UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reactive Power Capability Compensation Notice of Inquiry	)))	Docket No. RM22-2-000

COMMENTS OF THE STATE AGENCIES

On November 18, 2021, the Federal Energy Regulatory Commission (FERC or the Commission) published a Notice of Inquiry (Notice or NOI) in Docket No. RM22-2 entitled "Reactive Power Capability Compensation."[1] The below-defined signatory state parties (together, the State Agencies) agree with Commission Staff that the transition to a clean energy grid will require reforms to how certain necessary services, such as the provision of reactive power, are compensated. In reforming the rules governing compensation for reactive power, the State Agencies urge the Commission to focus on the fundamental need to protect ratepayers from unjust and unreasonable costs and risks and ensure that any changes in compensation structures for reactive power are not inconsistent with state clean energy policies and goals. Currently, renewable energy resources do not generally

[1] 177 FERC P 61,118 (2021) available at: https://cms.ferc.gov/media/e-1-rm22-2-000.

provide reactive power. Emitting resources generally can provide this power but cause pollution and greenhouse gas emissions. The State Agencies urge the Commission to address the fact that many of the resources used to provide reactive power are associated with fossil fuel generators and are located in traditionally underserved and overburdened communities. Given the disproportionate burden these communities have borne from emitting resources, principles of equity require that the needs of these communities be respected and properly addressed.

THE PARTIES

The Connecticut Attorney General (CTAG) is an elected Constitutional official and the chief legal officer of the State of Connecticut. The Connecticut Attorney General's responsibilities include intervening in various judicial and administrative proceedings to protect the interests of the citizens and natural resources of the State of Connecticut and in ensuring the enforcement of a variety of laws of the State of Connecticut, including Connecticut's Unfair Trade Practices Act and Antitrust Act, so as to promote the benefits of competition and to assure the protection of Connecticut's consumers from anti-competitive abuses.

The Connecticut Department of Energy and Environmental Protection (Connecticut Department) has statutory authority over the state's energy and environmental policies and for ensuring that the state has adequate and reliable

energy resources.[2] The Connecticut Department is tasked with interacting with the regional transmission operator in response to state and regional energy needs and policies.

The Connecticut Office of Consumer Counsel is the statutorily designated ratepayer advocate in all utility matters concerning the provision of electric, natural gas, water, and telecommunications services. The Office of Consumer Counsel is authorized by statute to intervene and appear in any federal or state judicial and administrative proceedings where the interests of utility ratepayers are implicated.

The Delaware Attorney General is the chief law officer of the State of Delaware, empowered by state common law and statute to exercise all constitutional, statutory, and common law power and authority as the public interest may require, and charged with the duty to protect public rights and enforce public duties in legal proceedings before courts, boards, commissions, and agencies.[3]

The Delaware Division of the Public Advocate (DE DPA) is statutorily charged with, among other things, advocating for the lowest reasonable rates consistent with maintaining adequate utility service and equitable distributing rates

[2] Conn. Gen. Stat. §§ 22a-2d; 16a-3a.

[3] Del. Code Ann. tit. 29, § 2504; *Darling Apartment Co. v. Springer*, 22 A.2d 397, 403 (Del. 1941).

among all customer classes. To this end, the DE DPA is authorized to appear on behalf of the interests of ratepayers in federal administrative proceedings.[4]

The Office of the People's Counsel for the District of Columbia is the statutory consumer advocate for retail ratepayers in the District of Columbia and "[m]ay represent and appeal for the people of the District of Columbia at proceedings before related federal regulatory agencies and commissions and federal courts when those proceedings involve the interests of users of the products of or services furnished by public utilities under the jurisdiction of the Commission."[5]

The Maine Office of the Public Advocate is an agency of the State of Maine directed by the Maine legislature to represent the interests of consumers of utility services in utility regulatory proceedings and other forums, including participation on behalf of Maine consumers in federal proceedings "in which the subject matter of the action affects the consumers of any utility doing business in this State."[6]

The Massachusetts Attorney General is the chief legal officer of the Commonwealth of Massachusetts and is authorized by both state common law and by statute to institute proceedings before state and federal courts, tribunals, and commissions as she may deem to be in the public interest. The Massachusetts

[4] 29 *Del. C.* Sec. 8716(e).

[5] D.C. Code § 34-804(d)(2).

[6] 35-A M.R.S.A. § 1702.

Attorney General is further authorized expressly by statute to intervene on behalf of public utility ratepayers in proceedings before the Commission and has appeared frequently before the Commission.[7]

Dana Nessel is the duly elected and qualified Attorney General of the State of Michigan and holds such office by virtue of and pursuant to the provisions of the Const 1963, art 5, § 21, and mandate of the qualified electorate of the State of Michigan, and she is head of the Department of Attorney General created by the Executive Organizations Act, 1965 PA 380, ch 3,MCL 16.150 *et seq*. The Michigan Attorney General has the right, by both statutory and common law, to intervene and appear on behalf of the People of the State of Michigan in any court or tribunal, in any cause or matter, civil or criminal, in which the People of the State of Michigan may be a party or interested.[8]

The Minnesota Attorney General is a public officer charged by common law and by statute with representing the State of Minnesota, the public interest, and Minnesota citizens, including with respect to electric or gas industry matters that affect electric or gas consumers in Minnesota. The Minnesota Attorney General is

[7] MASS. GEN. LAWS ch. 12, § 11E.

[8] MCL 14.28; *People v O'Hara,* 278 Mich 281; 270 NW2d 298 (1936); *Gremore v Peoples Community Hospital Authority,* 8 Mich App 56; 153 NW2d 377 (1967); *Attorney General v Liquor Control Comm'n,* 65 Mich App 88; 237 NW2d 196 (1975); *In re Certified Question,* 465 Mich 537, 543-545; 638 NW2d 409 (2002).

specifically authorized by Minnesota Statutes section 8.33 to intervene in federal matters to further the interests of small business and residential utility consumers.

The Oregon Attorney General is the chief law officer for the state and is the head of the Oregon Department of Justice.[9] The Department of Justice has control of all legal proceedings in which the state may be interested.[10]

The Rhode Island Attorney General is a public officer charged by common law and by statute with representing the State of Rhode Island, the public interest, and the people of the State. This includes representation with respect to energy matters affecting consumers in Rhode Island. In Rhode Island, "the Attorney General is entitled to act with a significant degree of autonomy, particularly since the Attorney General is a constitutional officer and is an independent official elected by the people of Rhode Island."[11] Under the common law, he is the representative of the public, obligated to protect the public interest and empowered to bring actions to redress grievances suffered by the public as a whole.[12] The Attorney General, through his designated Environmental Advocate, and pursuant to the Environmental Rights Act, R.I. Gen. Laws § 10-20-1, *et seq*., also has a separate statutory right and obligation to "take all possible action" to protect the

[9] ORS 180.210

[10] ORS 180.220

[11] *State v. Lead Indus., Ass'n, Inc.,* 951 A.2d 428, 474 (R.I. 2008).

[12] The Rhode Island Attorney General "'has a common law duty to protect the public interest.'" *Id.* at 471 (*quoting Newport Realty, Inc. v. Lynch*, 878 A.2d 1021, 1032 (R.I. 2005).

right of each Rhode Islander to "the protection, preservation, and enhancement of air, water, land, and other natural resources located within the state." *See* R.I. Gen. Laws § 10-20-1 and § 10-20-3(d)(5).

BACKGROUND

State clean energy policies and growing consumer demand have led to significant growth in new, zero-carbon and renewable energy resources, including distributed energy resources (DERs) generally and distributed generation resources (DGs). In the past, large controllable fossil, hydropower, and nuclear generators at the transmission level were responsible for maintaining grid stability and power quality including reactive power. Today, emerging grid resources and specifically inverter-based renewable energy resources have different operating characteristics that need to be addressed to ensure grid stability. The State Agencies urge the Commission to reform transmission tariffs in a manner that fairly compensates resources, including clean energy resources, for the services they provide.

A. Reactive Power

Electric power is generated, transported, and consumed in alternating current (AC) networks. AC systems supply and consume two kinds of power: real power and reactive power. As the Notice states: "Real power accomplishes useful work (e.g., runs motors and lights lamps). Reactive power supports the

voltages that must be controlled for system reliability."[13] As conditions vary during any given day, resources must either supply or consume reactive power to maintain voltage levels required to reliably supply real power from generation to load. If there is not enough reactive power voltage drops and current must increase to maintain the same amount of power flow.[14] This will lead to the consumption of more reactive power which will drop voltage further. This cycle will eventually threaten transmission system stability and cause voltage collapse.

Reactive power is also important to system efficiency. For example, increasing reactive power can eliminate congestion in certain circumstances and even allow for the flow of cheaper power into load pockets.[15]

As noted above, in the past, large fossil, hydropower and nuclear generators provided reactive power to maintain grid stability and power quality. The on-going energy transition is adding large amounts of renewable resources and resources like solar or wind facilities have different operating characteristics than large nuclear or fossil units. These facilities are "non-synchronous inverter-based" resources and generally do not generate reactive power to maintain the voltage necessary to move the real power through the grid. These resources must rely on other sources of reactive power to maintain the volage of their output.

[13] Notice, P 4.

[14] *Id*.

[15] Notice, P 6.

B. Past Commission Orders Addressing Reactive Power

In Order No. 888, the Commission ordered that "reactive supply and voltage control from generation sources" is one of six ancillary services that transmission providers must include in an open access transmission tariff.[16] Order No. 888 noted that there are two approaches for supplying reactive power to control voltage: (1) installing facilities as part of the transmission system and (2) using generation resources. Costs associated with the first approach would be recovered as part of the cost of basic transmission service. If, however, generators provided reactive power, it was considered an ancillary service and would be cost-based, not market based.[17] At the time, most power was generated by large fossil, nuclear or hydropower synchronous power stations that produce both real and reactive power, and these resources were required to supply sufficient reactive power to maintain sufficient voltage to move their real power through the grid.

In Order No. 440, the Commission approved an approach developed by American Electric Power Service Corp. (AEP).[18] This approach separated the annual revenue requirements of these components for large, synchronous

[16] Notice P 8. See Order No. 888, FERC Stats. & Regs. ¶ 31,036 at 31,705. The *pro forma* open access transmission tariff (OATT) includes six schedules that set forth the details pertaining to each ancillary service. The details concerning reactive power are included in Schedule 2 of the *pro forma* OATT. *Id.* at 31,960.

[17] *Id*.

[18] Notice P 9.

generation resources between real and reactive power production.[19] The Commission directed that all resources that have the appropriate cost data and support should use AEP's methodology to recover reactive power capability costs pursuant to individual cost-based revenue requirements (hereinafter, the AEP Methodology).[20]

In Order No. 2003,[21] the Commission adopted standard large generator interconnection procedures and a standard agreement for the interconnection of large generation facilities (the *pro forma* Large Generator Interconnection Agreement (LGIA)) which includes the obligation to provide reactive power within defined ranges. Certain resources, such as small-scale wind, were initially exempt, but eventually all newly interconnecting non-synchronous generators were required to provide reactive power as a condition of interconnection.[22] Order No. 827 also clarified that the amount of reactive power required from non-synchronous resources should be proportionate to the actual (real) power output.[23]

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[19] The factor for allocating to reactive power, developed by AEP, is $MVAR^2 / MVA^2$, where MVAR is megavolt amperes reactive capability and MVA is megavolt amperes capability at a power factor of 1.

[20] *WPS Westwood Generation, LLC,* 101 FERC ¶ 61,290 at P 14; *FPL Energy Marcus Hook, L.P.*, 110 FERC ¶ 61,087, at P 16, *order on reh'g*, 111 FERC ¶ 61,168 (2005).

[21] *Standardization of Generator Interconnection Agreements and Procedures*, Order No. 2003, 104 FERC ¶ 61,103 (2003), *order on reh'g*, Order No. 2003-A,
106 FERC ¶ 61,220, *order on reh'g*, Order No. 2003-B, 109 FERC ¶ 61,287 (2004), *order on reh'g*, Order No. 2003-C, 111 FERC ¶ 61,401 (2005), *aff'd sub nom. Nat'l Ass'n of Regulatory Util. Comm'rs v. FERC*, 475 F.3d 1277 (D.C. Cir. 2007).

[22] *Reactive Power Requirements for Non-Synchronous Generation*, Order No. 827, 115 FERC ¶ 61,277, *order on clarification and reh'g,* 157 FERC ¶ 61,003 (2016).

[23] *Id.* P 49.

With respect to compensation, the Commission concluded that it did not have a sufficient record for determining a new methodology for non-synchronous generation reactive power compensation and stated that any non-synchronous resource seeking reactive power compensation would need to propose a method for calculating that compensation as part of its filing.[24]

C. Current Compensation Approaches

There is no current consistent approach to providing resources compensation for reactive power. PJM Interconnection, L.L.C. (PJM) and Midcontinent Independent System Operator, Inc. (MISO) generally use the AEP Methodology to set reactive power compensation on an individual resource basis, whereas resources in ISO New England Inc. (ISO-NE) and New York Independent System Operator, Inc. (NYISO) compensate resources for reactive power under a flat rate.[25] Outside of these regional transmission operators and independent system operators (RTOs/ISOs), when transmission providers pay for the capability to provide reactive power within the standard power factor range, resources generally use the AEP methodology to set reactive power compensation on an individual resource basis.[26]

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[24] *Id.* PP 47, 52.

[25] Notice PP 12-16.

[26] In addition, California Independent System Operator Corporation (CAISO); Southwest Power Pool, Inc. (SPP); and some non-RTO/ISO transmission operators (e.g., Bonneville Power Administration, Arizona Public Service Company, Southern Companies) do not pay for reactive power capability.

COMMENTS OF THE STATE AGENCIES

The State Agencies agree that there have been, and will continue to be, significant changes in the nation's electric system that justify an evaluation of whether transmission tariff reforms are needed. As the State Agencies have noted in several recent filings, state clean energy and zero carbon policies have initiated a major shift in the nation's resource mix. As Chairman Glick noted:

> The generation resource mix is changing rapidly. Due to a myriad of factors—including improving economics, customer and corporate demand for clean energy, public utility commitments and integrated resource plans, as well as federal, state, and local public policies—renewable resources in particular are coming online at an unprecedented rate. As a result, the transmission needs of the electricity grid of the future are going to look very different than those of the electricity grid of the past.[27]

A critical issue for this new and different grid is how to maintain its reliability and stability. A central element in this solution will be the provision of necessary reactive power. In any reform to the compensation structure the Commission chooses to adopt, whether market based, rate based, or otherwise, the State Agencies urge the Commission to (1) ensure that consumer interests are protected, (2) accommodate state policy interests and targets, and (3) identify, respect, and accommodate the interests of overburdened communities.

[27] Docket RM21-17, ANOPR P 1, Chairman Glick, concurring.

I. Consumer Protection Must Be a Core Principle of Any Transmission Reform.

The State Agencies support the goal of improving the efficiency and flexibility of transmission tariffs to support the transition to a modern clean energy electric grid. In so doing, the Commission must closely scrutinize the proposed transmission reforms in a manner consistent with its duty under the Federal Power Act to ensure that consumers are not charged excessive costs. *Xcel Energy Servs. Inc. v. FERC*, 815 F.3d 947, 952 (D.C. Cir. 2016). *See also Jersey Cent. Power & Light Co. v. FERC*, 810 F.2d 1168, 1207 (D.C. Cir. 1987) (Mikva, J., dissenting) ("The Commission stands as the watchdog providing 'a complete, permanent and effective bond of protection from excessive rates and charges'" (quoting *Atl Ref. Co. v. Pub. Service Comm'n*, 360 U.S. 378, 388 (1959))); *California ex rel. Lockyer v. FERC*, 383 F.3d 1006, 1017 (9th Cir. 2004) (noting the Act's "'primary purpose' of protecting consumers"); *City of Chicago v. FPC*, 458 F.2d 731, 751 (D.C. Cir. 1971) ("[T]he primary purpose of the Natural Gas Act is to protect consumers."); (*City of Detroit v. FPC*, 230 F.2d 810, 815 (D.C. Cir. 1955)).

Consumers have a direct interest in the reliability of the bulk power system. A presidential report estimated the annual cost of power outages between 2003 and 2012 and concluded that "outages are estimated to have cost the U.S. economy an

inflation-adjusted annual average of $18 billion to $33 billion."[28] The February 2021 outage in Texas alone is estimated to have cost the Texas economy between $80 billion and $130 billion.[29] As noted earlier, reactive power is necessary for the grid to function. Failure to maintain appropriate reactive power levels can have catastrophic impacts. In fact, the official final report of the largest outage in recent U.S. history (the 2003 Blackout that affected the Northeastern and Midwestern U.S. and Ontario in Canada), concluded that a primary cause was that FirstEnergy (a utility in Ohio) "did not monitor and manage reactive reserves for various contingency conditions as required by NERC Policy 2."[30]

At the same time, the costs paid by consumers for reactive power services must be just and reasonable. Notably, transmission is already expensive. In 2019 for example, ratepayers paid some $40 billion in transmission costs.[31] Any reforms to the compensation metrics for reactive power to support the transmission system should ensure that ratepayers are fully protected from excessive costs. For that reason, the Commission should carefully review any proposed market changes to protect consumers.

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[28] Economic Benefits of Increasing Electric Grid Resilience to Weather Outages, Executive Office of the President, August 2013, p.3.

[29] Cost of Texas' 2021 Deep Freeze Justifies Weatherization - Dallasfed.org

[30] Final Report on the August 14, 2003, Blackout in the United States and Canada, April 2004, p. 17.

[31] See, https://www.eia.gov/todayinenergy/detail.php?id-47316

II. Any Tariff Changes Must Accommodate State Policy Goals

The Federal Power Act explicitly reserves to the states the authority to choose their desired resource mix. Many states are exercising this authority to transition to zero-carbon resources to meet their climate and other state policy goals. Part of the reason that states are advocating, and often paying for these resources with state contracts, is to meet legislatively mandated greenhouse gas emissions and other de-carbonization targets. These new resources are intended to provide energy and to displace greenhouse gas emission generating resources. As the Commission has repeatedly noted, state clean energy policies are having a profound impact on the nation's energy system. The vast majority of projects in the interconnection queues of the RTOs and ISOs across the country are renewable or clean energy resources, often inverter based.[32]

In the context of these important state policy goals, it is critical that any reactive power compensation reforms are designed in a way that does not simply provide additional compensation to existing fossil generation. Doing so would encourage older and dirtier generation to continue operating simply to collect reactive power compensation windfalls thus undermining state climate, emissions, and resource mix goals.

[32] Docket RM21-17, P 13.

The Commission should note that recent technological developments could make it feasible to provide reactive power capability without increasing emissions. Changes in inverter technology, the so-called "smart inverters," will permit renewables to provide reactive power.[33] In addition, generator manufacturers are developing, and have already deployed, equipment that permits the use of existing power plant generation equipment to provide reactive power without use of fossil-fuel burners and turbines, in effect, turning generators into synchronous condensers.

Specifically, a synchronous condenser is a "DC-excited" motor whose shaft is not connected to anything but spins freely.[34] It is not used to create working power but to adjust voltage conditions on the transmission gird; particularly to add or absorb reactive power. It does this by adding reactive power when the DC field is excited and absorbing reactive power when the field is not.

Converting a fossil generator to a synchronous condenser can be done by adding a clutch to disengage the generator from the turbine. As one article notes:

> Synchronous condenser conversions have been done successfully in many areas. In the U.S., there are a great many examples. The Los Angeles Department of Water and Power (LADWP) has four GE LMS100 gas turbines operating primarily as synchronous condensers but poised to provide generation when necessary. Numerous

[33] IEEE Power and Energy Society, Technical Report PES-TR67.r1, Impact of IEEE 1547 Standard on Smart Inverters and the Applications in Power Systems, August 2020, pp. 20-25

[34] B. M. Weedy, Electric Power Systems Second Edition, John Wiley and Sons, London, 1972, page 149

> steam turbine generators have been repurposed throughout North America too, such as four 150-MW units at BC Hydro's Burrard Generating Station near Vancouver, British Columbia, Canada.[35]

There are important consumer benefits from such an approach. The drive to new clean energy resources has led to the mothballing of numerous fossil plants. Some of these are newer more efficient gas plants that were shut down before the end of their useful lives leading to stranded costs that consumers are paying. In addition, in some areas older, less efficient fossil plants are being kept minimally operational simply as so-called "peaker" plants that are seldom used and generally only at rare peak load conditions. These plants are often much more polluting than more modern generation.

Turning off the fossil fueled generation and repurposing these plants as synchronous condensers will simultaneously reduce pollution, assist in attaining state clean energy goals, and reduce costs for the reason that these facilities have already been built. But there is another important reason to repurpose peaker plants.

III. Equity and Environmental Justice Must Be Meaningfully Considered in Market Design.

Much of the nation's energy infrastructure has historically been sited and constructed in communities that are majority people of color and low-income.

[35] Putting Idle Turbine Generators to Work (powermag.com)

Residents in these areas suffer negative health consequences from pollution and blight that impedes participation in day-to-day activities and the healthy use of community spaces.[36] In addition to discrimination, the disproportionate ability and influence of well financed groups and individuals to intervene in siting processes to prevent new generation projects from being constructed in their own communities has compounded these inequities.

The clean energy transition is an opportunity to acknowledge and correct the historic discrimination caused by the infrastructure development approach that has been used for the past hundred years. The shift to incorporate equity into this work requires intentionally delivering the clean, advanced, reliable, resilient, and more distributed services that are foundational to the energy transition to families and businesses in disadvantaged communities. Further, the voices of representative members of these communities need to be elevated so their experiences and perspectives are an inherent part of the decision-making processes. The State Agencies urge the Commission to ensure that energy market reforms include an both overt and express recognition of this historic inequity and measures to promote equity and environmental justice going forward. The Commission's

[36] Shalanda Baker, *Anti-Resilience: A Roadmap for Transformational Justice within the Energy System*, 54 Harv. C.R.-C.L. L. Rev. 1, 12 (2019) (describing the "racist politics that led to the formation of the nation's energy system [and] persist today" with the system's reliance on "energy production concentrated in areas dense with black and brown bodies"); Maninder P.S. Thind et al., *Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography*, 53 Envtl. Sci. Tech. 14,010, 14,013 (2019) (finding that Black Americans have the highest average exposure to, and risk of death from, fine particulate matter pollution from electricity generation, and that low-income households are more exposed the higher-income households).

Office of Public Participation (OPP) is a key place to start. As the OPP begins its work, there are significant opportunities to incorporate equity into the Commission's decision-making processes. The Commission should invite comments from representatives of disadvantaged communities in all parts of the market design process and building a network of diverse voices in policy making to better understand and integrate the needs of and impacts on these communities.

For example, in a recent letter to the Comptroller General of the Government Accountability Office (GAO), members of Congress asked the GAO to evaluate peaker power plant pollution nationwide.[37] The letter requested that the GAO evaluate the role of peaker plants in exacerbating cumulative impacts of air pollution, noting that peaker plants "can emit twice the carbon and up to 20 times the nitrous oxide" of more efficient plants. The letter also points out that these plants "are more likely to be in low-income neighborhoods and communities of color."[38]

Repurposing of peaker plants can help address the problems noted in the congressional letter above. One specific opportunity that the Commission can consider in the context of market design would borrow from the recent Transportation Climate Initiative (TCI). Transportation infrastructure burdens

[37] Letter from Representatives Carolyn Maloney, Alexandria Ocasio-Cortez & Yvette Clarke to Comptroller General Gene Dodaro (Dec. 21, 2021).

[38] *Id*. at p. 1.

disadvantaged communities in much the same way as energy infrastructure in that low-income communities of color suffer a disproportionate impact from transportation emissions. One element of the TCI approach is to get "buy in" from local communities through revenue sharing. Similarly, a market design for reactive power can include the means to compensate the communities that host these facilities. In effect, by repurposing fossil peaker plants as synchronous condensers and including a percentage of reactive power revenue in the form of host compensation to the affected communities, it would help to reverse the current situation and allow infrastructure that has burdened communities to become a source of positive benefits to underserved communities. Additionally, compensation in a reactive power market could allow for a hosting compensation variable that increases depending on whether the reactive power producer is an emitting resource. Emitting resources burden local communities more than non-emitting resources so it would be fitting to provide more compensation to these communities.

CONCLUSION

The State Agencies appreciate the Commission's solicitation of public input on reactive power market design. We respectfully urge the Commission to consider the above comments and recommendations as it considers potential reforms.

Respectfully Submitted

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