UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Post-Workshop Comments on Grid-Enhancing Technologies	))	Docket No. AD19-19-000

Comments of the R Street Institute

I. Issue Summary

On November 5 and 6, 2019, the staff of the Federal Energy Regulatory Commission (Commission or FERC) convened a workshop to discuss grid-enhancing technologies (GETs).[1] These technologies can increase the capacity, efficiency, and/or reliability of transmission facilities. On January 17, 2020, the Commission issued a notice inviting post-workshop comments and invited responses consistent with a series of specific questions.[2]

These comments provide the overarching view of the R Street Institute, including a strategic take on next steps for the Commission. They also provide responses to some of the specific questions posed by the Commission.

II. Summary of R Street Position

The R Street Institute applauds the Commission for investigating this matter. Innovation is critical to economic progress and consumer welfare, and many technologies have been deployed efficiently across the economy where policy aligned incentives properly. Great opportunities lie in the area of remote monitoring and control of various types of infrastructure. However, the current economic system for transmission planning and asset management is inefficient and loaded with perverse incentives. This explains why innovative, low-cost solutions are, by and large, not displacing traditional transmission builds or enhancing the performance of the existing system. This results in additional costs to consumers, deters innovation, and distorts generation investment and retirement decisions; it especially reduces the economic value of geographically-constrained resources like wind power.

Independent economists, suppliers of GETs, and transmission consumers are in general agreement on the problem[3]—namely, that the current cost-of-service paradigm embeds an economically inefficient incentive structure for transmission owners in selecting and managing grid technologies. GETs are a particularly disaffected technology class under this paradigm. The Commission should endeavor not to

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[1] An agenda, description, notices, and initial testimonies are located here: Federal Energy Regulatory Commission, *Workshop November 5-6, 2019*. https://ferc.gov/EventCalendar/EventDetails.aspx?ID=13554&CalType=. See Docket No. AD19-19-000 for further information.

[2] Federal Energy Regulatory Commission, *Notice Inviting Post-Workshop Comments on Grid-Enhancing Technologies*¸ Docket No. AD19-19-000, Jan. 17, 2020. https://www.ferc.gov/CalendarFiles/20200117114456-AD19-19-000%20Post-Workshop.pdf.

[3] For example, see oral testimony of Devin Hartman at the GETs workshop: Federal Energy Regulatory Commission, *Grid-Enhancing Technologies Workshop, Day 2 transcript,* Docket No. AD19-19-000, Nov. 6, 2019, p. 231. https://www.ferc.gov/CalendarFiles/20200106102931-Transcript,%20Day%202.pdf.

merely layer technology-class band-aids atop a flawed paradigm, but to use this record to motivate more ambitious reform that would make the United States a leader in transmission policy.

Cost-of-service transmission is inherently a conservative business. Managers are penalized harshly for mistakes, while following old practices is met with reward. As technologies enter the transmission business, there is not only a typical "learning curve," but a very high and steep "adoption curve" in which operating protocols, operator practices, protocols between system operators and transmission owners, reliability standards, and many other practices need to change to fully incorporate the technologies into transmission practices. In cost-of-service regulated monopolies, these curves will serve as barriers unless the regulator proactively pushes them over, either through requirements or incentives. Regulators should ensure that once a technology reaches the flat part of these curves—perhaps after a few years of operation—the incentives phase down and are integrated as standard business practices.

Effective regulation under the cost-of-service model would ensure that least-cost technologies, including GETs, are selected in transmission-planning processes and as part of best practices in asset management. The Commission has, frankly, neglected much of this duty for years, and the GETs quagmire is but one symptom. At the same time, the GETs record also indicates how the economic characteristics of transmission technologies are changing. For example, flow controls, automation, advanced sensors, intelligent load shed technologies, and other innovations are fundamentally reshaping the ability to define grid services and property rights, which opens the door to a market-based regulatory model. If FERC wishes to propel the United States to the forefront of global transmission policy, it would be wise to change the role of economic regulation consistent with the economic characteristics of the industry.

Proper implementation of the current cost-of-service paradigm may be the second-best solution; as a first-best solution, a market-based model is worth exploration. In this proceeding, Monitoring Analytics laid out the benefits of a market model—including far better motivations for innovation and cost reduction[4]—while Potomac Economics articulated some basic parameters for defining property rights so that the value of GETs would depend on the marginal value of transmission capability.[5] The Electricity Consumers Resource Council's testimony corroborated Potomac Economics' parameters, calling them a worthy first step in the Commission's "policy decision-making tree."[6] R Street suggests the Commission open a proceeding to explore a market-based model or, at the very least, initiate an effort that takes seriously the ability of regulation to substitute for competition under the cost-of-service model.[7]

Altering the perverse incentive structure via incentive policy is where GETs suppliers, economists, and transmission consumers often disagree. In this regard, it is important to distinguish between structural incentive compatibility (i.e., whether incentives are aligned with the efficient and reliable investment

[4] Testimony of Joseph Bowring, Independent Market Monitor for PJM, before the Federal Energy Regulatory Commission, *Grid Enhancing Technologies,* Docket No. AD19-19-000, Nov. 6, 2019, pp. 2-3. https://www.ferc.gov/CalendarFiles/20191104100751-Bowring,%20Monitoring%20Analytics.pdf.

[5] Testimony of David Patton, Independent Market Monitor, before the Federal Energy Regulatory Commission, *Efficient Incentives for Grid-Enhancing Technologies,* Docket No. AD19-19-000, Nov. 5-6, 2019, pp. 2, 4. https://www.ferc.gov/CalendarFiles/20191104100839-Patton,%20Potomac%20Economics.pdf.

[6] Federal Energy Regulatory Commission, *Grid-Enhancing Technologies Workshop, Day 2 transcript,* Docket No. AD19-19-000, Nov. 6, 2019, p. 233. https://www.ferc.gov/CalendarFiles/20200106102931-Transcript,%20Day%202.pdf.

[7] See, for example, various works of Alfred Kahn explaining this regulatory function.

and operation of the bulk transmission system)—which determines *relative* incentives for technology choice—and *absolute* incentives (e.g., whether return-on-equity levels are adequate to attract capital). There is no evidence of a problem in absolute incentives. As R Street has noted in other proceedings, the "Commission's [return on equity (ROE)] policies are, in a word, generous."[8,9] This sentiment also explains why transmission consumers are highly critical of policies to "sweeten" incentives for GETs or any other form of good utility practice: Under proper cost-of-service implementation, GETs cost savings would flow in full to consumers. Transmission-dependent utilities note that instead of pursuing shared-savings or ROE incentives, the Commission should ensure that transmission owners adopt low-cost GETs as part of good utility practice, and that low-cost GETs are better integrated into planning processes.[10] Industrial energy users clarify that "we would rather have the scrutiny of investment decisions, and scrutiny of operating practices to make sure that we're going to have an accountability mechanism subject to economic criteria for those asset decisions going forward," and added that this "obfuscates the need of trying to sweeten the pot to encourage entities without [proper] incentive structures to do something else."[11] In short, enriching incentives is not the categorically ideal long-term way to address what is inherently a structural incentive misalignment.

That said, practical and political constraints may relegate the Commission's short-term policy menu to either business as usual or new or modified incentive programs. The current institutional configuration of FERC and the regional transmission organizations (RTOs) is nowhere close to being capable of implementing cost-of-service regulation for transmission effectively. The rule-of-law of course factors in as well; revisions to the Federal Power Act direct the Commission to encourage GETs. To date, encouragement via incentives has not been used for operations-type GETs. Indeed, well-crafted incentive policies may produce more economically efficient transmission technology choice and management, from which a portion of cost savings would flow to consumers. But it is also a path full of potential unintended consequences and by no means constitutes a permanent solution for the paradigm flaw.

A well-designed, limited incentives program would be a major, albeit temporary, improvement over the status quo. Even the testimony outlining Great Britain's experience, which revealed the positive net benefits of its shared-savings structure, implied that this was not an ideal solution but rather a means to reduce costs "without the need for detailed regulatory scrutiny."[12] In other words, it is a potential path forward should the Commission continue to forego its responsibility as an economic regulator to properly scrutinize the cost-of-service model. If the Commission does not view this as a plausible

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[8] Testimony of Travis Kavulla before the Federal Energy Regulatory Commission, *Inquiry Regarding the Federal Energy Regulatory Commission's Electric Transmission Incentive Policy,* Docket No. PL19-3-000, June 18, 2019, p.2. https://www.rstreet.org/wp-content/uploads/2019/06/Final-edit-June-2019-Transmission-Incentives-Comments.pdf.

[9] Granted, this tide may be shifting based on recent FERC rulings on transmission ROEs in the Midcontinent Independent System Operator footprint.

[10] Testimony of Steven Leovy, on behalf of WPPI Energy and the Transmission Access Policy Study Group, before the Federal Energy Regulatory Commission, *Grid-Enhancing Technologies,* Docket No. AD19-19-000, Nov. 5-6, 2019, p. 3. https://www.ferc.gov/CalendarFiles/20191104100512-Leovy,%20TAPS.pdf.

[11] Federal Energy Regulatory Commission, *Grid-Enhancing Technologies Workshop, Day 2 transcript,* p. 233. https://www.ferc.gov/CalendarFiles/20200106102931-Transcript,%20Day%202.pdf.

[12] Testimony of Andrew Hiorns before the Federal Energy Regulatory Commission, *Grid-Enhancing Technologies Workshop,* Docket No. AD19-19-000, Nov. 6, 2019, p. 1. https://www.ferc.gov/CalendarFiles/20191104100551-Hiorns,%20Hiorns%20Smart%20Energy.pdf.

alternative, a time-limited "shared savings" GETs deployment incentive is a workable, impactful improvement until the Commission decides to tackle transmission policy reform more comprehensively.

III. Responses to Commission Questions

1. Workshop participants identified several types of technologies that are currently capable of being deployed, such as power flow control and transmission switching technologies, dynamic line ratings, and storage as transmission. What other technologies that increase the capacity, efficiency, or reliability of transmission facilities are ready for deployment?

The Commission should consider employing a third party with intricate engineering and business expertise in the pre-commercial and commercial stages of GETs to provide a commercial readiness evaluation.

Storage is difficult because, unlike most other GETs, it is not exclusively a transmission technology. Ideally, storage investment would be motivated by efficient arbitrage opportunities on the wholesale energy and ancillary services markets plus any capacity revenue where applicable. Shoehorning storage under the cost-of-service model is suspect, as the model is inherently incapable of accurately capturing the value of heterogeneous resources—of which storage is perhaps the most diverse.

Although the Commission emphasizes mature technologies, it is important that any reforms be made with reducing barriers to nascent technology advancement and upstream innovation in mind. This requires more of a competitive platform approach for transmission services, where technology developers can better attract capital by accurately projecting the revenue stream they can fetch. The Commission should think proactively in this regard, as waiting to adjust the regulatory construct until technology commercializes will stunt its early- and mid-stage development.

2. Some workshop participants argued that further deployment of technologies that increase the capacity, efficiency, or reliability of transmission facilities can be encouraged with various types of incentives. What types of incentives would encourage the deployment of technologies referred to in Question 1?

R Street stresses that the incentives policy objective is not to encourage any form of GETs deployment but rather to encourage cost-effective GETs deployment that would not have otherwise occurred. Either a shared-savings or ROE incentives approach could markedly shift financial incentives for transmission owners from more expensive technology to lower-cost GETs in some circumstances. The breakeven incentive point, however, would be very context-specific and thus is poorly suited to a uniform ROE adder. The result may be that some cost-effective GETs are egregiously over-incentivized, while others do not come close to being incentivized. Rather, a "shared-savings" approach that safely exceeds the risk-adjusted opportunity cost of a cost-of-service transmission owner foregoing a traditional investment would be a more effective and efficient tool.

Consider the case of a $500 million traditional transmission build whose same transfer capability could be achieved with three different GETs cost-scenarios: $250 million, $100 million, and $5 million. The breakeven point to match a 10% ROE on the traditional build would require an implied ROE ranging from 20% for the $250 million scenario to 100% for the $5 million scenario (the $100 million scenario would breakeven at 50% ROE). All the while, the breakeven shared-savings amount would be 10%. Considering the range of current transmission ROEs, the fact that GETs generally hold greater investment risk to

transmission owners than traditional builds, and the desire to ensure a positive GETs incentive above the breakeven point, a shared savings level in the 15-20% range would likely prove sufficiently effective to motivate transmission owners to adopt GETs. In the examples provided, consumers would save hundreds of millions of dollars, and transmission owners may see millions to tens of millions in additional revenue.

Great Britain's 50/50 shared-savings model is far above a level that shifts the incentive structure; it likely provides more than double the savings ratio required to flip the incentive structure of transmission owners. Still, the record suggests substantial economic efficiencies and consumer savings at this level.[13] The WATT Coalition proposes a 25% savings share for transmission owners, which is closer to alignment with the threshold noted above.[14] Thus, it would be reasonable to assume that it would also be effective in promoting cost-saving GETs use while distributing far more of the savings to consumers than the Great Britain model.

3. In discussion at the workshop of the "shared savings" approach for the deployment of GETs to existing transmission assets, workshop participants expressed general ratemaking concerns, and identified implementation issues, such as the measurement of benefits and distribution of payments. Please provide comment on the proposed ratemaking structure and any implementation challenges.

Assuming perfect implementation, the catch with "shared savings" in theory is that the implied rates of return are off the charts. This lies at the crux of the Monitoring Analytics argument that "a higher rate of return on the GETs investment, within any conceivably reasonable bounds, could never make a regulated transmission owner indifferent."[15] Implied ROEs at multiples of the going cost of capital is a sharp departure from textbook cost-of-service regulation. Under effective cost-of-service regulation, all savings from good utility practice would flow to consumers, and ROEs would reflect the cost of capital. However, as previously noted, current practice is nowhere close to good practice, and it would take a very large undertaking to correct this.

Effective implementation of a "shared savings" approach faces many challenges. The biggest challenge will be to establish a reliable, accurate, and verifiable baseline from which to quantify savings. Constructing a counterfactual may appear doable now, when we have a sense of business as usual, but it will not age well. Determining what investment behavior would have otherwise been is a near-impossible task in the long term. It will also steer transmission owners' strategic behavior toward inflating the baseline. That said, Great Britain's example speaks to how consumer savings can be realized even if a baseline is potentially inflated.[16]

The methodology for determining the benefits, or incremental savings, must be robust and durable. This is important to reduce uncertainty and excessive litigation, and to build industry and consumer trust in the construct. To implement the "shared savings" model, the Commission would need to order the RTOs

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[13] Ibid., p. 5.

[14] Working for Advanced Transmission Technologies (WATT) Coalition Initial Comments before the Federal Energy Regulatory Commission, *Inquiry Regarding the Commission's Transmission Electric Incentives Policy,* Docket No. PL19-3-000, June 26, 2019, p. 11. https://gridprogress.files.wordpress.com/2019/06/watt-noi-comments-with-brattle-grid-strategies-paper.pdf.

[15] Testimony of Joseph Bowring, pp. 2-3. https://www.ferc.gov/CalendarFiles/20191104100751-Bowring,%20Monitoring%20Analytics.pdf.

[16] Testimony of Andrew Hiorns, p. 5. https://www.ferc.gov/CalendarFiles/20191104100551-Hiorns,%20Hiorns%20Smart%20Energy.pdf.

to implement a suite of metrics and perhaps develop behavioral investment models. The ongoing state renaissance in performance-based ratemaking may provide some insights in this regard, as may takeaways from other industries employing predictive modeling of investment behavior.

To treat GETs on a consistent and comparable basis, the measurement of benefits and timeframe for payments would need to be comparable to traditional investments. Actual benefits will differ from projected ones based on forecasting error and potential GETs performance deviations from expectations. If compensation is tied to forecasted benefits, a true-up may be required for actual benefits provided. R Street previously suggested that the Commission build on a production-cost modeling approach used in compliance with Order 1000 such that transmission owners can make low-capital improvements and receive a limited-time share of actual production cost savings.[17]

Calculating some traditional benefits, like production cost savings, will prove more challenging for GETs than for traditional transmission. For example, GETs are particularly valuable in very concentrated and highly congested areas. Monitoring Analytics identified the challenges of calculating such congestion in noting the degree of dynamic intertemporal and spatial variability of congestion on the PJM system.[18] Furthermore, some GETs only provide use-limited and variable increases in transfer capability rather than the more predictable and stable ones offered by conventional transmission. Quantifying the equivalent benefits of such imperfect substitutes will be difficult, but it is an endeavor worth undertaking.

Another challenge is determining what categories of benefits to include that are unique or disproportionately high with GETs. For example, the spillover benefits of learning-by-doing for a nascent technology are large, whereas those for mature technology are small. Quantifying this would prove very challenging, but a rough proxy is achievable for each technology set as a function of deployment level. GETs may also provide some unique reliability benefits, such as the ability to provide targeted load curtailments to lower value-of-lost-load end uses. This could dramatically reduce damage from load loss even if the probability of lost load remained constant. Further complicating this is that these and other GETs may have little marginal value at low deployment levels, but the network effect of having a critical mass deployed would drastically elevate the average per-unit benefit above the marginal value at lower levels.

Such challenges notwithstanding, the scale of cost savings from efficient GETs investments would easily outweigh moderate flaws in implementation. Given the major long-term challenges associated with the "shared savings" approach—plus the potential for comprehensive transmission policy reform in the years ahead—a time-limited deployment program in the short term (two to four years) would be reasonable.

4. Referring to the technologies mentioned in Question 1, some workshop participants indicated that RTOs/ISOs consider qualitative benefits, including certain reliability and flexibility attributes, in the regional transmission planning process. How do RTOs/ISOs currently measure or consider these benefits? Please provide examples.

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[17] Testimony of Travis Kavulla, p.5. https://www.rstreet.org/wp-content/uploads/2019/06/Final-edit-June-2019-Transmission-Incentives-Comments.pdf.

[18] Testimony of Joseph Bowring, pp. 4-6. https://www.ferc.gov/CalendarFiles/20191104100751-Bowring,%20Monitoring%20Analytics.pdf.

5. What software or other changes would an RTO/ISO need to make to implement GETs? As more of these technologies come onto the system, what challenges exist for coordinating their control in terms of analytics, automation, and optimization?

6. Workshop participants discussed the benefits of pilot programs. Should the Commission encourage the testing and deployment of technologies that increase the capacity, efficiency, or reliability of transmission facilities through pilot programs and demonstration projects? If so, is there regulatory support that the Commission could provide to support and encourage such efforts? Could the Commission use its transmission incentives policy to encourage such pilot programs and demonstration projects? If so, please describe how the Commission could do so.

Pilot and demonstration programs have been in use already. The decision to expand their use should be a function of the information value derived from the experience—such as systems integration knowledge for RTO operations staff—as well as investment parameters for transmission owners and various economic insights for regulators. Pilots and demonstrations are better suited to understand new technologies that are poorly understood by operators and investors, whereas they typically do not provide a regulatory model for scale-up purposes. Some GETs fall into this pre-commercial category, while others are ready for market integration, meaning a pilot or demonstration program would provide little value as the policy priority becomes reducing barriers to entry.

If the Commission pursues this option, it could survey GETs providers, transmission owners, and the RTOs on the best ways to maximize informational value. In particular, it would be beneficial to target improvements at overcoming shortcomings of past pilots. For example, some pilots have not integrated technologies into systems operations, have faced difficulty bidding out projects consistent with Order 1000, and have faced limits on information dissemination because of constraints on sharing confidential information.

IV. Conclusion

RSI respectfully requests the Commission consider the comments contained herein.

Respectfully submitted,

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