

Standardizing Energy Policy Analysis: A Global Ontology of Factors and Research Questions for a Sustainable Transition

S. Lumbreras Sancho; A. González Moreno

Abstract-

Despite the surge in energy policy research, the absence of a standardized vocabulary for analytical factors hinders the comparability of studies and, therefore, the effectiveness of policy design. This study addresses this gap by developing a comprehensive, multidimensional ontology of 190 unique factors extracted from a structured review of 150 high-impact articles published in 2024 and 2025. Factors were organized into 11 functional categories and classified by their analytical roles as inputs, outputs, decisions, or mediating variables. Input and output roles accounted for most factor assignments, representing 44.4% and 36.8%, respectively, while mediating and decision-oriented factors were less frequent. The analysis also identified geographical differences within the reviewed sample. The regional comparison focused on China, Europe, and the Middle East, the three most represented regions in the dataset. Chinese studies more frequently emphasized environmental policy stringency and government intervention, European studies placed greater emphasis on system profitability and capital investment requirements, and Middle Eastern studies highlighted demand flexibility and system profitability. These patterns should be interpreted as descriptive findings within the reviewed sample. Although the short time window limits the ability to infer long-term trends, it allows the ontology to capture recent developments and emerging analytical priorities in energy policy research. This ontology provides a robust, standardized framework that bridges the gap between technical power system modeling and socio-economic policy analysis. By aligning research variables with global sustainability targets, this tool facilitates more transparent decision-making toward sustainable energy systems.

Index Terms- energy policy; ontology; decision-making support; research questions; policy factors; energy transition; standardized framework

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Sustainability, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Lumbreras, S.; González-Moreno, A. "Standardizing Energy Policy Analysis: A Global Ontology of Factors and Research Questions for a Sustainable Transition", Sustainability, vol.18, no.13, pp.6648, July, 2026.