

A holistic framework for the design and implementation of regional transmission cost allocation: Opening a can of worms in the West African Power Pool

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Abstract-

Regional transmission cost allocation (RTCA) is widely recognised as a prerequisite for financing and expanding cross-border electricity networks. Although the subject has traditionally been approached from a techno-economic-regulatory perspective, the practical implementation of RTCA reforms is influenced by a broader set of institutional, political, and financial factors that have received limited attention in the literature. This paper develops a holistic framework for designing and implementing RTCA, integrating technical principles with institutional governance, political economy, and financial considerations. The framework is illustrated through an embedded case study of the recent RTCA reform in the West African Power Pool (WAPP), informed by technical modelling, documentary analysis, stakeholder consultations, and the authors' direct participation in the reform process. Applying the framework to the case study shows that successful RTCA reform requires both a sound techno-economic design and the ability to navigate the compromises required to make that design implementable in practice. The recent adoption of the revised RTCA methodology in WAPP provides an opportunity to examine how these compromises were progressively managed through credible institutional arrangements, stakeholder engagement, transitional mechanisms that accommodated political constraints, and financial arrangements supporting both cost recovery and investment. While the institutional context of WAPP is specific to West Africa, the framework developed in this paper provides a structured lens for analysing and guiding RTCA reforms in other regional electricity markets. More broadly, it suggests that successful RTCA should be understood as a multidimensional regulatory process that requires the alignment of techno-economic, institutional, political, and financial arrangements.

Index Terms- Regional transmission cost allocation; Holistic framework; Institutional governance; Political economy; Regional regulation; West African power pool

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Citation:

Elabbas, M.A.E.; Pérez-Arriaga, I.J.; Olmos, L.; Pontoni, F. "A holistic framework for the design and implementation of regional transmission cost allocation: Opening a can of worms in the West African Power Pool", Energy Policy, vol.219, pp.115575, December, 2026.