BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION AT NEW DELHI

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REPORT BY DR. ASHLEY C. BROWN

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I. BACKGROUND AND QUALIFICATIONS

My purpose in offering commentary in this proceeding is to discuss the important role that power exchanges play in the evolution of competition in the power sector. The Commission is to be commended for reviewing the role of power exchanges. Periodic review of the role of various actors in the market is always a useful and potentially productive activity for regulators to engage in. It is important that regulators be abreast of developments and should always be looking for ways of optimizing resources and assets. Given the pivotal role that power exchanges play in electricity markets around the world and given that the potential their role in India in making the market more robust, more transparent, and more efficient, an examination of their role is important. Given that in spite of over 11 years of operations, Indian power exchanges account for only 4% of the transactions in the Indian electricity industry, however, regulators should take care to be certain that any proposed changes in their operations not constrain the potential for exchanges to innovate, increase productivity, and make their full contribution to a market that is more efficient and more responsive to consumer interests and social welfare. For the reasons I will note in this commentary, ***I have a real fear that creation of a Market Coupling Operator will, for reasons I will explain, have the adverse effect of discouraging, if not actually precluding, the development of the type of vibrant exchanges that are very much in the interest of a competitive and efficient market****.*

To put my commentary in perspective, permit me to describe my background on these issues. I am the Executive Director of the Harvard Electricity Policy Group (HEPG) at the Harvard Kennedy School, at Harvard University. HEPG is a "think tank" on electricity policy, including but not necessarily limited to pricing, market rules, and regulation, as well as environmental and social considerations. HEPG, as an institution, never takes a position on policy matters, so this paper represents solely my opinion, and not that of HEPG or any other organization with which I may be affiliated.

I served 10 years as a Commissioner of the Public Utilities Commission of Ohio (1983-1993), where I was appointed and re-appointed by Governor Richard Celeste (who later served as U.S. Ambassador to India). I also served as a member of the National Association of Regulatory Utility Commissioners (NARUC) Executive Committee and served three years as Chair of the NARUC Committee on Electricity. I was a member of the Advisory Board of the Electric Power Research Institute. I was also appointed by the U.S. Environmental Protection Agency as a member of the Advisory Committee on

Implementation of the Clean Air Act Amendments of 1990. I am also a past member of the Boards of Directors of the National Regulatory Research Institute and the Center for Clean Air Policy. I have served on the Boards of Oglethorpe Power Corporation, Entegra Power Group, and e-Curve. I serve on the Editorial Advisory Board of the Electricity Journal. I am also affiliated with the Center for Regulatory Studies at the Fundacao Getulio Vargas in Rio de Janeiro, Brazil.

I have been at Harvard continuously since 1993. During that time, I have also been Senior Consultant at the firm of RCG/Hagler, Bailly, Inc. and have been, at various times in the past, Of Counsel to the law firms of Dewey & LeBouef and Greenberg Traurig. I have also taught in training programs for regulators at Michigan State University, University of Florida, and New Mexico State University (the three NARUC sanctioned training programs for regulators), as well as at Harvard, the European Union's Florence School of Regulation, South Asian Forum for Infrastructure Regulation, Association of Brazilian Regulatory Agencies, and a number of other universities throughout the world. I have advised the World Bank, Asian Development Bank, International Energy Agency, United Nations Council on Trade and Development, Development Bank of Latin America, and the Inter-American Development Bank on energy and infrastructure regulation, and have advised governments and regulators in more than 25 countries around the world, including India, Bangladesh, Saudi Arabia, Cambodia, Indonesia, The Philippines, Brazil, Argentina, Chile, Costa Rica, Guatemala, South Africa, Cape Verde, Guinea Bissau, Zambia, Ghana, Tanzania, Namibia, Equatorial Guinea, Liberia, Mozambique, Hungary, Ukraine, and Russia,. I have written numerous journal articles and chapters in books on electricity markets and regulation. I am also the co-author of the World Bank's Handbook for Evaluating Infrastructure Regulation, the lessons of which are drawn upon in this commentary.

I hold a B.S. from Bowling Green State University, an M.A. from the University of Cincinnati, and a J.D. from the University of Dayton. Additionally, I completed a course of study at the University of Parana in Curitba, Brazil, and have also fulfilled all work, except the completion of my dissertation, for a Ph.D. from New York University. My current CV is provided as an attachment.

II. APPLICABLE PRINCIPLES FOR REVIEWING POWER EXCHANGE RULES

The Central Commission, in notifying the Power Market Regulations 2010 (PMR-2010), wisely established a "Principle based regulatory framework" while leaving micro-management to the participants and creating space for innovation by markets to help promote competition in the power sector. The objective in promoting competition, of course, as is the case globally, is to create and maintain a more efficient marketplace that encourages innovation and increases in productivity. For electricity markets to function

effectively, regulatory oversight has an important role, particularly in monitoring and keeping current on the state of the market with actual intervention being limited only to those circumstances where the market is dysfunctional, or is found to be abused by parties with undue market power, or where the market rules must be altered to reflect changes in technology or provide for other significant market circumstances. There are several principles to keep in mind in pursuing such an inquiry.

Re. Process. The first is the process itself. It needs to be open, transparent, accessible to all interested parties, and, of course, heavily focused on fact finding.

Re. Ambit of Intervention. If the decision is taken that intervention is appropriate, a regulator is well advised to narrowly tailor any proposed changes to the specific circumstances being addressed and as to avoid any unanticipated adverse consequences. Simply stated, the second principle should be to limit the nature of intervention the specific problem(s) identified and not delve into extraneous issues that are likely to have unanticipated consequences. The intervention should also be done with no more harm to property interests of affected parties than is necessary. Stranding of otherwise productive assets must be avoided scrupulously. Perhaps stated more succinctly, the principle might simply be stated as: do no harm.

Re. Role assigned to and played by the institution under review. The third critical principle in reviewing the functioning of institutions in the marketplace is to focus on the role that the institution(s) being examined play and/or ought to play. In the case of power exchanges, the role they can play in enhancing the efficiency of markets is potentially very substantial, although it is critically important to be mindful that that potential is currently constrained in the Indian market by the fact that only 4% of electricity transactions are exchanged based. The significance of that potential role is borne out by the widespread use of exchanges in markets around the world. Properly administered, they can and do reduce transaction costs, reduce counter-party risks, heighten transparency, incentivize and facilitate the development and deployment of innovative products, provide greater visibility of market opportunities, and other such benefits that enrich marketplaces and

increase efficiency. CERC has adopted rules that govern the operations of exchanges that are designed to assure all parties that the exchanges are governed and administered appropriately. While it is perfectly reasonable for the Commission to periodically review those rules, or respond to complaints about any particular exchange or the rules governing them, such a review must be done in keeping the regulatory eye on the objectives, potential, and purpose of exchanges and on avoiding taking any action that would preclude or even diminish the important role that exchanges can and do play in the market. In the case of the Indian electricity industry, where only 4% of the transactions take place on the exchanges, that consideration takes on added emphasis, because the potential for growth is so critical for the long-term growth and viability of completion. Any measures, absent evidence of abuse or dysfunction, undertaken to diminish or impair the role of exchanges will inevitably have adverse consequences for the long-term competitiveness of the electricity market.

Re. Mission of the institution under review. The fourth principle that is important to keep in mind is the mission of the institution(s) being examined. In the case of exchanges, the mission is to enhance overall efficiency and transparency. The objective of exchanges relate to how the market operates and not to specific results that occur in a properly functioning marketplace. In other words, the measure of an exchange's effectiveness is not whether prices are too high or too low, but, rather, that the prices are properly derived, and not the consequence of abuse, dysfunctional operations, or other inappropriate circumstances related to the functioning of any particular exchange.

Re. Context of Evaluation. The fifth principle relates to context. Market functionality results from a number of circumstances, only some of which are subject to the control of any institution. It is important to keep in mind when examining the role of market institution, which circumstances are within their control and which are not. Stated more succinctly, institutions can only be held to account or to be subject to new rules when past problems or future improvements are within their area of responsibility. Regarding exchanges, for example, a disruption in exchange-based transactions caused by a *force*

majeure event should not result in penalizing an exchange or diminishing the role of exchanges in the market.

Re. Doctrine of Proportionality. The sixth and final principle, I would note relates to proportionality. Whatever regulatory intervention is decided upon, that intervention should be directly related and proportionate to the problem or opportunity presented. An example would be if a an isolated problematic transaction occurred, a regulator might change a rule to address the problem, but it would be grossly disproportionate, if not entirely inappropriate, to suspend the license of the exchange in which the transaction occurred.

The point in articulating these principles is simply to suggest that they are important guideposts for any regulators to deploy as they evaluate the role of institutions in the marketplace and the context in which they operate, and how they relates to other market participants.

III. SUBSTANTIVE ISSUES IN REVIEWING POWER MARKET RULES

The role of power exchanges in competitive market around the globe is very important. The situation in India, as noted above, is that the power exchanges account for only 4% of the transactions in the Indian electricity industry (being the market as indicated for any inquiry into market distortions under Section 60 of the Act), while long term PPA's constitute 87% of transactions, 7% are sale through trader arrangements which are predominantly negotiated contracts, and 2% are through Deviation Settlement Mechanism. That suggests that power exchanges are being underutilized and remain nascent in their development. While there are a variety of reasons for that, it is worth noting that the relative paucity of exchange-based transactions should caution regulators to mould their proposed action to ensure that the same does not inhibit growth in exchange transactions. The reason for concern is that exchanges are a very efficient means of transacting business with relatively low transactions costs for both seller and buyers, reduced counter-party risk, greater transparency, well understood risk allocation, relatively simple terms and conditions, and rapid deal consummation. Because the exchange transactions are often

based on marginal costs and requirements, they tend to both emphasize the most competitive components of the markets and add to market liquidity.[1] In addition, because of its dynamism, exchange based transactions provide insight for all market participants into what additional products and service might be offered which would provide both a more robust, efficient market, but also increase social welfare. That type of opportunity for such market enrichment is generally not present in the other three types of making transactions in the Indian power sector[2].

The potential for enabling a greater and richer variety of transactions is enhanced by the fact that the exchanges are incentivized to provide more transaction opportunities for market participants, since their revenues are driven by the volume of transactions. Moreover, to the extent that exchanges gain a bigger presence in the market, there will be more opportunity to reduce dependence on long term PPAs that both tie up capital and focus more attention on capacity requirements rather than focusing on the energy component of the market, where the opportunities for incentivizing both competition and productivity gains is most pronounced. It seems, therefore, that any changes in the rules governing exchanges should be designed in a fashion that they do no harm to the operations of exchange markets, because to do so, would effectively reduce the robustness and future growth of competition in the power sector.

The issues that appear to have led the Commission to create a Market Coupling Operator are important and certainly merit attention. They include:

1. Diverse results in price discovery**.**
2. Transmission allocation among power exchanges**.**
3. Failure to maximize economic surplus**.**

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[1] The dominance of PPA's and bilateral arrangements in India has the effect of focusing heavily on capacity rather than energy. While may be understandable historically, that focus de-emphasizes the energy market which is potentially the most dynamic and most competitive part of electricity markets, and the area where power exchanges can play an external important role.

[2] Being (i) long term bilateral contracts, (b) negotiated trader arrangements, and (c) deviation settlement mechanism.

It is perhaps best to begin the analysis by noting that the creation of the Market Coupling Operator (MCO) will do harm to and perhaps even destroy the exchanges. **That is because the MCO will effectively displace the exchanges as the site of price** discovery and where the exchanges have information to provide to the system operator, they will no longer be able to do so directly because of the insertion of the MCO between the exchanges and the grid operator something that will increase transaction time and expense, and is likely to lead to bypass of the exchanges. **While assigning the MCO role to the system operator may expedite the process a bit if the MCO were a separate entity, it is, nonetheless an additional level of bureaucracy/complication to a process that, optimally should simplify and expedite the smooth and efficient flow of accurate and precise information. Additional bureaucratic steps in that flow can not only slow down the flow of information, but additional handlers of data can also increase the potential for errs in the date transmitted.** By-passing the exchanges, of course, will provide **less transparency to market participants** and will also **deprive the exchanges themselves of the information and incentive to offer innovative products and services that will enhance the market**. It would also, of course, very likely **lead to the stranding of some or all the assets in which the exchanges have invested**. Even more important than the stranding of private assets, however, is the high likelihood that the damage done to the exchanges **will cost the entire power sector the opportunity offered by exchanges to enrich the markets and produce a more efficient power sector**.

Thus, contrary to the principle of doing no harm, the proposal will do harm. That, however, is not the end of the inquiry. The next question is whether that harm is outweighed by the benefits offered by the creation of the MCO. That requires an examination of the reasons underlying the proposal.

1. Diverse results in price discovery

One of the concerns underlying the proposal to create the MCO is that multiple exchanges may produce diverse results in price discovery. It is not clear that the situation poses a problem so consequential that it warrants the rather draconian step of creating the

MCO and effectively bypassing, if not ultimately eliminating the exchanges altogether. One aspect in which the problem of having diverse prices rather than a single market clearing price emerging from the exchanges and the proposed remedial action must be evaluated is that exchange based transactions constitute only 4% of the Indian electricity industry as a market. So even if one assumes, for the sake of argument, some distortion of pricing, the result is not terribly consequential. It would be a mistake, however, to simply assume that the lack of a single market clearing price is particularly problematic under the current dispatch and revenue flow model in India. That is because 94% of the transactions are dispatched by contract prices, rather than a market clearing price. In fact, the prices of the uncoordinated, non-uniform pricing arrangements in PPA's and bilateral contracts are quite diverse, perhaps, considering all of the variations in terms and conditions, even more so than exchange-based transactions. .The point is that India has managed up to now with diverse, rather than uniform, price signals from 94% of the market and the Commission is not proposing to remedy that situation, Thus, it is not at all clear why "reform" of the very small 4% market share of exchange-based transactions will cure any defect resulting from the lack of a single, uniform price signal, since it would leave the rest of the market without such a clearing price.[3]

It is worth noting that competition may well be enhanced, not diminished by diverse signals in pricing and other terms and conditions. That is because diversity in contract terms, including pricing, provides incentives and reference points for competing parties to offer and/or seek out even better arrangements, increases the likelihood of improved products and services, as well as productivity gains, and aligns incentives with resource optimization. Moreover, if financial arrangements between parties are separate from the

[3] It is important to note that decentralized price discovery is neither an unprecedented occurrence nor an overly concerning matter. Certainly, there are multiple stock and commodities exchanges. There are also innumerable over the counter trades that occur outside the reaches of formal exchanges. In regard to power sector related exchanges, In the United States, power trades occur on more than one exchange and, of course, over the counter as well. Indeed, some of the downsides are eliminated by effective self-policing by market actors who select on which exchanges they do business, thereby reducing of not eliminating the risks of confused signals, such as abusive arbitrage. Arbitrage, in and of itself, however, is not an abusive or adverse practice e. While it can be abused, it can also be useful by adding liquidity of to the overall efficiency f the operation of the market.

actual physical dispatch, where a single market clearing price might be needed for purpose of security constrained merit order dispatch, resources can be optimized both economically and physically[4]. The mere fact that there is no single market clearing price and/or that there may be arbitrage occurring is not, on its own, problematic, as long as the market rules are appropriate, and the Regulator is empowered to take corrective action when necessary. In fact. both the lack of uniform pricing and the use of arbitrage are common characteristics of competitive marketplaces and can provide opportunity for increased liquidity and efficiency.

Given how market function, from a regulatory or market perspective, logic would suggest that any proposed changes regarding closing opportunities for arbitrage, or moving toward a single market clearing or reference price be preceded by a fact finding proceeding designed to ascertain the scope of arbitrage taking place and examining whether those activities constrain or harm the operation of the market in any significant way. I say this because, the existence of a competitive market pre-supposes the absence of regulatory intervention unless there is evidence of dysfunction, abuse, or other functional disorder. As noted, the mere existence of arbitrage is not evidence of such disruption. Indeed, it could be part of the market optimizing on its own. Given that context, if the Commission has reason to suspect that the lack of a uniform clearing price or the nature of arbitrage activities pose a serious problem for the market, a factual inquiry would have two very important values. The first is that is establishes a factual predicate that justifies consideration of regulatory intervention, something that will provide investors with assurances that the activity being undertaken is neither arbitrary nor ill considered. The second value, is that the findings of fact that result from such an inquiry will enable the Commission to focus its attention on those matters that are most troublesome.

A critical challenge not to avoid the problem of "not seeing the forest through the trees." No inquiry into a market as vast and as complex as the Indian electricity system,

[4] I understand that this aspect is under active consideration of the Commission since August 2018, culminating in a pilot on pan-India Security Constrained Economic Dispatch for ISGS being designed and implemented by POSOCO under the directions of CERC from April 2019 till May 2020.

should be undertaken on an issue by issue basis, in isolation from the operations of the entire system. Thus, any inquiry into to the pricing and dispatching of generation, along with related products and services, as experience shows, requires a broader view of not only how the exchanges operate, but also how they, and the transactions they enable, interact with the entire Indian electricity industry than simply an examination of the derivation of power transactions constituting 4% of that market, or exclusively focusing on actual physical transactions.

The electricity market, to be optimized, should be enriched and enhanced by more than physical transactions. Financial arrangements, such as hedges of various types, including futures contracts, energy swaps, tolling arrangements, and a host of other possible transactions enable to energy to flow while offering the opportunity to all parties to optimize costs. Exchanges play a critical part in enabling that optimization. As competition has evolved in other markets, for example, the flow of revenue has become largely, if not entirely, decoupled from the physical flow of energy. Transactions, either bilateral or exchange based are, as noted, largely financial in nature and have little or nothing to do with physical dispatch (security constrained merit order based on either cost or bid) but buyers and sellers in the market have the ability to hedge their risks, or otherwise seek to optimize their position in the market. The critical point, of course, is that electricity markets are no longer simply the buying and selling of electricity. The traditional products such as capacity, energy, transmission, distribution, and ancillary services are no longer bundled in sophisticated markets, and many new products have been added to the mix of what is available.

The increased reliance on intermittent (63%anticipated by 2030), zero marginal cost renewable resources (e.g. solar and wind) accentuates the need for greater flexibility and new products, both financial and physical, to manage the increased challenges of the uncertainty of supply from wind and solar, and the ability to financially sustain needed baseload generators that are lowered in the merit order of dispatch, raising both physical and economic questions regarding their sustainability. Other changes in the market, such

as storage, distributed generation, smart technology, demand response, and electric vehicles will both demand and enable increased efficiency in the market as well as efficient and widespread deployment of new products and services, including financial, non-physical, ones to serve a rapidly changing marketplace. Institutions such as exchanges will be a very, perhaps the most important component for meeting that demand both expeditiously and efficiently. Given the important role exchanges will play, it is vital that they be reinforced rather than diminished, weakened, or encounter undue barriers in fulfilling the important role they have to play.

Alternative features of market designs

The purpose in mentioning this is not necessarily to advocate that India undertake a full transition to such a model at this point in time, but simply to point out that such a market structure is quite likely to evolve as the country advances down the path toward a fully competitive power sector, and to recommend that regulators and policy makers do not erect barriers to facilitating that transition.

Central to the ability of the market to evolve in such a direction is the existence of vibrant power exchanges with the capability of innovating with changed circumstances and offering a variety of products and services to market participants. The diminution of the functionality or the inadvertent elimination of exchanges is not simply the stranding of assets, but effectively limits the country's ability to enable the full evolution of competition in the power sector. It also has the effect of signaling investors that the vital institutions in the power sector may be subject to regulatory uncertainty regarding their financial viability. Stated in terms of the principles enunciated in the second section of this paper, it would seem that the supplanting or diminution of power exchanges by creating an MCO, as opposed to working with the exchanges to get to the results the Commission sees as important, runs afoul of the principles of do no harm by acting disproportionately to the problem being confronted, and not fully appreciating the context within which the market will involve and what will be needed to enable it. One additional harm that the creation of the MCO would cause is that it would not only do severe damage to the existing exchanges,

but would constitute a significant barrier to new entrants to the exchange business, thereby precluding the type of competition among exchanges to provide new products and services and to add increase efficiency the market.

There is, in addition, another dimension to the question of the value of establishing a market clearing price. India, unlike Europe, has a single integrated national grid

- under the command and control of a single national grid operator supervising 5 regional and 30 state grid operators,
- a central regulator regulating grid inter-state operations while states are obliged to align their intra-state grid operations[5], with
- nation-wide power exchanges.

So market wide institutions are in place to avoid and/or remedy any serious market constraints or distortions that results from problems associated with decentralized markets and market institutions, as is the case in Europe. The existence of market wide institutions is very important for longer term evolution of the Indian power sector, an evolution that would be greatly enhanced, indeed, enabled, by the existence of vibrant energy exchanges.

As the Commission, in recent proposals, has recognized, the use of contract-based pricing for generation, particularly regarding energy and dispatch, has shortcomings. Moving more toward a more market-based approach is quite sensible. If that requires the use of a market clearing price, as it does in some markets, then the Commission has options. One, as is noted earlier in the document, and perhaps the most simple, is to simply make certain that the clearing prices of dispatch are transparent and easily accessible. That provides a reference price that all market participants, as well as the Commission, can use as a reference price. It is not clear that anything more is required, as most transactions are likely to be designed and constructed around that reference price. .If, for some reason, the

[5] North America is similar to Europe in the sense that it has different grids and different operators in various parts of the continent, but differ from Europe in that it, like India, does have a central regulator, as well, of course, as regulators in each state.

Commission believes more than a reference price is necessary, then the customary regulatory course would be to ask existing parties, in this case, the exchanges, to develop the means of supplying that information rather than supplanting already fully functional institutions. Given that one exchange accounts for 99% of the transactions conducted at exchanges which itself is a meagre 4% of the volume of transactions conducted in the Indian electricity industry, should not be overly complicated. India has one integrated national grid, with one national grid operator supervising 5 regional grid operators and all state grid operators, as well as an effective central regulator, that should not be overly difficult to accomplish when the power exchanges are envisaged to be pan-India in their footprint. In my considered opinion, the full exploration of these two options, and perhaps other, should be undertaken before embarking on the more disruptive, indeed, draconian route of bypassing the exchanges altogether.

Competition regarding Exchanges

Closely corelated, although flipped, perhaps, to the concern about price diversity is the question of market dominance by one exchange. As noted, exchange transactions, account for only 4% of the deals in the Indian electric industry. There are only two exchanges doing business at present. 99% of the arrangements are transacted on one of the two exchange. That is a bit ironic, since the likelihood of price diversity may well be diminished by the centralized exchange activity. Regardless, in a competitive marketplace, market dominance by a single player is a subject that often arises. In the electricity sector in India, the concern appears to be derived not by specific complaints or misbehavior, by virtue of the fact that there are only two exchanges doing business, and one of the me controls 99% of the market. It appears that the situation is not as concerning as the 99% figure might suggest. There are three basic reasons for this conclusion, one related to the fact that market share itself may not constitute a threat to competition, the second reason is related to the definition of the market, and the third related to the nature of the exchange business.

In regard to market share, a dominant position in the marketplace is not, in and of itself, a threat to competition. While it is understandable that a 99% market share would give rise to competition concerns, further inquiry would be needed to see if, in fact, that market dominance arose from bad behavior, and/or poses a threat to competition going forward. Such an investigation would include whether that market share was devised through unlawful, coercive, and/or anti-competitive practices. Were that the case, presumably, there would be complaints from those who suffered from such misbehavior, or there would be a paper trail of financial manipulation that bear evidence to such activity. No such trail appears to exist that would substantiate any such abuse, nor is there evidence that the dominant exchange, as it currently does business, is doing anything inappropriate to keep competitors out of the market. In fact, it appears that the historic dominance in the electricity market by long term PPA's and bilateral contracts is the primary cause for the fact that exchanges play a small role, in terms of market percentage. The limited nature, up to now, of the opportunity to engage in the exchange business has likely discouraged new entrants from entering the market and caused at least one player to depart. It is important, however, to keep in mind that as the market evolves, to make sure that no residual barriers exist to discourage new entrants from getting into the exchange business, but the lack of competition in the 4% of the market occupied by exchange transactions appears less of a concern than is the fact that exchanges account for such a small overall component of the market.

In regard to the market definition, the fact that only 4% of all transactions occurring in the Indian electricity industry are conducted on the exchanges makes it clear that the Indian electricity market is substantially bigger than any exchange could possibly dominate. As a result, even an exchange with a commanding 99% market share in exchange trading, is simply not capable of dominating the market when it has no access to 96% of the transactions. The determining factor in market dominance is if the market power exercised by one player is sufficient to effectively dictate prices or terms and conditions of transactions in the market. The market in this case is statutorily defined in Section 60 as

the Indian electricity industry and not some small component of it, because the exchanges themselves have no viability absent the presence of the larger electric sector in which exchanges fill a niche, an important one, but not capable of dominating the sector.

The final factor in determining that possessing 99% of the market poses no threat to the overall competitiveness of the sector is the nature of the business. Exchanges operate the market; they are not market participants. Properly governed, no exchange would ever have an interest in the outcome and would be self-interested in maintaining sufficient transparency in trading that it inspires trust and confidence of market participants. in the competition in products and services traded on the exchange. Absent some conflict of interest or fraudulent business practices, and there are no accusation of that in this matter of which I am aware, the only anti-competitive concern that might arise is if there were an effort to use transaction fee pricing to either drive other exchanges out of business or to serve as a barrier to new entrants. There is, again, in this case, no evidence of that either. Moreover, if prima-facie evidence existed, in terms of Section 60 of the Act the Commission would have to undertake an adjudicatory proceeding commencing with a show cause notice to ascertain the factual situation that any of the 3 kinds of actionable conduct resulting in adverse effect or likely adverse effect on competition in the Indian electricity industry have been committed. Only upon coming to a finding that indeed such an actionable conduct has been committed can the Commission issue appropriate directions (proportionate to the malady) to remedy the situation – like imposition of restrictions on transaction fees. It is not conceivable that such remedial action could be to diminish the role of power exchanges for all times to come particularly when the PMR-2020 is an action towards market development under Section 66 of the Act. Ironically, if persisted with, it would culminate in an anti-competitive result, the extinction or severe diminution of an entire mechanisms that adds liquidity and dynamism to the marketplace[6]. Thus, there is no

[6] The Commission appears to have some concern about the transaction fees, as it proposes to regulate them. Given the small niche that exchanges possess in the marketplace, that move might well be counterproductive. The paucity of exchange based transactions is ample evidence that the incentives to engaged in the exchange business are quite weak. The imposition of limit on fees to be administered using some unspecified methodology is very likely to have the inadvertent impact of further discouraging potential players from entering the

monopoly circumstance demanding a remedy, and, even if there was the proposed action of the Commission would be entirely disproportionate to the problem.

2. Transmission allocation among power exchanges

A second concern driving the proposal of the Commission is the allocation of access to transmission assets. That is a well-founded and reasonable concern. Certainly, grid constraints such as congestion or insufficient interconnections can constitute significant barriers to the development of efficient energy markets. In specific regard to the question of how much of a role the power exchanges play in transmission allocation, given the small share of the market that exchanges have in India, the answer is that it is minimal. Indeed, based on international experience the role of exchanges regarding transmission is highly dependent on the market design, particularly as it relates to transmission pricing, and, perhaps, to a lesser degree, to generation.

Transmission pricing is a complicated process, made even more so by the heavy emphasis that must be placed on grid security. At a conceptual, perhaps overly simplistic, level, there are two basic approaches to transmission pricing, one that socializes costs, and the other, which attempts to allocate costs to market participants in proportion to their use of and/or benefit from the grid. The former approach approaches the grid as a commons that exists for the benefit of all, so proponents of that approach generally do not unduly concern themselves with who may have caused specific costs or with who receives the most benefits. The other approach is very much concerned with cost causers and beneficiaries, because without knowing those circumstances, it is impossible to send the right price signals that incentivize optimization of grid utilization. The second approach is

exchange business. That is particularly the case in this circumstance because there is no fact finding predicate (e.g. abusive or monopoly prices) for imposing limitations. Indeed, there is not even a discussion of the incentives exchanges have for not engaging in price gauging on exchange fees, namely that their market share in energy transactions in so sparse, that their incentive is to encourage more use of the exchanges rather than discourage them through excessive transaction prices. Given the expected growth shorter term transactions the Commission anticipates, as articulated in its proposal, discouraging new entrants from entering the exchange market may prove to be disadvantageous.

to put in place locational marginal rates that capture costs in real time at up to thousands of nodes on the grid and charge users accordingly. In both types of transmission pricing regimes, the grid operator has the authority to intervene to protect security, but such intervention is less likely to occur in the more sophisticated pricing regime because customers can decide what risks they wish to take in regard to congestion and other potential costs. The point here is not to go into any depth of detail on the complexities of transmission pricing, but, rather, to indicate that exchanges play very little role in determining allocation of transmission resources. In fact, the products that are traded on the exchanges are reflective of the nature of the market within which they carry out their business.[7]

The reality is that exchange transactions, by volume, have little impact in India, and what impact they do have, are not necessarily any different in character regarding use of the grid than are bilateral arrangements of various types. Similarly, any concerns about allocation of transmission among the exchanges seems not to be terribly important for two reasons. The first is that there are only two exchanges which serve only 4% of the Indian electricity industry/market, and one of them controls 99% of that exchange market. The second is that allocating transmission rights by the nature of how the transaction was derived (e.g. bilateral or exchange) has little or no economic value and constitutes little more than a convenient administrative tool that puts more constraints on the system than adds value. If the allocation of access to transmission assets is a concern, that does not get addressed effectively by the proposed changes to the Power Market Regulations. It is much more efficient to address them directly through transmission pricing reforms or through such changes in pricing energy transactions as pricing at the delivery point and not at the bus bar.

[7] For example, an exchange doing business in a market that did not explicitly charge congestion rents, there would be no product offered to mitigate against such risks. An exchange in a market with congestion rents would probably be offering firm transmission rights, a product that mitigate congestion costs. In that example, the exchange did not create or obviate congestion, but it simply offered innovative products to enable customers to make economic choices. This example is very important to illustrate another important point, namely that vibrant exchanges constitute a major contributor to enriching whatever market is deployed. Without such institutions, any reform is likely to be less effective and less efficient.

Given the generic nature of transmission issues, it is difficult to see what problems are resolved by the proposed creation and deployment of a Market Coupling Operator. Succinctly stated, transmission concerns are more effectively dealt with on a generic basis than based on how transactions were derived.

In terms of the principles enumerated, above, creating the MCO to resolve transmission allocation problems does do harm to the use of exchanges in whatever market model or pricing regime which is employed, miscasts the focus of an exchange's mission to an area where it is, at best, a marginal player, and, for that reason, is a disproportionate response to an identified problem.

3. Failure to maximize economic surplus

The maximization of economic surplus is a critical objective of all markets. Because there are so many variables between markets, there is no single way to achieve it. That is certainly the case in power markets. There are a variety of tools to try to accomplish that, but the differences between markets and market structures is such that even in electricity there is no single assured way to maximize economic surplus. In the United States the dominant notion is that it is best accomplished by large regional markets (often, but not always, interconnected with other regional markets) with security constrained bid-based dispatch and locational marginal cost based transmission pricing. While the model is less than perfect and has its share of controversies and flaws, the market has worked reasonably well in trying to achieve surplus maximization. Part of that success has been due to the facts that the regional grids are interconnected with a single central operator, centralized planning, market wide uniform rules, and a central regulator. Europe, lacking in both a central regulator and single central grid operator, has opted for a market coupling mechanism to try to optimize economic surplus. The fundamental difference between the two approaches is that the U.S. has endeavored to maximize surplus through the internalized operations of the market, whereas Europe, in a very different political and institutional setting was not able to internalize the seeking of surplus maximization, so it opted instead for an external mechanism, market coupling.

In contrast, India is certainly able to choose the model most suitable for it. It would be useful to look at both the U.S. and European experiences to see which institutional setting most reflects the setting in India and what lessons might be drawn from each experience. On the surface, however, India has a bit more in common in the U.S. since it has a central grid, a single operator, a central regulator (state regulators as well), and centralized planning.

The point of comparing the European and North American systems was not to suggest that India needed to replicate one of the models, but, rather to note that the Commission has more than one route to choose, so to maximize economic surplus, it need not do damage to the exchanges by creating the MCO, which would effectively displace them. Rather it would be useful to enable the exchanges to do what they do best, namely find ways to offer products and services that best optimize the market model in place. Displacing the exchanges with the MCO does harm to the principles of do no harm, taking their focus away from the mission of exchanges, and is disproportionate to the problem since it does damage to an important asset when it could accomplish the same result without inflicting the harm.

IV. CONCLUSION

It is important not to lose sight of the importance of exchanges to the operation and optimization of competitive electricity markets. The added value they bring include but are not limited to low transaction costs, reduced complexity, added liquidity, ease of use, transparency, reduction of counter-party risk, increased market efficiency, and perhaps, most importantly, they bring the promise of new and innovative products and services that will enrich the market, They are critical to the optimization of economic surplus. The creation of the MCO, although well intentioned, is very likely to have the effect of severely diminishing their role, and, perhaps, fully displacing them with an institution, the MCO that is neither positioned nor incentivized to add similar value to the market. That result might be understandable, if unfortunate, if the only way to maximize economic surplus were through the creation of the MCO, but, as discussed in this paper, there are alternatives,

including even the delegating responsibility to perform the MCO function to one or more of the exchanges.

Another possibility to remedy problems associated with the lack of a central point of price discovery is to focus solely on the activity where a single market clearing price is needed, namely the payment of the generators who are dispatched, and not, absent a showing of abuse or dysfunction, to be overly concerned with financial transactions that do not affect physical operations. Certainly the U.S. experience has demonstrated that where the regulators focus on the central market functions and leave it largely to the market to develop trading practices that diminish risk and to add liquidity, the result has been beneficial. The classic example relates to the adoption of locational marginal cost ricing for transmission. Many market participants complained bitterly about the risks they perceived, but the trading market offered a solution to that problem by opening up the trading of firm transmission rights (FTR's) to reduce the risk of being unable to access transmission. It is worth noting that FTR price discovery is not centralized, but the market has worked quite successfully, I strongly encourage the Commission to maintain its efforts to maximize economic surplus, but to do so without doing unintended harm to exchanges and the vital role they play. As a final, but critically important note, it is essential to keep in mind that the objective for both policy makers and regulators is not getting to a specific price result, but, rather to create and maintain a highly efficient market that enables the optimization of resources.

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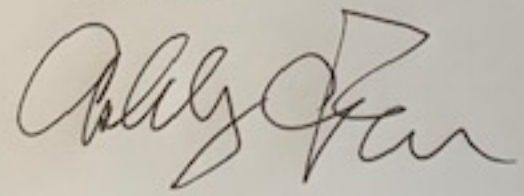

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Before his current activities, Ashley Brown served as Commissioner of the Public Utilities Commission of Ohio, appointed twice by Governor Richard F. Celeste, first for a term from April 1983 to April 1988 and for a second term from April 1988 to April 1993. As Commissioner, he was of five members responsible for the regulation of the state's electricity, telecommunications, surface transport, water and sanitation, and natural gas sectors.

Prior to his appointment to the Commission, Mr. Brown was Coordinator and Counsel of the Montgomery County, Ohio, Fair Housing Center. From 1979-1981 he was Managing Attorney for the Legal Aid Society of Dayton, Inc. From 1977 to 1979 he was Legal Advisor of the Miami Valley Regional Planning Commission in Dayton. While practicing law, he specialized in litigation in federal and state courts, as well as before administrative bodies. He has served as an expert witness in litigation in the courts and administrative agencies In addition, Mr. Brown has extensive teaching experience in public schools and universities.

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Member, National Association of Regulatory Utility Commissioners

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Member, the Keystone Center Dialogue on Emissions Trading

Member, the Keystone Center Project on the Public Utility Holding Company Act of 1935

Member, The Keystone Center Project on State/Federal Regulatory Jurisdictional Issues Affecting Electricity Markets

Member, Policy Steering Group, The Keystone Center Project on Electricity Transmission

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Member, U.S. Delegation to International Electric Research Exchange (IERE), Rio de Janeiro, Brazil, 1991

Consultant, Hungarian Ministry of Industry and Trade on Gas and Electric Regulatory policy, 1991-1992

Advisor to Ministry of Trade and Industry on Writing New Laws Governing Electricity, Natural Gas, and Regulation

Consultant, SNE, Costa Rican Regulatory Agency, on Transmission Access Issues, 1992

Advisor on Development of Independent Power Producers and Transmission Access

Consultant, World Bank Mission to Hungary Investigating the Financing of New Power Plants for MVM (Hungarian Electric Co.), 1992

Preparation of Background Materials in Preparation of a World Bank loan to the Hungarian Power Sector

Member, U.S. Delegation, in Conjunction with the U.S. Department of Energy, to the Argentina and United States Natural Gas and Electricity Regulatory Meetings, 1992

Consultant, ENARGAS, the Argentine gas regulatory agency, 1992
Providing Training for ENARGAS Commissioners and Staff

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Preparation of a Report on Introducing and Promoting Private Investment in the Indian Power Sector

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Participant, Harvard University's East Asian Electricity Restructuring Forum, 1994-1995
Delivering a Series of Lectures in China, Indonesia, and Thailand on Reforming the Power Sector

Consultant, Government of Ukraine on Electricity regulatory policy and industry restructuring, 1994-1995
Advisor to the National Energy Regulatory Commission on the Structure, Processes and Substance of Electricity Regulation

Consultant, Government of Brazil on Electric Sector Restructuring, 1995-1996
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Member, Brazil-U.S. Energy Summit, 1995-1996
Preparation of a Report and Lecture on the Options for the Regulation of a Restructured Brazilian Power Sector

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Advisor on Development of Independent Power Project and on Restructuring of the Electric Distribution Sector

Consultant, Government of Indonesia on electricity regulation, 1999
Training Government and Industry Personnel on Electricity Regulation

Consultant, Government of Mozambique on reform of the commercial code, 2000
Advisor on Reformation and Rewriting of the Commercial Code

Instructor, South Asia Forum for Infrastructure Regulation, 1999-present
Annual Training Regulatory Personnel from Five South Asian Countries

Consultant, Government of Tanzania on electricity regulation, 2002
Advisor of Rewriting the Laws Governing Energy and Transport Regulation

Consultant to Inter-American Development Bank on Sustainability of Sector Reform in Latin American energy markets, 2001-2002
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Consultant to World Bank on Brazilian energy regulation, 2002-2004
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Consultant to the Brazilian Government on Redesign of Electricity Market, 2003-2004
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Consultant to Government of Dominican Republic on Electricity Regulation, 2004
Delivery of a Series of Lectures on Problems in Restructuring and Privatization in Dominican Power Sector

Consultant to Eskom, South Africa, 2004-2005
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Consultant to World Bank on Regulation and Market Reform in Russian Power Sector, 2004-2005
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Consultant to Government of Guinea-Bissau on Infrastructure Regulation, 2005
Training Government and Industry Personnel on Infrastructure Regulation

Consultant to the Government of Mozambique on Electricity Regulation, 2006-2007
Assisting in the Re-Establishment of the Electricity Regulatory Agency

Consultant to the Government of Equatorial Guinea, 2007
Assisting in writing the country's electricity law

Consultant to the Public Utilities Commission of Anguilla, 2008
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