Feasibility of achieving 70% renewable energy supply in Sri Lanka by 2030: A scenario analysis

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Sri Lanka's energy sector is undergoing a significant transition aimed at strengthening energy supply security, reducing dependence on imported fossil fuels, lowering electricity costs, and mitigating greenhouse gas emissions. In 2024, renewable energy accounted for approximately 47% of total electricity generation, with the remainder largely reliant on imported coal and petroleum (Sri Lanka Sustainable Energy Authority, 2024). The national energy policy targets sourcing 70% of the country's electricity from renewable energy by 2030, aligning with Sustainable Development Goals (SDGs) 7 on affordable and clean energy and 13 on climate action. While ambitious, the target faces substantial technical, financial, and institutional challenges. Guided by energy transition theory, this study evaluates the feasibility of achieving the national energy-mix transition target using secondary data from the Ceylon Electricity Board, International Energy Agency, and Sri Lanka Sustainable Energy Authority. The analysis covers the period from 2010 to 2023 through a descriptive approach using scenario analysis to assess current energy mix, renewable capacity growth, demand trends, and fossil fuel dependency. The scenario modelling considers four pathways: baseline (business as usual), optimal (high renewable adoption with strong policy support), pessimistic (low renewable adoption due to barriers), and middle (moderate progress). Findings reveal that under the baseline scenario, the renewable energy share is projected to reach only 50% by 2030, well short of the target. The optimal scenario demonstrates technical feasibility if substantial investments in solar, wind, and grid modernisation are paired with stable policy frameworks. The pessimistic case highlights the risk of stagnation, while the middle case suggests a realistic possibility of 60–65% share with steady reforms. The study concludes that achieving the 70% renewable energy target is possible but requires decisive actions in capacity expansion, policy stability, financing mobilisation, demand-side management, and enhanced grid integration. Success or failure in this endeavor will influence not only Sri Lanka's domestic energy security but also its role as a regional model for small, import-dependent economies pursuing clean energy transitions.

Keywords: *Energy policy, Renewable energy transition, Scenario analysis, Sri Lanka, Sustainable Development Goals*