

Stochastic Market Clearing: An Adequate Pricing Scheme Per Scenario

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Abstract:

Each market-clearing model needs an adequate pricing scheme to guarantee two properties: i) revenue adequacy for the market, and ii) cost recovery for all producers (either conventional or non-dispatchable renewable) and transmission operator. In case of stochastic market-clearing models, the available pricing schemes in the literature either fulfill both properties in expectation only or satisfy one property per scenario and another in expectation. This has been criticized since both properties are not guaranteed per scenario. In this work, we propose a stochastic two-stage market-clearing model including day-ahead and real-time settlements with an energy-only pricing scheme that ensures both properties per scenario. This renders a stochastic equilibrium problem that is recast as a mixed-integer linear programming problem. Numerical results from an illustrative example and a case study based on the IEEE RTS demonstrate the usefulness of the proposed model.