

# ECONOMIC INEFFICIENCIES OF COST-BASED ELECTRICITY MARKET DESIGNS

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## EXECUTIVE SUMMARY

Some restructured power systems rely on audited cost information instead of competitive bids for the dispatch and pricing of electricity in real time, particularly in hydro systems in Latin America. Audited costs are also substituted for bids in U.S. markets when local market power is demonstrated to be present. Regulators that favor a cost-based design argue that this is more appropriate for systems with a small number of generation firms because it eliminates the possibilities for generators to behave strategically in the spot market, which is a main concern in bid-based markets. In this paper, we discuss several types of economic inefficiencies that can result from relying on audited information instead of on bids that typically reflect both direct and opportunity costs, to determine the optimal dispatch and prices of electricity in a power system. We make two basic arguments. First, it is incorrect to argue that forcing generators to bid their marginal fuel costs eliminates all possibilities for the exercise of market power and thereby increases the economic efficiency of the system. As we discuss in the literature review and demonstrate with a simple example using a bi-level equilibrium model, by design cost-based markets do indeed, effectively, prevent the exercise of strategic behavior in the short-run—exactly the type of market power that regulators and final consumers are most sensitive to. However, those markets also can provide incentives for generation firms to strategically select capacities and technologies that lead to a long-run equilibrium that is distant from a perfectly competitive one, and that the resulting market inefficiency is difficult to correct through market rules if investments are deregulated.

Our second argument is that, even in the absence of strategic behavior, identifying and auditing the total marginal costs of all generators in real time is challenging and likely to lead to incorrect estimates and inefficient dispatch. Marginal costs have two components: 1) direct costs that are directly attributable expenditures on fuel, operation and maintenance (O&M), and any other variable inputs and 2) opportunity costs. The inefficient dispatch could, in theory, be avoided if generators were allowed to bid both direct and opportunity costs instead of only directly attributable costs. Furthermore, the information required to compute the opportunity costs of all generators in real time goes far beyond the responsibilities of the SO. This requires access to information concerning intertemporal generator constraints as well as on parallel markets, such as natural gas, emissions permits, and renewable energy certificates.

**Keywords:** electricity market design; market power; equilibrium modeling; opportunity costs.

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