**STATE OF NEW JERSEY**
**BEFORE THE**
**BOARD OF PUBLIC UTILITIES**

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| In the Matter of the Board's Investigation of Capacity Procurement and Transmission Planning | ) ) ) | Docket. No. EO11050309 |

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## COMMENTS OF FRANK C. GRAVES[1]

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Initial comments presented by participants in the BPU's investigation of capacity adequacy and generation resource development in New Jersey identified many important issues for market managers and regulators to consider. They also revealed a broad spectrum of divergent opinions about the efficacy of PJM's capacity markets and resource expansion processes. The New Jersey EDCs perceive that a few issues raised in their initial comments merit further clarification, in light of questions raised by the Commissioners and other commenters. Specifically, I will comment on four areas:

- *Analogy of LCAPP to PURPA* – Clearly the motivating market conditions are different now for LCAPP than prevailed in the mid to late 1970s when the PURPA was introduced. Nonetheless, there are similarities and insights from the comparison. There may be a perception that the LCAPP process is fortuitously timed and designed so that New Jersey is "buying low," however, I do not believe this is the case. (In fact, the SOCPs have not been disclosed to the public to demonstrate what the future costs will be.) It is more likely that LCAPP is locking customers into liabilities which will look uneconomical in hindsight, for many years[2].
- *Speed and extent of negative feedback loops* – In my initial comments, I noted (as did others) that participants in PJM will adjust their future development plans in response to LCAPP in ways that are likely to "undo" some of the intended benefits. I was asked about how rapidly this might occur. While I cannot be specific about a precise reaction rate, I will explain why I expect this to be a matter of a few years or less.

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[1] Mr. Graves is a Principal of *The Brattle Group* (www.Brattle.com). The views expressed herein are the author's own.

[2] Broad references to "LCAPP" in these Comments refer, as appropriate, to the Long-Term Capacity Agreement Pilot Program addressed in Docket No. EO11010026 and/or to the BPU's consideration in this Docket of implementing another comparable program or another regulatory intervention to incentivize generation resource development in New Jersey.

- *Implications of contracting horizon and price risk in capacity contracting* – Some generation developers described their preference for LCAPP over RPM due to its long horizon with price certainty. This understandably facilitates financing and construction, but the risk reductions extended to LCAPP developers have an implicit cost to customers, which should be recognized when assessing LCAPP.
- *Other positive changes to make in lieu of LCAPP* – The LCAPP program is designed to work around, rather than reform, some perceived (but not agreed) infirmities in PJM's RPM and other capacity development processes. As a result of this approach, any such problems will remain in place, possibly creating a perceived need in the future for yet more work-around incentives from New Jersey ratepayers. This cycle is undesirable. It would be more productive to directly address ways in which New Jersey can help make the PJM processes more effective.

**PURPA Analogy and Unintended Consequences**

In my initial comments, I used the example of PURPA to demonstrate the danger of unintended consequences from regulatory decisions. There was some misunderstanding of the analogy between LCAPP and PURPA, confusing the differing circumstances that motivated them with the over-commitment and long-term fixed pricing patterns decoupled from the market that are common to both.

PURPA was designed in the mid to late 1970s in the context of a recent oil embargo and increasing frustration with "white elephant" large baseload coal and nuclear plants that were experiencing significant cost overruns. We had plenty of capacity, but not enough low cost energy. PURPA was intended to introduce a new paradigm for more efficient capacity development (*i.e.*, cogenerators) who would take the construction cost risk off of ratepayers in exchange for long term output pricing at estimates of long run avoided costs ("LRAC") by the utility buyer of the PURPA power. But by virtue of locking in those LRAC prices for the life of the plants, and allowing an unlimited number of such qualifying facilities to participate, PURPA attracted a great deal more capacity than was needed, at a cost that was much higher than the market alternatives.

LCAPP is being considered under different circumstances: in particular, we are enjoying relatively low cost and abundant natural gas supplies (subject to some uncertainty about the long run viability of shale gas). So the "problem" is somewhat reversed from PURPA – plenty of low cost energy coupled with an unfounded concern that not enough new capacity is forthcoming from PJM in New Jersey. LCAPP also does not involve an unlimited amount of development opportunity, unlike PURPA, nor has it forecasted the LRAC value of future capacity.

However, it has created the opportunity for developers to "name their price." To the extent the winning bidders were otherwise unwilling to develop similar resources for the RPM resource clearing price, it is fair to assume that the SOCA contracts provide them with rewards or guarantees that are above the fair market price.[3] Thus, the key similarities to PURPA are:

- Committing ratepayers to resources whose value and need is not otherwise being confirmed in the market (*i.e.*, the "need" for which is being created by legislative or regulatory rule, not by actual system demand or economic advantages)
- Very long term, fixed price contracting with no adjustments over time for shifting market conditions
- Failure to anticipate likely market adjustments in response to/as a result of the policy action (especially, omission of such feedback effects from forecasted benefits in Cost/Benefit assessments)

Despite the fact that natural gas prices now appear to be at a low and fairly stable level, it is important to appreciate that *LCAPP does not lock-in any direct ratepayer access to the low cost energy these plants may be able to produce.*

- LCAPP is not a cost-based contract for the CC plants' output, just a true-up payment for new capacity up to the bidder's fixed-cost coverage preferences.
- The energy from the LCAPP facilities may not even be sold to New Jersey customers.
- If future gas costs should stay low (well in-the-money compared to market prices of power), the LCAPP plant owner will reap the profit margin between gas costs and LMPs, not customers.
- The only energy "benefit" of these plants may be temporary LMP price suppression -- These savings have been estimated to be significant by the consulting firm that reviewed the LCAPP bids, but that conclusion has not been publicly tested or even explained as to what it assumes about market conditions and other potential development. As I explain later, it is doubtful that any such price effects will be large or persistent.

Thus, the LCAPP commitments are not an example of "buying low" at a fortuitous point in time. They are an example of "buying high" relative to the current (and past) capacity market, with no component of protection for energy savings. There is a strong likelihood that the LCAPP contracts will end up being a source of "regret" (*i.e.,* hindsight disappointment) from which there is no relief.

In 1998, the New Jersey Division of the Ratepayer Advocate ("NJDRA") produced a position paper on "Above-Market Non-Utility Generation Power Purchase Agreements" making the following points about lessons learned and regret over PURPA, which we compare with LCAPP.

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[3] It is possible that some of the LCAPP resources would have been developed eventually anyway, without LCAPP. If so, they now enjoy a price guarantee they would not otherwise have had or needed.

| **Issue 1: Forecasting based on "current trends" failed to account for major market adjustments** | |
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| ***NJDRA 1998 Position Paper on PURPA Contracts***[4] | ***Parallel with LCAPP Today*** |
| • "During the early to mid-1980's, New Jersey's utilities widely assumed that fuel and plant construction costs would continue to escalate throughout the 1980's and 90's… Thus, the assumptions underlying many NUG contracts proved to be wildly inaccurate and the disparity between forecasted and actual avoided costs has significantly contributed to the high energy costs in New Jersey and other states"<br><br>• "Finally, the problem posed by the above-market NUG contracts result[ed] from fundamental changes in the economics underlying the electricity industry." | • If more efficient or less expensive capacity enters the market in 2015-2030, the SOCP in LCAPP may be higher than the cost of new alternatives.<br><br>• With Smart Grid and other new technologies, the electric industry is shifting towards more distribution-scale capacity, demand control, and reliability management.<br><br>• Assumptions about future avoided costs (and incurred SOCP obligations) under LCAPP have not been made public or subjected to any regulatory review and scrutiny as to their reasonableness. |
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| **Issue 2: High costs in New Jersey are the result of various factors but the "solution" may not be any more cost effective [than the problem]** | |
| ***NJDRA 1998 Position Paper on PURPA Contracts*** | ***Parallel with LCAPP Today*** |
| • "The high existing [early 1980s] production costs of New Jersey's utilities resulted in high base line avoided costs, making the New Jersey market attractive to NUG developers." | • Higher Gross CONE and congestion in New Jersey/East Coast are somewhat intrinsic to the region, not the fault of PJM or reluctant developers.<br><br>• However, RPM has cleared in New Jersey at the RTO price more than once, so price separation for New Jersey is not a "given." |

[4] New Jersey Division of the Ratepayer Advocate, "Position Paper on Above-Market Non-Utility Generation Power Purchase Agreements," February 1998. http://www.rpa.state.nj.us/nug.htm (accessed July 6, 2011).

| **Issue 3: Inflexible, long-term contracts may be a source of "regret"** | |
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| ***NJDRA 1998 Position Paper on PURPA Contracts*** | ***Parallel with LCAPP Today*** |
| • "While recognizing the limitations on its authority to reform above-market NUG contracts, the BPU has acknowledged that above-market NUG contracts are a heavy burden for New Jersey ratepayers, and will, unless mitigated, make it very difficult to achieve significant rate relief for consumers under deregulation." | • SOCA has a guaranteed floor regardless of market conditions. |

| **Issue 4: More subsidies and out-of-market interventions may follow** | |
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| ***NJDRA 1998 Position Paper on PURPA Contracts*** | ***Parallel with LCAPP Today*** |
| • "Division of Ratepayer Advocate proposed an amendment which would have made the availability of a sales tax exemption for natural gas purchases by NUGs holding above-market power purchase agreements with utilities, subject to a BPU finding that the NUGs had renegotiated these contracts in good faith. Alternatively, the legislature might… require that NUGs renegotiate their above-market contracts as a condition for receiving a retail license, and as a condition for continuing eligibility for New Jersey's property tax exemption for machinery and equipment used in trade or business." | • If there is no avenue to renegotiate the SOCA in light of major market adjustments, additional subsidies or interventions may be necessary.<br><br>• Market expectations or fears of recurring New Jersey interventions will become a self-fulfilling prophecy. |

The utility industry may be on the verge of a significant transformation in the way power is produced and consumed, driven by Smart Grid, distributed generation (small scale, low voltage and customer-located), consumption information and optimization technologies, heightened conservation and demand response, renewables, storage, and other innovations. This transformation is in its infancy now, but it is likely to come to fruition around 2020 and thereafter – shortly after LCAPP commits New Jersey customers to the current (2011) technology through 2030, largely in the interests of responding to a perceived problem which (if it exists at all) appears likely to last only until 2015. Over the 15 year period of fixed SOCP payments, there could be material changes in New Jersey's needs or the nature of the best solution, resulting in hindsight regret over LCAPP.

**Market Adjustments and Resulting Negative Feedback Effects**

In my initial comments, I expressed concern that the LCAPP will send confounding signals to the market regarding the risks of future development of new capacity resources in New Jersey. In the first instance, the LCAPP resources will drive down RPM prices and LMPs (for a while) thereby discouraging whatever would have otherwise entered. In the longer run, there is likely to be a perception that future LCAPPs might occur, making it better and safer to wait for those rather than develop and be compensated under straight RPM prices. If so, that will drive up PJM capacity and LMP prices, undoing any price suppression impacts of the initial slate of resources. Commissioner Fox sought more specific views on the pace and extent to which the market might adjust.

This is a difficult question to answer formally, as it depends in significant part on how strongly the LCAPP affects developers' and other market participants' beliefs – which is of course unobservable. However, there is anecdotal evidence implicit in the rapid changes in RCPs and in the amounts and types of participating capacity that have already been observed in the RPM auctions to date. As was shown in Figure 3 of my initial comments, RCP for New Jersey has varied between about $100 and $250 per MW-day, often changing from year to year by about $50 MW-day, with the most recent change being a drop of over $100/MW-day in the last auction. Three times out of those eight years, New Jersey was part of PJM as a whole for RCP purposes. RCPs in unconstrained PJM have varied from about $25 to $175/MW-day over the same time period, again often with single year movements of $100/MW-day in response to a few thousand MWs of new resources being available (or not needed, e.g., due to the recent recession). RTO-wide uncleared capacity (UCAP) has generally increased, from a couple of thousand MWs in the early auctions to over 10,000 MW in the most recent auction for 2014/15. Annual changes in offered capacity are often several thousand MWs, so it is quite possible for the RPM process to attract more than twice as many MWs as the LCAPP solicited.

These rapid and large changes in capacity and prices indicate that there is considerable responsiveness to RPM conditions and opportunities. Therefore, it would not be implausible to expect that LCAPP will cause an initial withdrawal of RPM bidding into eastern PJM by flexible resources (such as DR or plant life extensions), and that this withdrawal might almost immediately offset the price suppression LCAPP would have otherwise induced. Of even greater concern is the long run, where reluctance to develop new capacity for New Jersey may persist even if/when RCP prices have rebounded, out of suspicion that there may be a second LCAPP-type proceeding to bypass the PJM capacity markets.

**Horizon and Risk of LCAPP Contracts**

Though this issue was addressed in my initial comments, it is important that the issue of risk transfer being an implicit cost to ratepayers be well understood and factored into the BPU's considerations of whether to abandon or continue LCAPP-style out-of-PJM development of new generation resources. The essential message is that there is "no free lunch" from simply extending the term and price certainty of capacity contracting, even if it should appear that the developers are willing to offer LCAPP at SOCP prices below forecasted RPM prices. The fact

that LCAPP winners are willing to develop under those terms, but not for the RPM, indicates that they place a lot of value on the risk reduction from long-term price certainty. For example, a potential bidder noted that its proposed SOCP was consistently below the RCP forecast such that it was expecting it "would essentially pay the electric utilities [in] each and every year of the Standard Offer Capacity Agreement."[5] The bidder explained that it was "willing to accept this 'below market' pricing in exchange for certainty."[6]

Precisely because the LCAPP developers value avoiding that RPM risk, customers should recognize incurring it as a cost. *This has not been done in the cost/benefit analysis of the LCAPP bids*, because those benefits have been evaluated as the present value of the net difference between forecasted RPM prices and the winning SOCP bids. Discounting the net annual difference is mathematically equivalent to discounting the RPM prices and the SOCP prices separately, at the same discount rate, and then subtracting the two present values from each other. That is an appropriate economic calculation if the two streams have equivalent risk, but if one (the SOCP) is much safer than the other (the RPM forecast), then the former should have a low discount rate applied (since its payments are more secure and certain, akin to a bond) while the latter should have a higher, riskier discount rate applied.

I have done these calculations, using an illustrative 5.00% discount rate (close to the high grade corporate bond rate in early June, 2011) for the SOCP cash flows, while using the 8.37% rate (described as the EDC's after-tax WACC and used by the BPU's consultant in its LCAPP assessment) for the forecasted RPM prices. This causes the present value (PV) of the SOCP payments to be approximately $2.0 billion, while the PV of the RPM payments using the higher rate is approximately $1.6 billion. (More risky cashflows are more heavily discounted, so they have a lower present value cost.) As a result, the net impact of substituting a lower and more reasonable discount rate for the SOCP is an increase in customer costs for LCAPP capacity of $380 million – in contrast to the erroneous finding when risk differences are ignored that there is a net savings to ratepayers of almost $200 million. This adjusted finding of a net increase in costs due to the value of the risk transfer is much more plausible.

This may seem counterintuitive, so it is instructive to step outside of LCAPP and RPM and consider how a bond and a stock are priced. Assume there is a stock paying dividends that average about a 5% yield, but those payments and the resulting future stock price are of course uncertain. This yield is pretty close to current long term government bond rates, so a 20-year T-bond paying that same coupon rate would have a market value equal to its par value of $100/bond. In contrast, if the appropriate discount rate for the stock is in the 9-11% range (roughly typical for the allowed cost of equity on utility stocks), the present value of the stock will be more like $40-60/share. Even though the two securities pay about the same annual cash flow, the safety of the bond makes its payments more valuable. The same is occurring in the SOCP vs. the RPM price. Thus New Jersey should not be under the illusion that it can create ratepayer benefits by assuming risks through LCAPP, or any other similar mechanism, that developers are not otherwise willing to bear.

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[5] The comments of West Deptford Energy - LS Power as summarized in State of New Jersey Board of Public Utilities, In the Matter of the Long-Term Capacity Agreement Pilot Program, Docket No. E011 01 0026, March 29, 2011, p. 11.

[6] *Ibid.*

Though not related to LCAPP risk reductions, there was some apparent confusion from some commenters over whether the LCAPP mechanism is a bargain compared to RPM payments, based on the fact that RPM payments go largely to incumbent generators, not new entrants.[7] This predominance of payments to existing units seemed like an unnecessary windfall which was not helping build new capacity in New Jersey, while the directed payments under LCAPP had evidently succeeded in doing so. It is factually correct that most RPM payments go to existing units, but this is very necessary for the viability of the fleet and is not a problem. To the contrary, as is noted in the most recent 2010 State of the Market Report, virtually all generation types (with the exception of hydro and nuclear) could not fully recover all of their avoidable costs (i.e. fuel plus fixed O&M, ignoring returns on capital) from just the energy and ancillary services markets. The table below summarizes the problem. Capacity payments fill the gap needed for the incumbent units to remain viable.

**Table 1:**
**Units With Percentage of Recovery from Energy and Other PJM Markets**

| | 2009 | | 2010 | |
|---|---|---|---|---|
| Technology | Units with full recovery from Energy Markets | Units with full recovery from all markets | Units with full recovery from Energy Markets | Units with full recovery from all markets |
| CC - NUG Cogeneration Frame B or E Technology | 0% | 100% | 30% | 100% |
| CC - Three on One Frame E Technology | 54% | 100% | 85% | 100% |
| CC - Two or Three on One Frame F Technology | 83% | 100% | 93% | 100% |
| CT - First & Second Generation Aero (P&W FT 4) | 6% | 100% | 32% | 100% |
| CT - First & Second Generation Frame B | 2% | 100% | 22% | 99% |
| CT - Second Generation Frame E | 0% | 100% | 42% | 100% |
| CT - Third Generation Aero (GE LM 6000) | 16% | 100% | 32% | 100% |
| CT - Third Generation Aero (P&W FT- 8 TwinPak) | 0% | 100% | 33% | 100% |
| CT - Third Generation Frame F | 25% | 100% | 62% | 100% |
| Diesel | 12% | 96% | 13% | 100% |
| Hydro | 100% | 100% | 100% | 100% |
| Nuclear | 93% | 100% | 100% | 100% |
| Oil or Gas Steam | 3% | 92% | 3% | 92% |
| Sub-Critical Coal | 30% | 75% | 52% | 82% |
| Super Critical Coal | 35% | 82% | 50% | 82% |

Source: Monitoring Analytics, 2010 *State of the Market Report for PJM*, Volume II, Section 3, "Energy Market, Part 2," Table 3-36.

[7] Joint Comments of the Public Power Association of New Jersey and the American Public Power Association, *In the Matter of the Long-Term Capacity Agreement Pilot Project,* Docket No. EO11010026, June 17, 2011, p. 4.

Thus, the "problem" is not that RPM pays incumbents, but rather that capacity and energy are both "on sale" right now in PJM, as they have been for several years, such that some plants are barely remaining viable. RPM payments are filling a vital need to keep enough capacity operating to serve PJM's overall reliability needs. Distortions to RPM results from local attempts to manage capacity supply could make retention of this needed capacity more difficult.

**Better Possible Changes to New Jersey Policies**

While my view is that LCAPP was an unnecessary intervention in the market, it is perfectly reasonable for the New Jersey BPU and state legislature to worry about externalities and inefficiencies that could be improved within the existing market framework. Indeed, if LCAPP simply works around perceived problems but leaves them in place, it is almost inevitable that there will be a future need to intervene again, because LCAPP will mask the symptoms. Thus, non-market approaches to capacity development would become entrenched. By contrast, it would be more effective to address such matters as:

- The BPU has cited reliance on "out-dated coal-fired power plants"[8] as a motivating factor behind LCAPP, and it notes that environmental attributes are valued in LCAPP's criteria for choosing new generation. However, air pollution regulations are already being considerably tightened at the national level over the next few years. Any remaining concerns are likely to be better addressed through a comprehensive set of changes to state implementation programs and other environmental rules that would tighten local emissions standards, rather than through a one-off procurement of new capacity.
- While I have not conducted any transmission engineering analyses, the fact that PSEG-North has separated into its own LDA within RPM indicates that there are congestion points within New Jersey that could potentially be addressed by improving the investment environment for new transmission (as well as all types of generation capacity and capacity-equivalents) by streamlining siting and permitting procedures.

**Conclusions**

The risk of unintended adverse consequences arising from LCAPP and its successors should be a key concern of the BPU. The mechanisms by which this is likely to happen were not factored into the cost-benefit analysis that concluded the LCAPP process was likely to produce meaningful ratepayer benefits. It is doubtful that that result is correct. In any event, such a complex evaluation with large, long term resource implications should be subjected to more public scrutiny before commitments are finalized. It would be more useful to work with PJM, FERC, and New Jersey environmental and siting agencies in order to improve market processes, rather than to create a long-term, fixed-price patch to work around the system that does not even closely fit the perceived problems.

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[8] State of New Jersey Board of Public Utilities, *In the Matter of the Long-Term Capacity Agreement Pilot Project, Order Initiating Proceeding and Approving Agent*, Docket No. EO11010026, February 11, 2011, p. 2.

**Commenter's Certification**

I hereby certify that I have read the filing signed and know its contents are true as stated to the best of my knowledge and belief. I possess full power and authority to sign this filing.

Frank Graves, July 12, 2011

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My Commission Expires: 2/11/16