

Transmission Investment and Cost Allocation in Electricity Markets:

A Paper in Honor of Stephen Littlechild

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The Argentine case from the 1990s presented early on many of the challenges of evaluation and payment for transmission infrastructure in the context of an organized electricity market, as compared to the related but different challenges under the model of a vertically integrated monopoly. Littlechild recognized the innovations in Argentina and foreshadowed the appearance of similar problems and possible solutions that could apply in the expanding reforms of electricity systems. **Regulated monopoly or government decisions were to be replaced by the “Public Contest Method.”** (Littlechild and Skerk, 2008b), (Littlechild and Skerk, 2008a), (Littlechild and Skerk, 2008c), (Littlechild and Skerk, 2008d), (Littlechild and Ponzano, 2008), (Littlechild and Skerk, 2008e).

Public Contest Framework for Major Transmission Expansions:

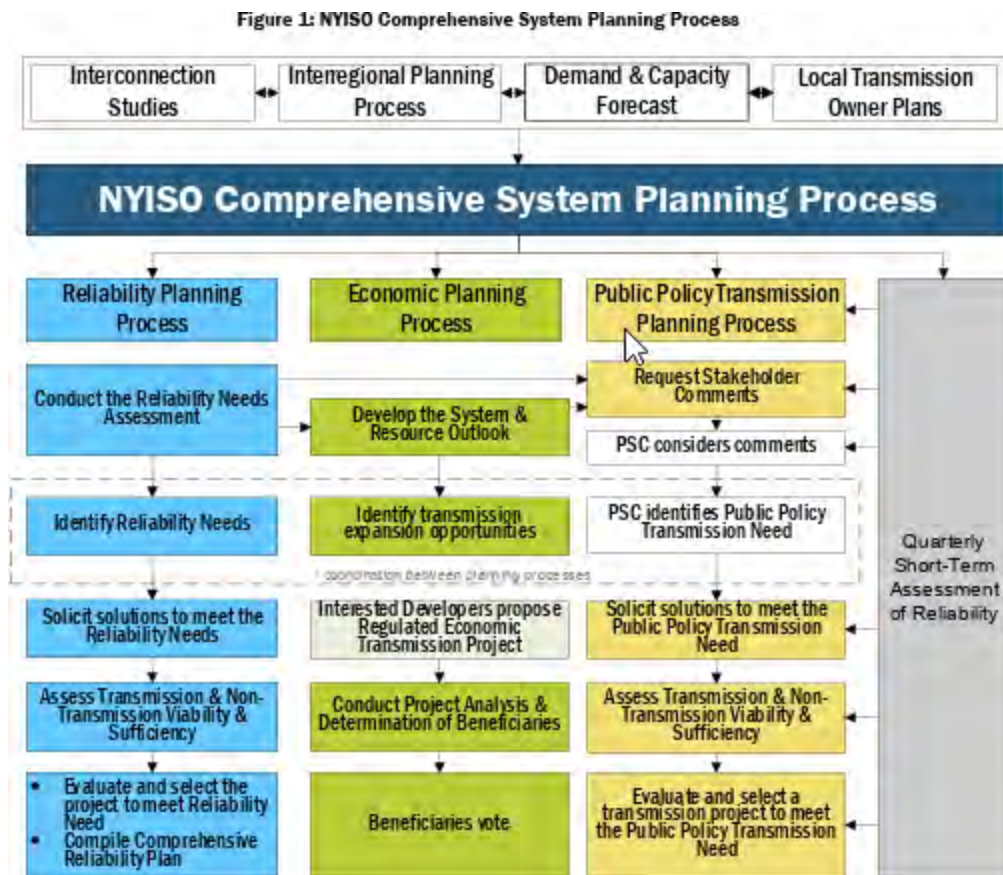
- **Identification of Beneficiaries.** The system operator carries out a technical study, using the so-called Area of Influence method, to identify the “beneficiaries” of the expansion and the proportion in which each beneficiary would have to share the costs of amortisation. The transmission company reports on the technical feasibility of the request.
- **Beneficiaries Vote on Expansion.** In the event of opposition by 30% or more of the beneficiaries of the expansion, the regulator must reject the expansion request.
- **Competitive Bidding.** The proponents then arrange for a public tender to construct, operate and maintain the proposed expansion. Subject to some qualifications, the tender goes to the lowest bidder.

Initially, an important case--“the Fourth Line”--failed to find support. Littlechild and Skerk found that the line was uneconomic at the time, and with changed economic conditions was later constructed under the Public Contest method: “far from demonstrating the failure of the Public Contest method, the Fourth Line experience taken as a whole is testament to its success” (Littlechild and Skerk, 2008b, p. 1415)

ELECTRICITY MARKET

Transmission Benefit Calculations

The Argentine Model for the Public Context echoes in the current transmission planning theory in the organized markets of North America. (NYISO, 2023, p. 5)

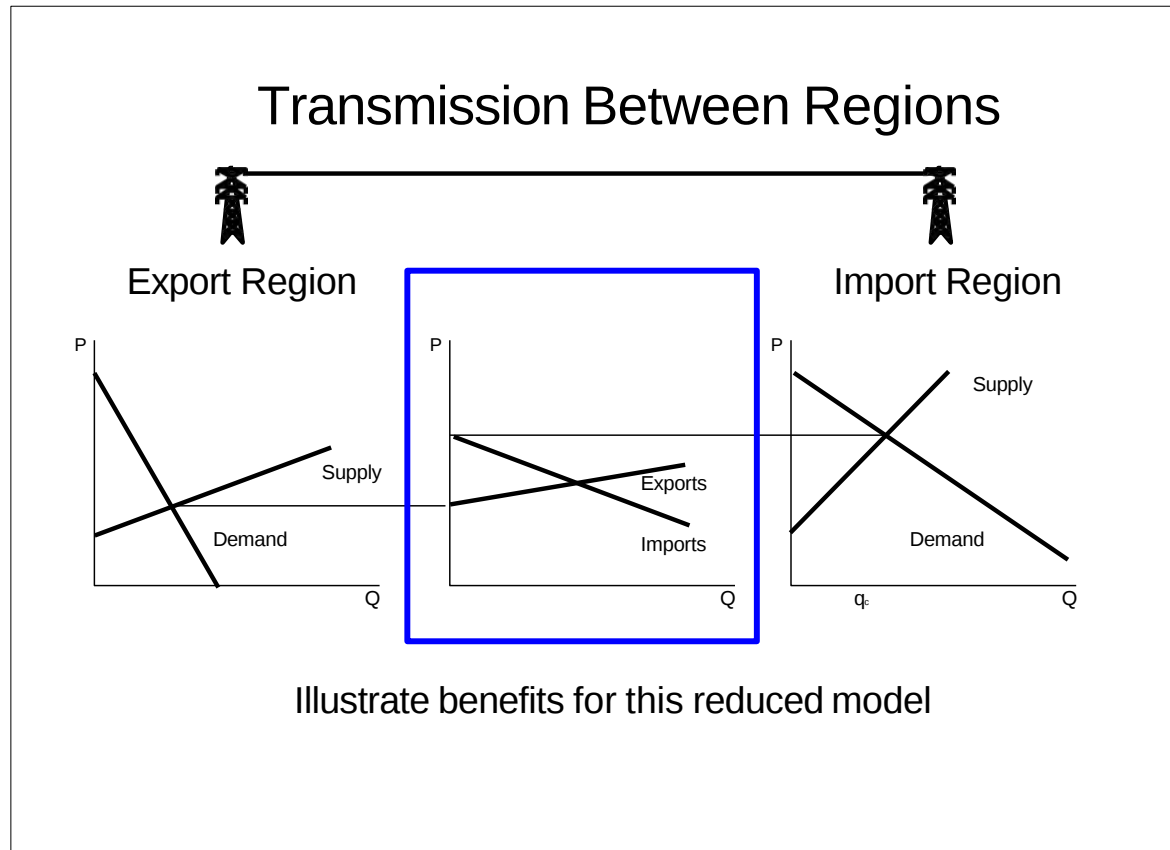


For example, in New York ISO, different lines are treated differently, with different cost allocation rules. A major deficiency is in defining the benefits that would underly the decisions and the cost allocation. A new approach is required. (FERC, 2025)

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Transmission Benefit Calculations

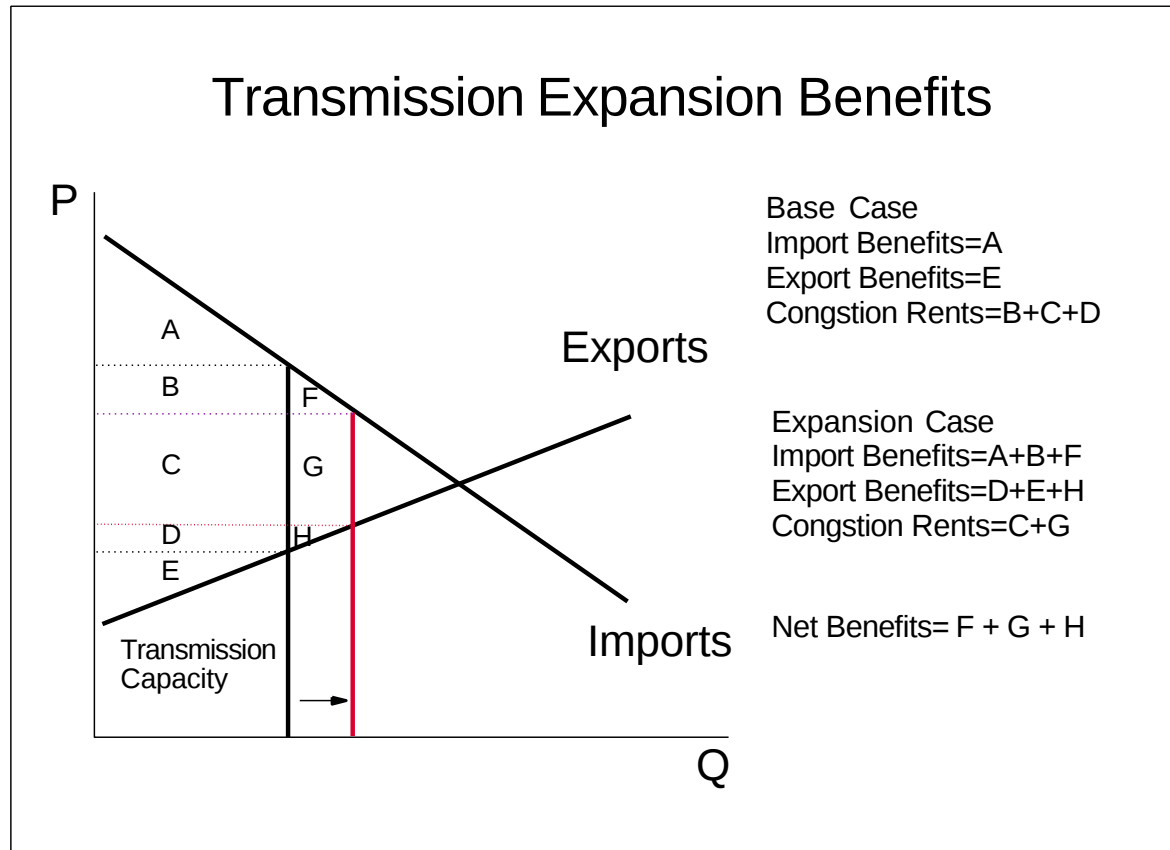
A simple model illustrates a basic framework for defining and classifying the impacts of transmission expansion. The same analysis applies to a network. (Hogan, 2018) (Hogan, 2020)



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Transmission Benefit Calculations

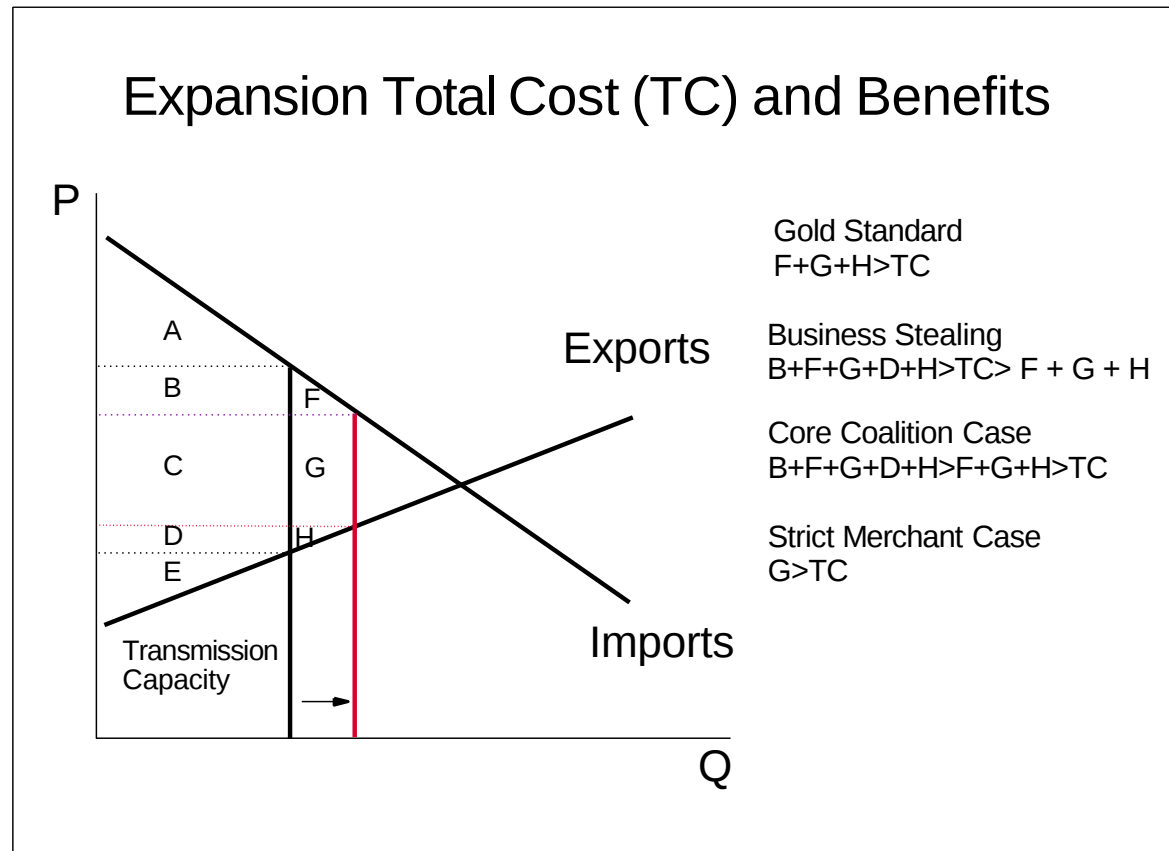
Large scale transmission investments can change export and import volumes and have a material effect on expected market prices.



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Transmission Benefit Calculations

Different conditions can arise in parsing the distribution of benefits and the comparison with the total cost of the transmission expansion.



Transmission expansion typically involves material economies of scale. Hence marginal cost pricing would not recover the full investment costs. This calls for multi-part pricing.

- **Transmission Scarcity Pricing.** The basic LMP model addresses the efficient use of the transmission grid. The associated congestion revenues support financial transmission rights which can be purchased and contribute to covering part of the cost of the network.
- **Residual Costs.** To the extent possible, residual system costs should be allocated to the ex ante beneficiaries as fixed charges independent of ex post usage.
 - **Fixed Connection Charges.** Set at levels that avoid disconnection from the grid.
 - **Variable Cost Recovery.** Any remaining costs that must be collected as variable charges should be spread widely (e.g. all MWhs) to approximate one-part Ramsey prices and minimize changes in efficient usage at market-clearing prices.

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