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Designing power purchase agreements and market arrangements in Single-buyer models under energy transition

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Extended Abstract

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Abstract Summary

The Single-buyer electricity market model (SBM) is the dominant market architecture in developing economies, centralizing procurement through a state-owned or regulated entity that signs long-term power purchase agreements (PPAs) with independent power producers. As the share of variable renewable energy (VRE) increases, these markets face a fundamental challenge: traditional competitively tendered, fixed-price PPAs reveal developers' costs through auctions but fail to reveal the system value of intermittent generation. This paper develops a theoretical framework to analyze PPA pricing in SBMs under increasing VRE penetration and proposes an alternative arrangement, the Adjusted Power Purchase Agreement (Adjusted-PPA), that incorporates marginal system conditions into contractual settlements.

Presenting Author Biography

Dr. Selahattin Murat Sirin is a Research Fellow at KAPSARC specializing in regulation, business economics, electricity markets, and sustainable energy.