

# MERCHANT TRANSMISSION REDUX

Financial transmission rights and regulated returns have not induced needed construction. Presenting an alternative model.

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**B**etween 1975 and 1999, transmission investment fell from \$5 billion per year (in 2003 dollars) to less than half that amount. It is now on an upward trend, but the 2003 figure (the latest available) is only \$4.1 billion.<sup>1</sup> Even if investment increases substantially and stays high, the decline in transmission capacity relative to peak loads will not be reversed quickly.<sup>2</sup> That ratio peaked in 1982, a year when wholesale markets had begun to grow.

By 2004, 75 percent of power generated in the United States went through those markets (this figure does not include some bilateral transactions).<sup>3</sup> Arguments that the system was not “designed” for wholesale transactions are beside the point: They are taking place, providing benefits, and must use the same wires that serve everyone else.

By almost any measure, the nation is running short of transmission, and the existing volume of investment cannot long continue to reliably accommodate retail-load growth and larger wholesale volumes. Factors like environmental opposition also have caused declines and delays in transmission investment, but it seems clear that financial transmission rights

(FTRs) and regulated returns have not sufficed to induce the necessary construction.

## **LMP and the Value of FTRs**

Uncertainty about the FTRs granted to new transmission lines is only one reason they provide inadequate incentives. Because their value falls with new investment, awarding FTRs to a line builder almost is self-defeating. In the long debate over locational marginal prices (LMP) and FTRs, this consequence largely went unnoticed. Under LMP, the price difference between two nodes equals the difference in their incremental generation costs. (This difference also is the value of an extra megawatt of transmission service between them.) It was thus expected that LMP would provide incentives to locate new generators efficiently and expand transmission where appropriate.

But no one ever adds just 1 MW of transmission capacity. Scale economies remain so great that an efficiently sized upgrade or new line almost invariably will shrink nodal price differences, possibly even to zero. The closer to equality the investment brings prices, the lower the worth of the FTRs it

creates, unless a large volume of new rights emerges elsewhere on the system.

Herein is the difference between merchant generation and merchant transmission. The generator earns an income that reflects the additional (marginal) benefits users receive, because its plant is an incremental investment.

The transmission investor that builds on an efficient scale gains only the small post-construction difference in LMPs. This difference equals the congestion cost saved by the last megawatt of new transmission capacity. The upgrade's full benefits equal the sum of the savings for every megawatt it carries, a figure that is unrelated to the builder's income. A new line with more capacity produces more benefits for producers and consumers, but smaller FTR-related gains for its builder. Incremental generation benefits both the builder and the consumers of its power. Incremental transmission benefits users but cuts the payoff to its builder. A policy that can align those incentives is more likely to get transmission built than a policy that puts them in opposition.

### The RICC System

Our proposed policy—reduction in congestion costs (RICC)—rewards transmission investors who lower those costs, with larger rewards for larger cuts. RICC allows any eligible investor (perhaps a hedge fund, an independent power producer, marketer, or large customer) to fund investments in “economically beneficial transmission” (EBT). As in other “participant funding” plans, an RTO or some other planning organization separates projects into those required for reliability and EBT lines that will lower congestion costs. The RTO attends to investment in reliability lines. Utilities have rights of first refusal to construct EBT lines as rate-based investments. Those they choose not to build will qualify for RICC treatment.

An EBT project's sponsor bears all of its capital costs and associated risks. The upgrade becomes property of the transmission owner (TO), a utility, or an independent transmission company. The TO uses it to deliver power to a load-serving entity (LSE), possibly itself or an affiliate. The sponsor's RICC income arrives over a contract term of 10 years or some other agreed-upon duration. The RTO computes that income in a shadow settlement process based on avoided congestion costs, described in more detail below. If savings are negative or zero, so is

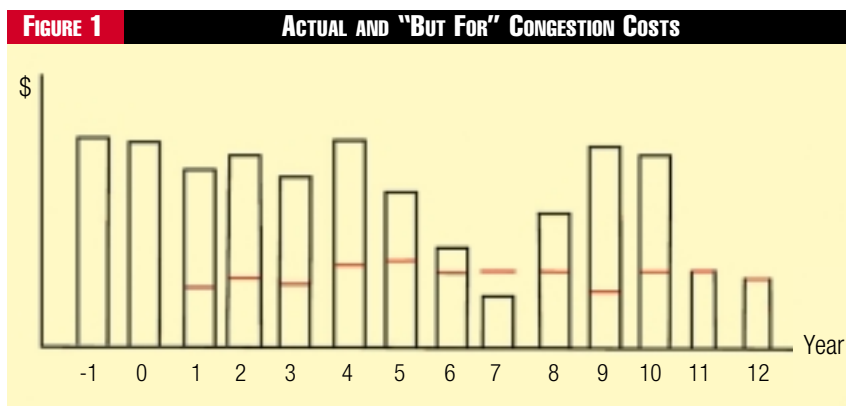
the sponsor's revenue. All of the affected parties benefit. LSEs in the area are paid a set percentage of the gross congestion savings. The sponsor also pays an administration fee to the RTO, and an operation and maintenance fee to the TO.

To ensure that ratepayers also get a better deal and regulation continues to function, the sponsor's gross RICC revenue is capped at 95 percent of total costs to ratepayers under traditional rolled-in pricing. RICC also discourages projects that facilitate the exercise of market power. In the savings calculation, any nodal price that increases due to the new line is capped at its old level. The sponsor receives none of the new FTRs that the line creates, which the RTO is free to allocate as it wishes. Upon the contract's termination, the depreciated line reverts to the TO's rate base for regulation as usual. A sponsor that fails to recover its costs over the contract period has no regulatory recourse.

### Estimating Savings<sup>4</sup>

The sponsor's income is the difference between congestion costs absent the line and those that remain when it is in operation. The latter is no problem, but estimating congestion “but for” the line will require system simulations.

We propose that the RTO perform a daily simulation using the previous day's load and generation conditions, but with the line removed. In Fig. 1, the height of each bar equals annual congestion costs without the upgrade as calculated by simulation. The orange breakpoint in each bar shows actual congestion. In years 1 through 10, the sponsor shares the area above it with the LSE per their contract. The LSE's income is unaffected by the sponsor's payments to the TO and RTO. In years 11 and after the LSE and ratepayers would share all of the saving in congestion costs. Because actual congestion in year 7 exceeds simulated congestion, the sponsor receives no revenue but remains liable for contracted payments to the LSE, TO, and RTO.



**FIGURE 1** ACTUAL AND “BUT FOR” CONGESTION COSTS  
 Break line in bars divides actual (below) and “But For” congestion costs absent investment in upgrade. Payments to RTO, LSE, and TO must come from upper areas.

The percentage of congestion cost savings that LSEs share is indirectly set by the rule that caps the sponsor's annual revenue at 95 percent of its value under a rolled-in rate. To maintain the expectations of all interested parties, the percentage should be set in advance and fixed for the life of the contract. We propose running simulations to forecast congestion costs over the contract life and comparing their value if the project is built with their value if it is not built.

The simulations must account for forecasted load growth, as well as new (and abandoned) generation and transmission at their expected dates of operation. The difference between the simulated amounts in each year is an estimate of the sponsor's revenue absent any regulatory constraints. Subtracting each year's rolled-in cap from unconstrained revenue and summing allows one to compute the LSEs' percentage that keeps the sponsor within the rolled-in constraint. RICC encourages efficiency because it gives the sponsor no guarantee of cost recovery, while allowing it to keep every dollar of savings that it earns as a result of efforts to keep its costs down.

### **The Benefits of RICC**

There are no apparent obstacles to implementation of RICC in the existing regulatory environment. It is consistent with FERC's policies, and with RTO planning and queueing processes. Most important, however, RICC promises some of the benefits of competition where its scope has hitherto been severely limited, and reallocation of risk in ways that we see more often in competitive markets than in regulated ones.

RICC is consistent with regulation because it offers a back-stop equal to 95 percent of the cost-based rolled-in rate. It also has aspects of a market-based system because the sponsor receives income commensurate with benefits created, but only for a fixed number of years. Since competitive entry into transmission is unlikely to occur, setting a fixed termination year is a reasonable regulatory alternative. Payments to the LSE, TO, and RTO allow them and ratepayers to share the benefits, while properly putting responsibility for cost causation on the sponsor. RICC is an alternative to construction by utilities that in no way limits their future options. Because the sponsor handles all funding and bears most of the risk, there is no need to allocate costs among LSEs as would happen with rate-base transmission. Operations also can be more flexible because there is no need for the common requirement that LSEs take their deliveries at particular nodes.

RICC can be implemented in ways that are minimally disruptive of existing RTO and utility planning processes that forecast growth, solicit generation and transmission, and set project queues. Adding it as an option will have no impact on the process of calculating nodal prices or other aspects of LMP

as currently implemented.

As FTR policies continue to evolve, RTOs will remain free to innovate or not innovate as they wish. Since there is only one way to calculate nodal prices, the sponsor's recovery under RICC and its liabilities to the RTO, TO, and LSE will remain unchanged as institutional changes like these take place.

### **Increasing Competition and Reallocating Risk**

Because RICC encourages transmission investments that might not otherwise have been made, it increases the competitiveness of markets and widens their scopes, while posing no threats of market power. RTO rules and FERC regulations ensure that sponsors will be unable to withhold capacity, and a price cap at nodes that are adversely affected ensures that they cannot profit from any incidental congestion their projects cause.

Because RICC offers a new alternative, it will limit further the abilities of vertically integrated utilities (even under an RTO) to exploit system weaknesses that favor their own generation and allow discrimination of access. But competition is more than just a lack of abuses due to market power. Implementing RICC would promote entrepreneurship in an area that has seen little of it. It would motivate the expeditious construction of new lines and upgrades. The winning sponsor would be the first entity that believes it can earn an acceptable return by building it. RICC also rewards more efficient upgrades and better-located lines that are consistent with reliability. If a project can have several configurations, competition for RICC income can incentivize a search for designs that maximize the difference between its costs and benefits.

RICC also reallocates transmission risks as the shift from rate-base plants to non-utility production did for generation risks. Traditional regulation thrust the risks of both onto captive ratepayers, while utility investors enjoyed secure (but relatively low) returns. Today investors in independent power bear the risk that their plants will not pass a market test. Competition both limits their returns and offers the prospect of large rewards for efficient choices. There are limits to competitive transmission that do not exist in generation, because the benefits of a new or upgraded line usually are maximized by building one facility. Unlike generators, competing transmission owners will not enter a market to cut the profitability of existing ones and transfer more of the savings to customers. Economists sometimes say that regulation ideally attempts to bring about a competitive allocation of resources when the market will not provide one. Until now the market has offered few such opportunities in transmission. Behind RICC is the idea that some degree of competition is possible even in transmission, and that it is worth trying.

The nation's transmission system is closing in on engineering limits that threaten its reliability and economic limits that render it less able to move power on demand through an ever growing set of markets. Regulated rates of return on transmission appear insufficient to attract investment, while the future role of independent transmission companies is not yet clear.

Where competition has been possible, it usually has improved market efficiency and ensured the erosion of high profits as competitors enter. In transmission, however, nodal pricing and natural monopoly interact to reduce the incentives of competitors who are rewarded with FTRs. The RICC proposal facilitates competition by offering investors a reward based not on the costs that remain after construction (as a grant of FTRs does), but on the savings that their investment produces for market participants.

### Investor Relations

RICC offers any interested investor a multi-year window to earn returns that increase with the efficiency of its project, rather than with the amount invested, as happens under traditional regulation. It is fully consistent with the existing system of regulation and with the continuing role of utilities and independent transmission companies as owners of lines. It also is equitable; LSEs share the benefits from the outset, the costs of RTOs and TOs are covered, risk is shifted from consumers to investors, and there is a well-defined cap on the revenue that a sponsor can collect.

Simple regulatory measures that supplement existing open access and RTO rules can defuse a sponsor's potential to abuse market power. The simulations that determine saved congestion costs already are a part of every RTO's operations and planning. A number of regulatory rulemakings will be necessary, but this time the payoff may be a transmission system that has finally moved into step with the rest of its industry. ■

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### Endnotes

1. Edison Electric Institute, *EEI Survey of Transmission Investment: Historical and Planned Capital Expenditures (1999-2008)*, May, 2005 at 3.
2. Edison Electric Institute, *U.S. Transmission Capacity: Present Status and Future Prospects*, Aug. 2004 at 6.  
[http://www.eei.org/industry\\_issues/energy\\_infrastructure/transmission/USTransCapacity10-18-04.pdf](http://www.eei.org/industry_issues/energy_infrastructure/transmission/USTransCapacity10-18-04.pdf).
3. U.S. Energy Information Administration, *Electric Power Annual* (Nov. 2005) tables 6.1 and ES. <http://www.eia.doe.gov/cneaf/electricity/epa/epaxlfiles.xls> and [http://www.eia.doe.gov/cneaf/electricity/epa/epaxlfile6\\_2.xls](http://www.eia.doe.gov/cneaf/electricity/epa/epaxlfile6_2.xls). This figure does not include some bilateral transactions. See Vito Stagliano and J. Jolly Hayden, "The Electric Transmission Paradox," *Electricity Journal* 17 (Mar. 2004), 37-46.
4. A set of numerical examples, comparisons with conventional regulation, and additional discussion of technical details can be obtained from [jjhayden@sbcglobal.net](mailto:jjhayden@sbcglobal.net).