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FEDERAL ENERGY REGULATORY COMMISSION

Capacity Markets in Regions with) Docket No. AD08-4-000
Organized Electric Markets)

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My name is James F. Wilson. I am an economist and a principal with LECG, LLC, a consulting and expert services firm with offices worldwide. Many of my comments today will be based on my recent evaluation of the RPM mechanism and the results of its first four auctions summarized in my report: “Raising the Stakes on Capacity Incentives: PJM’s Reliability Pricing Model” (March 14, 2008, 84 pages). However, the views I will express are my own and I am not speaking on behalf of any client or of LECG.

I have been consulting to the electric power and natural gas industries for 25 years. I was drawn to the field of economics in the 1970s by the wave of deregulation that was beginning at that time, notably in the airline and telecommunication industries. The focus of my career has been the challenges involved in and resulting from bringing greater competition to the traditionally regulated natural gas and electric power industries. Most of my assignments have been in the U.S., however I also spent five years in Russia in the early 1990s consulting on the restructuring, reform and development of that country’s electric power sector.

Markets are a good thing because they create incentives and allow market participants, who have the best information, to act on those incentives to meet consumer

needs. Regulators can to some extent step aside and watch consumers reap the benefits. However, incentives can be a two-edged sword, and more harm than good can result if policies somehow lead to a misalignment of producer and consumer interests.

The Commission's policies to introduce competition into the natural gas industry have worked well, resulting in greater efficiency and consumer benefits. These policies are now mature, stable and relatively uncontroversial. The first round of reforms in the electric power industry, in the 1980s and early 1990s, also was successful and provided consumer benefits. However, the further restructuring of the past ten years has posed a significantly greater challenge and is still a work in progress. And the problem of resource adequacy is a part of this work that remains unfinished. While it is generally accepted that the industry should be prepared to meet peak electricity demands with a high degree of confidence, how to achieve this has been one of the most complex and controversial electricity issues the Commission has had to address. There have been multiple starts, stops and restarts in a new direction. Across the country at the present time, a wide range of experiments is underway.

This conference is focused on one relatively new approach – the *forward capacity market*. This approach – that assigns capacity obligations three years into the future and identifies resources to meet the obligation through an auction approach – is a new idea, with its first tests in this country occurring this year.

The attraction of the (three year) forward approach is clear. It certainly would be nice to know exactly what resources will be used to meet peak loads three years into the future, especially since we know that the most common type of capacity addition over the past decade – gas-fired – can't be built in much less than three years. Another attraction of

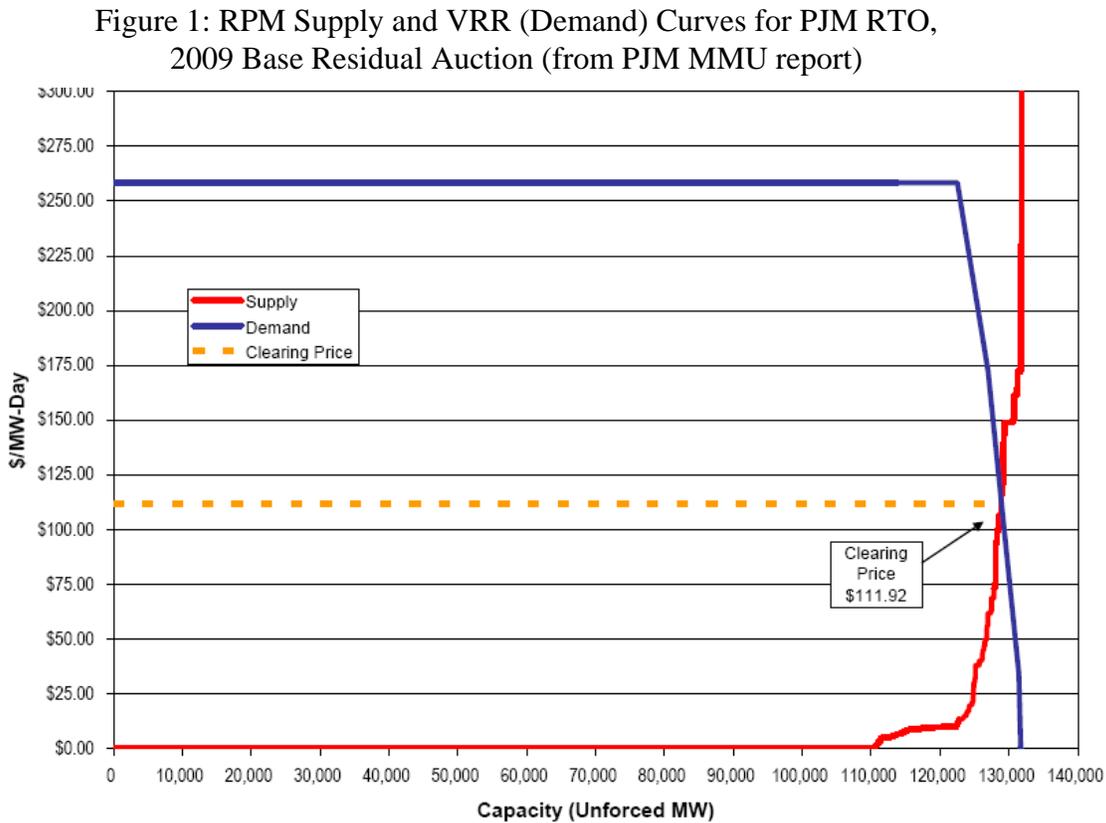
the three-year-forward approach is that it allows potential new resources to be offered, to be developed only if they are needed three years hence, as indicated by the auction result. This also offers hope that a market-based process held three years in advance could be somewhat competitive, if multiple developers vie to provide a needed increment of capacity. This is particularly important, because we know that these capacity markets can create strong incentives for some participants to offer less rather than more capacity, in order to raise prices and the profits earned on the rest of the participant's portfolio.

It is worth pointing out that in competitive markets, it is not necessary to implement forward markets administratively – forward markets evolve naturally as market participants plan ahead to meet future needs, to the extent this helps achieve quality, cost, risk or other objectives. If market participants face the full consequences of their choices, there is no need to require anyone to do anything in advance, it will happen naturally. However, because we aren't able to fully assign responsibility and consequences for electric generating capacity shortages in real time, we have administrative capacity mechanisms that have operated one year in advance, and now three years in advance of a delivery year.

It is also worth noting that it is really not very important, from a societal welfare perspective, if the electric system planners have targeted a bit too much or too little total capacity reserve margin, or if the actual capacity built is a bit over or under the optimal amount. This is because, when an electrical system has approximately the optimal amount of capacity, the marginal benefit that would be obtained from a bit more capacity is approximately equal to its marginal cost. As a result, the incremental benefits and costs are likely to be about equal, and net benefits or costs are very small.

However, when we implement a capacity incentive mechanism such as RPM, the economics are completely (and artificially) changed for consumers and producers. Now, rather than consumers being fairly indifferent as to a bit too much or too little targeted or actual capacity, the cost consequences are about an order of magnitude higher. The societal welfare conclusion is not changed; the problem is that the mechanism can cause large transfers of wealth between consumers and capacity sellers.

The administrative “demand” curves under PJM’s RPM mechanism are quite “steep”, meaning small changes in quantity have a relatively large impact on price (Figure 1 is an example). In the transitional auctions, the supply curves have also typically been very steep. As a result, setting the capacity requirement a bit too high (shifting the demand curve to the right) is very costly to consumers, as it sharply raises RPM prices. Similarly,



excluding even small amounts of capacity, allowing it to be withheld, or failing to create adequate incentives to provide it, reduces apparent supply and also raises RPM prices sharply.

The artificial raising of the stakes regarding capacity supply and demand resulting from an administrative capacity mechanism such as RPM means that numerous, seemingly minor administrative details can now carry price tags in the tens or even hundreds of millions of dollars (my report gives a few actual examples of this). Target reserve margins, details of the load forecasts, parameters of the CETO and CETL analyses, assumptions regarding when various transmission projects will come online, parameters of the administrative demand curve such as CONE and the E&AS offset, etc. all become controversial, as RPM prices and payments are highly sensitive to them.

In addition, RPM's high sensitivity creates strong incentives for many market participants to offer less, not more capacity into the capacity auctions. This is because offering and clearing a bit less capacity raises the RPM clearing price, in an amount determined by the RPM demand and supply curves such as those shown in Figure 1 above. If an entity has a large portfolio of capacity that is offered in the auction and will earn the clearing price, the loss of the capacity payment for a small amount of capacity that is not cleared can be more than offset by the portfolio's gain from the increase in the clearing price. Unfortunately, ownership of capacity in PJM is fairly concentrated, and *eighty percent* of the capacity in the PJM RTO is owned by entities with portfolios large enough that offering somewhat less rather than more capacity under the circumstances of the first four base residual auctions was likely to increase revenues. The percentage is even higher in some smaller zones.

However, under RPM, all existing capacity sellers are “mitigated” under some complex RPM rules that require them to offer their existing unforced capacity at capped prices. Doesn’t this mitigation constrain these large sellers to doing the right (competitive) things? Not at all.

Under the incentives provided by a reasonably competitive market, participants acting competitively can be expected to 1) increase the ratings of their units and drive the outage rates lower to be able to offer more unforced capacity; 2) to reduce avoidable costs to offer capacity at a lower, more competitive price; 3) to invest in older plants to keep them running additional years; 4) to export less capacity from PJM if RPM prices are relatively attractive; and 5) to develop proposals for economical new capacity as quickly as possible and offer it at the lowest prices possible. In PJM, small market participants, and totally new entrants, will have incentives to act relatively competitively and to do all these things. However, for the large entities owning 80 percent of the capacity in PJM, because incremental (decremental) capacity lowers (raises) RPM prices, they do not have these incentives, and in some instances may have strong incentives to take the opposite actions (*i.e.*, reduce unforced existing capacity and raise its avoidable cost offer caps, allow new projects to languish in the regulatory approval processes, prematurely retire older capacity, continue to export capacity even at a loss, etc.). Furthermore, even within the mitigation rules, there are various provisions allowing some flexibility to offer less or at higher prices, as detailed in my report.

How much capacity, with what impact on RPM prices, have these negative incentives cost us so far? Of course, no one (including PJM and its market monitor) can know this. But it should be clear that the conclusion “mitigated, so competitive” is simply

wrong under any normal definition of the word “competitive.” While there may have been no violations of the mitigation rules, there is no basis for believing that the potential benefits of competition are being realized, when normal, competitive incentives are lacking for the major market participants.

The results of the four transitional RPM base residual auctions held to date are consistent with the conclusion that incentives are pointing the wrong direction for much of the market. Little new capacity appeared in these auctions (and my report critiques PJM’s claim of 10,000 MW of incremental capacity, which contains some errors and some quite soft numbers). As a result of the lack of new capacity and also seller conduct, prices were much higher than market participants or PJM expected before the auctions. In the zone with the highest prices (which should provide the strongest incentive to bring forth new capacity), which also happens to be the most concentrated zone with the worst incentive problem, plant ratings declined, outage rates increased, offer prices rose sharply, and very little new capacity appeared from the first to the third auction, as RPM prices rose sharply. There were also some glaring incidents where the offer prices of existing resources were not mitigated to avoidable costs as the mitigation was (at least in principle) supposed to require, with a substantial impact on prices. For instance, in the Southwestern MAAC zone in the 2009-2010 auction, about one third of the existing capacity was offered at prices two or three times higher than the same capacity was offered into the 2008-2009 auction, held just a few months earlier (a phenomena that was not acknowledged, let alone explained, by PJM or the PJM market monitor in their respective reports on the auction). My report analyzes these and other results of the auctions in some detail, so I won’t go into further details here.

My evaluation of the RPM mechanism identifies why it has and will continue to result in excessive prices that overstate the need for additional capacity. This is because the RPM supply curves will understate available capacity in numerous small ways, and the RPM demand curves will overstate capacity needs, especially in the transmission-dependent zones. Understated supply results only partly from the incentives to offer less rather than more capacity RPM creates for many market participants; there are various additional ways capacity is excluded. RPM's price distortion can be understood as resulting from the mismatch between the two very different paradigms that it combines in its auctions. On the one hand, the administratively-determined capacity demand reflects the assumptions used in engineering-based reliability planning based on simulation of the physical system. Thus it is determined that PJM requires 15.5 percent reserve margin, assuming that this is all the capacity available in PJM. In addition, for sub-RTO zones, a once-in-25-year adequacy criteria is used, which further increases capacity requirements. On the other hand, the RPM supply curve and cleared quantities reflect a commercial paradigm, under which sellers have substantial flexibility in how they offer their resources and can be expected to hold some capacity back due to risk aversion and the bad incentives described earlier. Other available capacity may also not clear for various reasons (e.g., because it was not eligible at the time of the RPM auctions). Reflecting various commercial and practical circumstances, the supply curve understates the ability to meet the physical needs of the system, while the demand curve overstates needs, distorting prices upward.

My analysis also concludes that for a number of reasons, RPM's influence in attracting new or retaining older resources is likely to be weak, and its incentives do not

align well with the energy priorities as they are developing in many PJM states, which may emphasize energy efficiency, renewables, fuel diversity, new baseload capacity and/or transmission. The report discusses both the auctions held to date, and the details of the RPM mechanism, in considerable detail, expanding on these and many other points.

Perhaps the main reason there was interest in a detailed report on RPM's performance and structure was the \$26 billion in gross capacity cost (before taking into account self-supply or bilateral purchases) that the RPM auction prices represent to date. The prices and costs were much higher than expected, and PJM has not provided much analysis or explanation of the details behind the numbers. Stakeholders have sought to better understand the RPM results, however, PJM has responded to requests for more information about the auction details very slowly and very incompletely in at least some instances.

Consumers and policy makers would be more accepting of the high costs of capacity mechanisms if they were more convinced that the mechanisms and their high costs were necessary to maintain reliability. In its orders approving RPM, the Commission noted potential reliability problems as a primary reason why RPM and some of its features were needed. However, communicating about capacity adequacy and reliability risks can be complex, and I believe there have recently been some significant miscommunications and misunderstandings about these risks. For example, the word "shortfall" can mean available capacity less than load leading to curtailment of firm load; but in other PJM contexts, "shortfall" has meant CETL less than CETO, which only means that the loss of load expectation in a zone has risen above once-in-25-years. This is of course very, very different, but at times it has been unclear which type of potential "shortfall" was under

discussion. RTOs and stakeholders all know that the “R” word can be a strong motivator for policy makers, and ambiguity and confusion about reliability risks can lead to bad policy. In its recent filing to raise the RPM CONE parameter, PJM claimed “significant reliability concerns”; but it provided no support for its claim, and the Commission rightly rejected the request. The Commission should require RTOs to communicate in more specific terms about the potential risks of future capacity shortages, using measures that can be clearly defined and to which stakeholders can relate. For instance, rather than CETL/CETO, NERC violations, and the like, risks should be expressed in terms of loss of load expectation under specific scenarios and assumptions whenever practical.

In conclusion, the Commission may face a conundrum in that, for these capacity mechanisms to reach their full potential in attracting new capacity, they must remain in place without major changes for multiple years, to build investor confidence in them; but there is little patience for more capacity market experiments, due to the huge transfers of wealth they create while we wait and hope that investors will get comfortable with them. It is clear in retrospect that RPM auctions for the four transitional delivery years should never have occurred (one PJM official now acknowledges that PJM did not expect new capacity in the auctions for these delivery years¹). Patience is especially lacking, as the entities designing and operating these experiments – RTOs such as PJM – do not really have cost-effectiveness as part of the job description. PJM has demonstrated a willingness

¹ Reply Testimony of Michael J. Kormos, PJM Interconnection, L.L.C., on Behalf of the Staff of the Maryland Public Service Commission, Maryland PSC Case No. CN-9117, October 30, 2007, p. 4-5 (“The lack of new generation in these transitional auctions is not a surprise... This compressed, transitional schedule does not allow sufficient time for a generation project to enter the queue and advance to the stage of a completed System Impact Study or an executed Interconnection Service Agreement... We would not expect much new generation to bid into the RPM auctions until we reach the steady-state timetable [referring to the May, 2008 base residual auction for the 2011-2012 delivery year].”)

to call RPM results a success even if they differ substantially from what was expected and intended, and entail high costs and little new capacity.

I would recommend that the Commission stick firmly to the objective, expressed in RPM orders, that the capacity markets decline in importance over time. In the meanwhile, the errors should be kept on the side of lower impact and prices, rather than excessive capacity prices (PJM has consistently had excess capacity RTO-wide, even under the prior mechanism). Besides its negative impact on consumers, excessive prices in these markets shift revenue recovery from the “real” markets (energy and ancillaries) to these artificial, administrative constructs, and drive stakeholders to battle with each other and the RTO over the myriad administrative details involved. If this continues, it could do long-term harm to the Commission’s ability to pursue market-oriented policies.

Finally, I note that two papers purporting to rebut my report have recently been posted, by PJM and by the PJM Power Providers. These papers for the most part do not address the main arguments in my report, nor do they provide any arguments or analysis that would lead me to change any of my conclusions. The PJM paper especially is full of misrepresentations of my analysis and arguments. I encourage you to go to the source to see the detailed analysis on which my conclusions are based. My report can be accessed from my page at LECG.com (navigate to Experts – Wilson, James F.).

Thank you for your attention, and I will be happy to answer any questions.