Solution based upon Ranking.

2.3 PROMETHEE III (Interval ranking)

This version extends PROMETHEE II by incorporating uncertainty and imprecision in the input data. It uses interval-valued preference flows and introduces the concept of Ranking based on interval decision-making.

PROMETHEE III is specifically designed to handle decision problems involving uncertainty, interval-based outranking flows and imprecision in preference information. Unlike its predecessors, PROMETHEE III uses interval-valued preference functions, allocating for the modelling of imprecise or incomplete information. This is particularly useful in real-world decision-making scenarios where

precise data may be difficult to obtain. The method introduces interval outranking flows (positive, negative, and net flows) which represent the range within which the true preference values are expected to lie.

2.4 PROMETHEE IV (Continuous case)

PROMETHEE methods which are suitable for a finite number of discrete alternatives, PROMETHEE IV is designed for situations involving continuous alternatives. It is based on integral preference functions and is particularly useful to extend the methodology to handle continuous decision intervals.

In PROMETHEE IV, alternatives are not limited to a predefined list but can belong to a continuous domain. This capability is especially relevant in optimization problems where solutions can vary over a continuum (e.g., selecting optimal levels of investment, dosage, or design parameters). Adaptation to continuous decision problems, expanding the applicability of PROMETHEE to new domains. Use of integral preference functions instead of pairwise comparisons, allowing for the assessment of infinite or large sets of alternatives.

2.5 PROMETHEE V (Constrained and combinatorial selection)

PROMETHEE V integrates the PROMETHEE II methodology with integer linear programming to handle problems involving constraints, such as budget limits or resource availability. It is particularly useful in project portfolio selection and resource allocation problems.

This family specifically developed to handle involving discrete alternatives under additional constraints such as logical, budgetary, or resource-related limitations. solution respects feasibility constraints and involving combinatorial constraints and decision variables, such as binary or integer choices. It is specifically designed to support selection or ranking of a feasible subset of alternatives when the decision space is subject to explicit constraints, such as budget limits, resource capacities, or logical dependencies among alternatives. By using promethee II rank alternatives based solely on preference flows PROMETHEE V combines preference modelling with mathematical optimization techniques.

2.6 PROMETHEE VI (Behavioural modelling)

when human judgments are integrated into the model. It simulates the behavioural of a decision-maker and reflects psychological and behavioural aspects through a human-centered approach, In Promethee VI the model gives the decision-maker

more details about their personal perspective or analysis on the multicriteria dilemma.

PROMETHEE VI is a behavioural decision support method. The previous PROMETHEE I–V which are purely mathematical, PROMETHEE VI simulates decision-maker behavioural by using a conflict resolution strategy and visualizing a negotiation process among multiple hypothetical decision profiles. PROMETHEE VI, also a mathematical but it includes the preference function are here the shapes or profiles are (Quantitative normalized Usual shape called U shape, V in shape, V - shape with indifference, Level). simulates five behavioural profiles. The Weight based on decision-maker psychology is Conceptual (Qualitative normalized range-based approach) that is Optimistic (Focus on best values), Pessimistic – Focus on worst-case scenarios, Neutral – Balanced view of gains/losses, Risk-averse, Risk-seeking. The quantitative and qualitative both profiles have an entirely different Behavioural weights. Even not an entropy weight.

3 Methodology of the PROMETHEE family

The PROMETHEE family of methods belongs to the family of outranking techniques in multi-criteria decision-making, which are essential since their algorithms are based on particular preference relations that have been formed among pairs of alternatives [5], established are used to rank alternatives based on a given criteria (PROMETHEE I and PROMETHEE II) However, the PROMETHEE ranking's results can also be used to solve other decisions-making. The PROMETHEE ranking has gained a lot of popularity, primarily because it is an easy to understand and transparent computational process, which is beneficial for practitioners. Therefore, PROMETHEE VI supports the decision maker in determining the weights of criteria which is not based on entropy weights it's based on behavioural attitudes weights that make finest specific preference. Multiple cases of real-life applications that have been revealed at this point validate the PROMETHEE method's popularity [12], The following steps determine the PROMETHEE ranking:

The Entropy Weight $E(w_z)$ Method is an objective technique used to evaluate each criterion's (weight) according to the determination. It is widely useful in PROMETHEE I to V, where assigning appropriate weights to criteria is crucial. Apply them during calculation of preference indices, flows, or net flows and Promethee VI constraints a behavioural weights, behavioural attitudes, and final ranking. The behavior weight is (w_z) .

3.1 Entropy weight method

The entropy weight method is an objective weighting technique used to determine the relative importance of each criterion. The entropy value of each criterion is computed as

$$e_z = -h \sum_{i=1}^k r_{iz} \ln(r_{iz}), \quad z = 1, 2, \dots, l, \quad (3.1)$$

where $h = \frac{1}{\ln(k)}$. The weight of each criterion is obtained by

$$w_z = \frac{1 - e_z}{\sum_{z=1}^l (1 - e_z)}, \quad (3.2)$$

subject to

$$\sum_{z=1}^l w_z = 1. \quad (3.3)$$

3.2 PROMETHEE I and PROMETHEE II

For benefit criteria,

$$B_{ij} = \frac{G_{vr} - \min(G_{vr})}{\max(G_{vr}) - \min(G_{vr})}. \quad (3.4)$$

For cost criteria,

$$C_{ij} = \frac{\max(G_{vr}) - G_{vr}}{\max(G_{vr}) - \min(G_{vr})}. \quad (3.5)$$

where G_{vr} denotes the evaluation value of alternative v under criterion r .

$$P_j(a, b) = \begin{cases} 0, & R_{aj} \leq R_{bj}, \\ R_{aj} - R_{bj}, & R_{aj} > R_{bj}. \end{cases} \quad (3.6)$$

The net flow is calculated by

$$\phi(a) = \phi^+(a) - \phi^-(a). \quad (3.7)$$

3.3 PROMETHEE III

$$I(a) = [\phi(a) - \alpha\sigma_a, \phi(a) + \alpha\sigma_a]. \quad (3.8)$$

3.4 PROMETHEE IV

$$P(d) = \begin{cases} \frac{d}{n}, & 0 < d < n, \\ \frac{|d|}{n}, & -n < d < 0, \\ 0, & d \leq 0, \\ 1, & d \geq n. \end{cases} \quad (3.9)$$

3.5 PROMETHEE V

$$N_i \in \{0, 1\}, \quad (3.10)$$

subject to

$$\sum_{i=1}^l \text{Cost}_i N_i \leq \text{Budget}. \quad (3.11)$$

3.6 PROMETHEE VI

The quantitative behavioural weights are defined as

$$\text{Optimist} = \frac{R(w_g)}{\sum R(w_g)}, \quad (3.12)$$

$$(3.13)$$

$$\text{Pessimist} = \frac{1}{\min(w_g)}, \quad (3.14)$$

$$(3.15)$$

$$\text{Neutral} = \frac{1}{n}, \quad (3.16)$$

$$(3.17)$$

$$\text{Risk-averse} = \frac{1}{w_g}, \quad (3.18)$$

$$(3.19)$$

$$\text{Risk-seeking} = w_g. \quad (3.20)$$

Usual $\rightarrow$ 0 or 1

V-shape $\rightarrow$ Scale with difference / maximum difference

V-shape with indifference $\rightarrow$ Scale after ignoring small differences (q).

4 Application of the proposed method

Evaluation Matrix: evaluated over multiple criteria, Weights Assignment: Relative importance is assigned to each criterion, Preference Functions: functions are used to quantify the preference degree between alternatives on each criterion, Function, Multi Criteria Preference and Aggregated Preference Index, Parameters, Pairwise Preference, Budget Constraints, Attitudes. Outranking Flows: These include positive, negative, and net preference flows, which signify, how much an alternative outranks or is outranked. Ranking: Based on the flows, alternatives are ranked partially or completely, Constrained: The Cost. Attitudes: It has an individual weights based upon Quantitative and Qualitative (etc. . .)

5 Process of outcomes

Data Sources and Mapping: The National Renewable Energy Laboratory (NREL) is a generation of info and visuals of solar resources for India, including all States and Districts, which provide detailed information on GHI and DNI across the region. It has some collection of matrices that is Criterion Solar irradiance (S1), Efficiency of Solar panels (S2), Energy Yield (S3), Cost in crores (S4), Solar potential (S5), Capacity of Renewable energy (S6), parks (S7). The gauge leading to the conservation of solar energy parks are Bhadla (Y1), Charanka (Y2), Pava-gada (Y3), Kurnool (Y4), Rewa (Y5), Kamuthi (M6). Out of six projects, firstly assess the criteria weights using Entropy method. Then find the finest parks in the project using MCDM technics like Promethee family Techniques. Finally, the project is ranked mainly according to net flow. Statistical view on several Solar energy projects in India is gathered from related parks resources [9].

5.1 The growth of solar energy in India

“The solar energy power projects sector in India has perceived noteworthy growth in the last decade. With the launch of the Jawaharlal Nehru National Solar Mission (JNNSM) in 2010”, the government laid the foundation for large-scale solar

deployment [14],[15].

Table 1: Data set for various conservation of solar energy and entropy weights

	S1	S2	S3	S4	S5	S6	S7
Y1	6.5	0.22	1900	5	142.31	19.9	9
Y2	6	0.21	1800	7.38	35.77	10.6	7
Y3	5.5	0.20	1700	5	24.70	9.2	2
Y4	5.5	0.20	1700	4.5	38.44	4.3	5
Y5	5.4	0.21	1700	4.87	61.66	5.5	8
Y6	6	0.21	1800	5.95	23.70	1.73	9
$E(w_z)$	0.00391	0.00096	0.00156	0.02637	0.41585	0.40312	0.14824

Table 2: Maximum, minimum and range values of criteria

Criterion	S1	S2	S3	S4	S5	S6	S7
Min	5.4	0.2	1700	4.5	23.7	1.73	2
Max	6.5	0.22	1900	7.38	142.31	19.9	9
Raw or Range (w_g)	1.1	0.02	200	2.88	118.61	18.17	7

Table 3: Behavioural attitude of criteria (Max = T, Min = F)

Criterion	S1	S2	S3	S4	S5	S6	S7
Direction	T	T	T	F	T	T	T
Attitude shape	V	U	V	V in-differ	V	U	U

Table 4: Pairwise preference comparison (M1 to M3)

Case	Pair	S1	S2	S3	S4	S5	S6	S7
Case 1								
	Y1 vs Y2	0.5	0.01	100	-2.38	106.54	9.3	2
	Y1 vs Y3	1	0.02	200	0	117.61	10.7	7
	Y1 vs Y4	1	0.02	200	0.5	103.87	15.6	4
	Y1 vs Y5	1.1	0.01	200	0.13	80.65	14.4	1
	Y1 vs Y6	0.5	0.01	100	-0.95	118.61	18.17	0
Case 2								
	Y2 vs Y1	-1	0	-100	2	-107	-9	-2
	Y2 vs Y3	0.5	0.01	100	2.38	11.07	1.4	5
	Y2 vs Y4	0.5	0.01	100	2.88	-2.67	6.3	2
	Y2 vs Y5	0.6	0	100	2.51	-25.89	5.1	-1
	Y2 vs Y6	0	0	0	1.43	12.07	8.87	-2
Case 3								
	Y3 vs Y1	-1	-0.02	-200	0	-117.61	-10.7	-7
	Y3 vs Y2	-0.5	-0.01	-100	-2.38	-11.07	-1.4	-5
	Y3 vs Y4	0	0	0	0.5	-13.74	4.9	-3
	Y3 vs Y5	0.1	-0.01	0	0.13	-36.96	3.7	-6
	Y3 vs Y6	-0.5	-0.01	-100	-0.95	1	7.47	-7

Table 5: Pairwise preference comparison (M4 to M6)

Case	Pair	S1	S2	S3	S4	S5	S6	S7
Case 4								
	Y4 vs Y1	-1	-0.02	-200	-0.5	-103.87	-15.6	-4
	Y4 vs Y2	-0.5	-0.01	-100	-2.88	2.67	-6.3	-2
	Y4 vs Y3	0	0	0	-0.5	13.74	-4.9	3
	Y4 vs Y5	0.1	-0.01	0	-0.37	-23.22	-1.2	-3
	Y4 vs Y6	-0.5	-0.01	-100	-1.45	14.74	2.57	-4
Case 5								
	Y5 vs Y1	-1.1	-0.01	-200	-0.13	-80.65	-14.4	-1
	Y5 vs Y2	-0.6	0	-100	-2.51	25.89	-5.1	1
	Y5 vs Y3	-0.1	0.01	0	-0.13	36.96	-3.7	6
	Y5 vs Y4	-0.1	0.01	0	0.37	23.22	1.2	3
	Y5 vs Y6	-0.6	0	-100	-1.08	37.96	3.77	-1
Case 6								
	Y6 vs Y1	-0.5	-0.01	-100	0.95	-118.61	-18.2	0
	Y6 vs Y2	0	0	0	-1.43	-12.07	-8.87	2
	Y6 vs Y3	0.5	0.01	100	0.95	-1	-7.47	7
	Y6 vs Y4	0.5	0.01	100	1.45	-14.74	-2.57	4
	Y6 vs Y5	0.6	0	100	1.08	-37.96	-3.77	1

Table 6: Aggregated preference function $\pi(a, b)$

	Y1	Y2	Y3	Y4	Y5	Y6	Row Sum	Positive flow
Y1	0	94.968	157	152.33	144.24	99.530	647.899	129.580
Y2	0.08092	0.000	1	0.83	0.56	1.574	4.333	0.867
Y3	0	0.000	0	0.77	0.56	1.211	2.545	0.509
Y4	0	0.000	0	0.00	0.00	0.004	0.013	0.003
Y5	0	0.001	0	0.01	0.00	0.023	0.038	0.008
Y6	0	0.002	73	73.40	73.40	0.000	220.211	44.042
Column sum	0.08092	94.971	232	227.34	218.76	102.342	—	—
Negative flow	0.016184	18.994	46	45.47	43.75	20.468	—	—

Table 7: Ranking based on net flow

Alternative	ϕ (Net flow)	Rank
Y1	129.6	1
Y2	-18.1	3
Y3	-45.8	6
Y4	-45.5	5
Y5	-43.7	4
Y6	23.6	2

Table 8: Net Flows and Rankings under Different behavioural Attitudes

Alternative	Optimist		Pessimist		Neutral		Risk-averse		Risk-seeking	
	$\phi(\text{net})$	Rank	$\phi(\text{net})$	Rank	$\phi(\text{net})$	Rank	$\phi(\text{net})$	Rank	$\phi(\text{net})$	Rank
Y1	0.84	1	0.69	1	0.76	1	0.70	1	0.82	1
Y2	0.32	2	0.22	2	0.26	2	0.23	2	0.28	2
Y3	0.14	4	0.10	4	0.12	4	0.10	4	0.12	4
Y4	0.15	3	0.12	3	0.13	3	0.12	3	0.14	3
Y5	0.12	5	0.10	5	0.11	5	0.10	5	0.11	5
Y6	0.11	6	0.09	6	0.10	6	0.09	6	0.10	6

Table 9: Robustness Analysis Rankings under All behavioural Attitudes

Alt	Optimist	Pessimist	Neutral	Risk-averse	Risk-seeking	Robustness
Y1	1	1	1	1	1	Robust best
Y2	2	2	2	2	2	Robust good
Y3	4	4	4	4	4	Sensitive
Y4	3	3	3	3	3	Stable Mid
Y5	5	5	5	5	5	Sensitive
Y6	6	6	6	6	6	Robust worst

Table 10: Comparison of Rankings under the PROMETHEE Family Methods

Promethee Family - MCDM

Alternative	I & II	III	IV	V	VI
Rajasthan	1	1	3	1	1
Gujarat	2	4	6	2	3
Karnataka	4	2	5	5	6
Andhra Pradesh	5	6	4	6	5
Madhya Pradesh	3	3	2	3	4
Tamil Nadu	6	5	1	4	2

6 PROMETHEE family ranking diagram



Figure 1: Qualitive Normalize Ranking

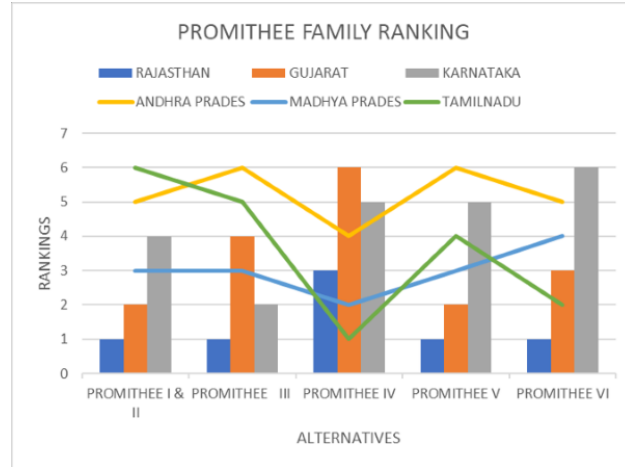


Figure 2: Promethee Family Ranking

7 Result and discussion

- The PROMETHEE I to VI assessments were conducted to assess six solar energy alternatives based on seven criteria. Each stage of the PROMETHEE family

provided more comprehensive insight into the decision-making process and the ranking stability of alternatives under varying assumptions.

- In PROMETHEE I (Partial Ranking), the alternatives were evaluated pairwise to find benefit criteria and cost criteria. The Matrix found that Rajasthan Strongly outranked other states, while Tamil Nadu and Andhra Pradesh demonstrated weaker dominance associations compared to other States. PROMETHEE II (Complete Ranking) refined this into a full priority order based on net flow values, again establishing Rajasthan as the best-performing option, followed by Gujarat and Karnataka.

- In PROMETHEE III (Interval Ranking) by defining preference intervals, revealing stable ranking patterns and it also shows that Rajasthan is Strongly Out-ranked.

- In PROMETHEE IV (Continuous Ranking) extended the analysis to continuous ranking of preference flows, and Out rankings.

- In PROMETHEE V (Constraints), the method integrated additional constraints cost, and selected alternative to determine the optimal combination of states for solar energy growth. This optimization strengthened Rajasthan and Gujarat as ideal locations within real-world limits(Y1,Y2).

- Finally, PROMETHEE VI (Behavioural Analysis) introduced decision-maker behavioural profiles (optimistic, pessimistic, neutral, risk-seeking, and risk-averse) to evaluate the ranking outcomes. Rajasthan consistently had the greatest net flow values, according to the behavioural sensitivity study, while Gujarat and Karnataka held intermediate places, suggesting ranking constancy throughout decision perceptions.

- Overall, the results confirm that the PROMETHEE family of methods provides a comprehensive and flexible multi-criteria decision-making framework. By integrating both quantitative criteria and behavioural aspects, the approach delivers transparent, robust, and policy-relevant insights for solar energy planning and sustainable site selection across India.

8 Conclusion

The PROMETHEE FAMILY framework was effectively used in this study to evaluate solar energy options according to a multiple criteria and behavioural profiles. The model improved understanding and precision by combining optimization, attitude-based evaluation, and entropy-based weighting. The results showed that Rajasthan, Gujarat, and Karnataka were the states most conducive to the development of solar energy. Overall Rajasthan take place at first. PROMETHEE VI's incorporation of behavioural analysis demonstrated how different choice of behavioural attitudes have ranking results. All things considered, the PROMETHEE family showed remarkable potential as an open, flexible, and trustworthy instrument for strategic and sustainable solar energy planning in India.

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