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Sustainable Energy Planning and Management with focus on local energy system transition, spatial carbon factors, community ownership, trust, and household energy management

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ABSTRACT

This 46th volume of the International Journal of Sustainable Energy Planning and Management presents contemporary work within the diverse field of energy planning with important new contributions on local energy system transition and district heating transition – both scenario-based analyses applying the EnergyPLAN model. The volume also probes into spatial carbon emission factors for China. Moving towards implementation of energy transition measures, the volume includes work on community ownership models as well as trust and acceptance of geothermal projects in East Africa. Lastly, and novel to this journal, a final article addresses links between religious practise and energy management in Indonesian households.

Keywords

Decarbonisation local systems;
District heating conversion;
Spatial carbon accounting;
Community ownership;
Trust, opposition and acceptance;
Household energy consumption

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1. Issue Contents

Bang, Nielsen and Lund [1] explore how global decarbonisation goals can be translated into actionable local energy planning within a Danish municipality. It presents four methodological steps for adapting a national energy scenario to the local context, emphasising the need to assess local potentials and constraints. By aligning local planning with national visions, municipalities can contribute meaningfully to a coherent energy transition. The study demonstrates that integrating global perspectives into local strategies enhances understanding of the national decarbonisation pathway and positions local systems as active components of a fully decarbonised future. The work performs its energy systems analyses using the widely applied EnergyPLAN model (See [2,3]),and the work follows up on previous analyses of local energy systems ranging from Aalborg, Denmark[4] via the Faroes[5] to the Alps [6] and beyond.

Smart district heating systems offer efficient, sustainable heat supply solutions. In Ref. [7], Dragusha and coauthors explore transitioning coal cogeneration in Prishtina, Kosovo, by integrating advanced technologies and reducing building heat demand. Using 2018 as a baseline, a bottom-up model evaluates scenarios shaped by current and future policies, including system expansion, wind-powered heat pumps, solar thermal storage, and individual heating changes. As with Bang [1] , this team applies the EnergyPLAN model to assesses energy savings, wind electricity generation, and sector coupling synergies. Results highlight substantial reductions in primary energy use and CO_2 emissions, emphasising the role of decarbonised heating strategies in enhancing system flexibility and renewable integration. Bidaj analysed electricity consumption for heating in nearby Albania[8]

Carbon accounting outcomes vary across temporal and spatial dimensions. A study by Tian [9] examines carbon emission factor calculations for a central China

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power grid, emphasising time- and region-specific accuracy. It analyses accounting differences at substation, administrative, and voltage levels, and proposes a multi-dimensional method based on the link between power generation and emissions. Quantitative analysis reveals emission variations across time and space, evaluating partitioning strategies from the perspectives of utilities, consumers, and policymakers. The findings underscore the need for standardised, granular approaches to enhance interpretability and support future research in power grid carbon accounting.

Community ownership models for renewable energy systems have emerged across the global south. In this volume of the IJSEPM, Schneider, Abraham and [10] Roche investigate the potential role of community ownership in addressing electricity access disparities, especially in remote areas. Using a scoping literature review and expert interviews, it examines varied interpretations and applications of community ownership in DRE. Four key themes—regulation, financing, roles and power, and capacities—are identified. Applying a multi-level perspective, the study highlights implications for energy access, socio-economic policy, and future research. Previously in this journal, Rygg and coauthors explorer ownership of small-scale hydro power stations with a perspective to social acceptance, and Proimakis explored community involvement in marine energy projects[11]. Tricarico[12] and Butu and Strachan[13] explored aspects of community energy systems while Bishoge [14,15] focused on community involvement in Tanzania.

A study by Mahamoud [16] examines trust-related social opposition to geothermal energy projects in East Africa, focusing on public participation materials from seven Environmental and Social Impact Assessments. Despite geothermal energy's clean and renewable profile, projects like Olkaria IV and Akiira in Kenya have faced resistance rooted in corporate, technological, and procedural trust concerns. These concerns are linked to employment, corporate social responsibility, environmental and social risks, and public engagement. The study underscores the need for transparent employment practices, fair corporate conduct, and inclusive public engagement. It recommends clearer guidelines for participation and stronger legal frameworks on land and resettlement, urging companies to improve procedural fairness and build trust with local communities. Trust and acceptance are also key elements in the community energy systems reviewed above, but in addition, authors like Akinwale [17] have focused more explicitly on factors leading to acceptance.

Hasmin and Nurung [18] examine how Religious-Based Family Management (RBFM) and Silaturahim Quality influence household resilience and consumption in Indonesia's energy transition. Based on data from 325 households and Structural Equation Modelling, RBFM significantly reduces Absolute Poverty directly and indirectly. RBFM also boosts Silaturahim Quality, highlighting the role of religious governance in strengthening social support. Findings emphasise the value of informal institutions in shaping sustainable energy strategies and recommend integrating local cultural systems into decentralised planning. This topic is novel in this journal, but Umoh[19] has previously addressed energy management in the Nigerian residential sector, Silva [20] addressed demands and savings potentials in low-income Brazilian households and Damayanti [21] assessed an Indian programme for the introduction of induction stoves in households

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