MIT Climate Policy Center

POLICY BRIEF

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Preliminary Analysis on Estimating Non-Engineering Costs to Building Transmission

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SUMMARY

Planning models routinely project large transmission build-outs since transmission lets systems access cheaper generation. In practice, however, actual build-out consistently falls short of these projections. This is because standard models price only the engineering cost of transmission, missing the cost-sharing disputes, local opposition, and permitting hurdles that create real-world barriers to development. We provide a first-cut estimate of these non-engineering barriers as cost multipliers to the engineering cost needed to build transmission.

FINDINGS

Financial incentives aimed at lowering the cost of building transmission address only the engineering portion of cost. For the small set of high-multiplier corridors, engineering cost is a minor share of what stands in the way of new capacity. The primary obstacles are siting, permitting, and local opposition, and policy instruments that focus only on engineering costs without addressing these barriers directly will be less effective.

Fig. 1 shows the non-engineering cost multipliers for different transmission corridors. A value near zero indicates the corridor faces little barrier beyond engineering costs. Higher values indicate corridors where non-engineering frictions inflate transmission cost such that it becomes more difficult to build in that area.

The map shows roughly three tiers. A large share of corridors fall in the low range (green). A broad middle tier (yellow to orange) which spans roughly 10 to 30 times the standardized cost of $2000 per MW-year as additional non-engineering cost, distributed across corridors in the Midwest, Central, and Northwest. A small number of corridors exceed 40 (purple) or approach it (dark red). These outliers cluster around west Texas, the Southwest, and a high non-engineering cost corridor in the Northwest connecting to the Mid-Atlantic.

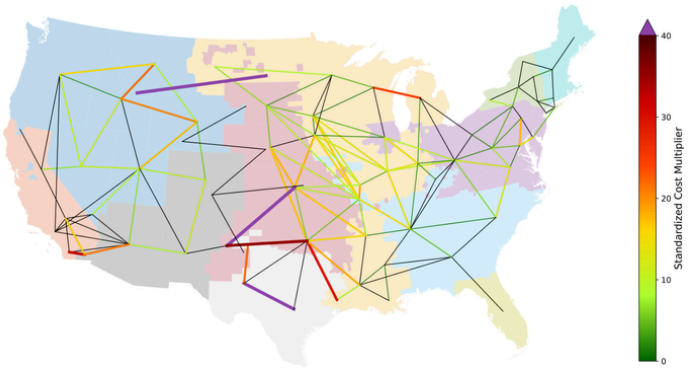

Figure 1: Cost Multipliers for line connections in the United States. Higher values indicate higher non-engineering costs. Black lines indicate no additional non-engineering costs.

METHOD

The standardized cost multiplier is estimated using an iterative search in the GenX capacity expansion model. In each iteration, the model solves for the cost-minimizing transmission build-out across the full network. Any corridor selected for new investment in that iteration has its cost increased by 10% of its own engineering cost before the next iteration is solved. This process repeats until no corridor is selected for new investment anywhere in the network.

Because the increment scales with each corridor's own engineering cost rather than a fixed dollar amount, the number of iterations a corridor survives corresponds to a multiple of its own baseline cost, not an absolute dollar figure. After the search is complete, these corridor-specific multiples are converted to a common standardized scale, expressed as an equivalent cost in $2,000/MW-year terms, so that corridors with very different baseline engineering costs can be compared on the same basis.