

US Electric Utilities & IPPs

PJM Auction: The Reviews Are In [Includes Transcript]

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A bit of a Flop, but can the Sequel get better?

As outlined in our initial note [\(1\)](#) and more company specific followup note [\(2\)](#), the annual PJM capacity auction results was below our modest expectations across the PJM region as risk premiums declined from new firm gas transport contracts, continued new build coming online in 2019/2020 timeframe, and region-specific dynamics in some of the notable underperformers like EMAAC. As a followup to the auction, we hosted our latest wrap up call with Stu Bresler, SVP of Market Operations at PJM to dig into the details. Our conversation focused on continued declines in cleared Coal and Nuclear, shifting DR dynamics (can it continue?), limited ability for renewables to continue to clear under CP, and surprisingly robust new entrants that helped to depress pricing further.

Street remains too high on expectations going forward – missing the story?

We're surprised by resilient expectations across the Street on future clearing prices, as it seems that the market continues to expect that a transition to a 100% Capacity Performance (CP) requirement will result in a bid closer to last year's results, in a range of \$150-180/MW-day. Meanwhile we think the *real* uptick is likely closer to \$120-130/MW-day (just +\$20-30/MW-day better). We emphasize risk premiums continue to decline as the polar vortex is increasingly in the rear view mirror, and with compliance strategies increasingly available and implemented across portfolios, enabling lower bids for compliance with CP. While YoY results should improve off their lows, and potentially more for EMAAC given its greater sensitivity, given the meaningful decline in DR, we don't expect as material impacts from fewer clearing coal and steam-based oil/gas peakers. While more resilient shares are also attributable to continued confidence in underlying gas and power price recovery, we remain concerned near-term on softness in shares as estimates may see downside risks.

Coal and Nuclear: Getting hit hard – low prices likely to drive portfolio turnover

Two of the biggest losers for this year's auction were coal and nuclear: Specifically, ~2.6GW less coal generation cleared and ~1.5GW less nuclear cleared (seemingly all EXC) vs last year, despite 6.6GW of new gas build. We note the Maryland Healthy Air act was not called out as a specific contributor to coal decline; this should have a modest effect YoY for the 2020/21 auction next year with several of the GenOn and Talen units likely to retire or convert to gas (details unclear given the Hogan administrations ambiguity on exact standards).

Retirements are now the real focus – when and how much?

We think discussion of retirements *beyond those already proposed* will not re-emerge, with a focus on *un*-convertible coal assets with limited dark spreads and high fixed cost structures in the RTO region of PJM (weaker prices). We suspect the underlying churn of the generation stack could yet accelerate. That said, retirements would *not* drive capacity prices higher but would *largely fall out of having not previously cleared*. We also see some risk to steam-based generators with even gas and oil peaker compliance, seeing these as less nimble in a CP world. That said, with growing number of compliance options and portfolio compliance a reality, it's hard to increasingly see much actually going away incrementally under the transition to CP. For instance, we see the 3.6GW that failed to clear for TLN as largely already reflecting the CP 'at risk' assets for the company. Moreover, with 17 GW uncleared from past auctions, it's easy to imagine this will be a bugger in compliance for those seeking not to fully commit their existing units.

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Magnitude of New Build and Imports Were Surprising

The RTO highlighted magnitude of new entrants into the auction, although 5GW was within recent range of 3GW last year and 6GW for 2017/2018. However, even some of these new assets were likely price takers which highlights significant drag on power returns in the region. PJM was quick to highlight the benefits to consumers while simultaneously conceding significant challenges for power producers. While this could indicate some type of rule change in a blue sky scenario, the only known major shift is the transition to 100% CP (which FERC clearly affirmed). However, risk management of penalties is under discussion as is continued participation in seasonal capacity resources, while multiple resource aggregation is also on the table as potential shifts into next years auction. Additionally, one third of imports cleared as base product versus most bidding as CP in the prior year, which may in fact have been driven by perceived lower risk of dispatch for external resources. External plants may have reduced output in order to manage local constraints, where CP Penalties during an emergency would still apply.

Demand Response Underwhelms, but Could Pair with Renewables?

Total demand response of ~10,348MW (~4700 of which were explicitly CP capable) was actually down YoY from 11,084MW, while the majority of cleared in the base product (as opposed to energy efficiency, which was more concentrated towards CP). The recently clarified diesel generator backup rules may have contributed to the shortfall YoY in cleared units, but the RTO was not expecting a major impact heading into the auction and we note that actual offered DR was greater versus last year. Of note, PEPCO's one cent DR clearing price was an interesting exception to the otherwise in-line with bas capacity DR results. While renewables have largely managed to bid without pairing with other sources, PJM expects next year's 100% CP auction could drive asset aggregation out of necessity, and DR provides a good potential pair for renewable assets in the region. However, bidding behavior thus far does not appear to take this possibility into account.

Regulatory and legislative risks remain

With multiple units not clearing previously, we see any potential for OH or IL to pass rules to enable revenues to the generators to allow these units to rec-clear the auction once more. Further, we see risks from the potential for DYN to succeed in joining the PJM market in Southern Illinois (unlikely given AEE's stance).

Please refer to the links below for our other recent PJM reports:

[05/26/16: PJM Results Take Two: Who Cleared?](#)

[05/25/16: PJM Results: Generation Gap](#)

[05/20/16: PJM Parameter Update is Slightly Positive](#)

[05/17/16: PJM Capacity Auction Survey: Exhibiting Moderation](#)

Capacity Uplift to Come?

Primary major shift next year is transition from 80% to 100% Capacity Performance Auction, ending the base product clearing. We highlight higher prices for CP resources across regions over the last several auctions and expect this could support pricing somewhat next year, adding \$20-30/MW-day based on our

latest assessments of the puts and takes. The key question remains just how little Demand Response will be eligible to clear?

- **Coal and Steam-based Peaker retirements:** Appear less viable (<5GW)
 - *What units will not be CP compliant?*
- **Renewables :** Can't clear as CP likely (~1GW)
- **Demand Response** (up to 5GW, but likely ~3-4GW) as need to 'double up' on existing assets to limit risk to CP events.
- **New Supply:** We see at least 2.5GW YoY available, if not more, several of which already have equity investors.
- **Net-net: 4GW * \$5/MW-day sensitivity = ~\$20/MW-day uplift**
 - EMAAC is probably better given higher sensitivity
 - ComEd is less given nuclear units set the clearing bid right now – and driven by their specific cost structures.

Figure 1: We Expect an Uplift of ~\$20-30/MW-Day in Next Year's Auction

| Capacity Performance | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 |
|--------------------------------------|----------|----------|----------|----------|-----------|-----------|-----------|---|
| Resource Clearing Prices (\$/MW-day) | | | | | | | | |
| RTO | \$27.73 | \$125.99 | \$136.00 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | We see an uplift of ~\$20/MW-day in 2020/21 |
| EMAAC | \$245.00 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$225.42 | \$119.77 | |
| SWMAAC | \$226.15 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | |
| MAAC | \$226.15 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | |
| DPL-S | \$245.00 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$225.42 | \$100.00 | |
| PS-N | \$245.00 | \$225.00 | \$167.46 | \$134.00 | \$151.50 | \$225.42 | \$119.77 | |
| PSEG | \$245.00 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$225.42 | \$119.77 | |
| PEPCO | \$247.14 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | |
| ATSI | \$27.73 | \$125.99 | \$357.00 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | |
| ComEd | \$27.73 | \$125.99 | \$136.00 | \$134.00 | \$151.50 | \$215.00 | \$202.77 | |
| PPL | \$226.15 | \$136.50 | \$167.46 | \$134.00 | \$151.50 | \$164.77 | \$100.00 | |
| Reserve Margin | 20.2% | 19.6% | 20.2% | 21.1% | 19.7% | 19.8% | 22.4% | |
| Base Product | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/2018 | 2018/2019 | 2019/2020 | |
| Resource Clearing Prices (\$/MW-day) | | | | | | | | |
| RTO | \$27.73 | \$125.99 | \$136.00 | \$59.37 | \$120.00 | \$149.98 | \$80.00 | ↑ |
| EMAAC | \$245.00 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$210.63 | \$99.77 | |
| SWMAAC | \$226.15 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$149.98 | \$80.00 | |
| MAAC | \$226.15 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$149.98 | \$80.00 | |
| DPL-S | \$245.00 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$149.98 | \$80.00 | |
| PS-N | \$245.00 | \$225.00 | \$167.46 | \$219.00 | \$215.00 | \$210.63 | \$99.77 | |
| PSEG | \$245.00 | \$136.50 | \$167.46 | \$219.00 | \$215.00 | \$210.63 | \$99.77 | |
| PEPCO | \$247.14 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$149.98 | \$80.00 | |
| ATSI | \$27.73 | \$125.99 | \$357.00 | \$114.23 | \$120.00 | \$149.98 | \$80.00 | |
| ComEd | \$27.73 | \$125.99 | \$136.00 | \$59.37 | \$120.00 | \$200.21 | \$182.77 | |
| PPL | \$226.15 | \$136.50 | \$167.46 | \$119.13 | \$120.00 | \$75.00 | \$80.00 | |

Source: PJM, UBSe

Conference Call on PJM Auction [Transcript]

We present below highlights from our recent call with Stu Bresler, SVP of Market Operations at PJM. We have edited the transcript below for clarity with emphasis added (bold and underlining for effect). The opinions expressed by Stu Bresler herein do not necessarily reflect the views and opinions of UBS. UBS accepts no responsibility for the accuracy, reliability or completeness of the information and will not be liable either directly or indirectly for any loss or damage arising out of the use of this information or any part thereof.

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Julien Dumoulin-Smith: Yes good afternoon everyone. Thank you for joining. We are joined this afternoon by Stu Bresler, SVP of Market Operations over PJM to talk about the latest 19/20 RPM auctions.

Stu Bresler: Thank you Julien and good afternoon everyone. This again is Stu Bresler from PJM. So really appreciate you joining us this afternoon.

Just to hit the highlight from the RPM base residual auction, the results of which we posted yesterday afternoon. Just a quick reminder that this is the second of two transitional auctions into full implementation of the capacity performance enhancements, to the definition of the capacity product in PJM.

And as such, we cleared both a capacity performance product and a base product. The base product being limited to a little bit less than 20% of the reliability requirement in this auction.

And that 20% varied somewhat across the system depending on the location of the system that was being evaluated. And then the remainder, at least 80% was committed as capacity performance.

Next year when we run the 2017 base residual auction for the 2020, 2021 delivery year we will move to 100% capacity performance.

But for this year, this auction which was for the 19/20 delivery year just to cut to the chase. We saw a price in the RTO, the majority of the PJM footprint of exactly \$100 per megawatt day of unforced capacity.

That compares to last year's RTO price of about \$164.77. So it was about a \$65 per megawatt day drop in the clearing price in the RTO.

We split out roughly the same this year as we did last year. So the two regions that primarily split with higher prices were Eastern MAAC and ComEd.

Eastern MAAC which is basically New Jersey, Delaware Pennsylvania and the PECO Zone at a price of \$119.77 per megawatt day this year. That is an even more significant drop of over \$100 per megawatt day from the \$225.42 we saw last year.

And then ComEd zone in the Greater Chicago Northern Illinois area we saw a clearing price of \$202.77 which is down about \$12 from last year's \$215 clearing price in ComEd.

So those are the capacity performance prices. Across the system we saw a \$20 discount again this year for base capacity compared to CP. Again almost exactly the same discount last year base and capacity compared to CP.

So for the RTO for example, the base capacity clearing price was \$80 a megawatt day versus the \$100 of megawatt day we saw for the capacity performance product.

So that is kind of the highlights of the prices. A couple other more minor things. The BG&E zone did split by itself but only by 30 cents from the RTO. So the clearing price in the BG&E zone was \$100.30.

And then the other thing to note is within the base category, that base capacity product we did have a separate limit within that base category for base demand response. Because base demand response assumed only to be available for the summer period.

And across the system with the exception of the Pepco zone that base demand response product did not split in price from the remainder of the base category.

But in the Pepco zone we actually saw sufficient offers in the Pepco zone at or extremely close to basically price takers. Such that the marginal offer for base DR in the Pepco zone was at one penny, one cent per megawatt day.

And so that was the clearing price in the Pepco zone for that base demand response category.

So that is the summary of the pricing results we saw hitting some of the other highlights coming out of the auction before I turn it back to Julien for questions.

We did see a – and maybe I will just start out with some of the drivers behind sort of the price reductions that I just talked about. One driver, those price reductions certainly was a reduction in the low forecast going into the auction this year. I know that was well publicized ahead of the auction.

So we did see an overall reduction in the reliability requirement across PJM of a little over 1600 megawatts which is obviously not unsubstantial.

But then I think an even bigger driver behind the price reduction was the significant amount of new entry that cleared in this auction. **We saw almost 5000 megawatts of new combined cycle natural gas fired generation clearing this auction.**

A little bit more even, ~100 megawatts or so of natural gas fired combustion turbine. And even some additional megawatts of uprates to existing units.

So the total new entry that cleared was over 5200 megawatts this year obviously at very competitive prices. So it is a fairly significant volume of new entry clearing again at very competitive prices which would put that downward pressure on the clearing prices that I discussed a minute ago.

So really that level of new entry really demonstrates I think the high competence of the investors in these plants. That the natural gas resources are going to continue to be competitive on into the future and also be very reliable.

Given the risks that are being taken on with respect to the capacity performance standards and the consequences of non-performance for resources that take on those requirements.

So obviously the competitive pressures on the prices this year are very beneficial to consumers. The fact that the cost of the auction was obviously lower this year than last.

However, one must recognize also that the competitive pressures of an auction like this also are very difficult for supply community as well. So it really is just a result of the supply and demand and the competitive offers we saw in the auction.

Looking more at some individual and some aggregate sort of resource details. The reserve margin resulting from the auction if you will include the 167,306 megawatts that were cleared in the auction. As well as the additional, about 14,000 megawatts of capacity committed to FRR or fixed resource requirement plans.

The overall reserve margin for 19/20 is 22.4%. That compares to an installed reserve margin target of 16.5%. So obviously ample supply for 19/20 committed to serve load in the PJM region for 19/20. But again that is obviously very competitive prices.

Looking at some of the categories that have been sort of the subject of discussion of late. We did see a reduction overall in the committed quantities of both coal fired and nuclear generation.

The committed quantity of coal fired generation was down a little over 2600 megawatts this auction compared to last. And the committed quantity of nuclear was down by a little over 1500 megawatts in this auction compared to last. So again significant competitive pressure exerted by the supply in this auction.

Finally I will just hit some more things on some of the resource categories, demand response, renewables and imports before I turn it back over to Julien.

On the demand response side, we cleared a total of 10,348 megawatts of demand response. Overall that is actually down 734 megawatts from last year where we cleared 11,084 megawatts. And of that 10,300+ megawatts of demand response that cleared, the vast majority was in the base category.

We had only 613.7 megawatts clearing at capacity performance. The remainder all cleared as base.

That 614 megawatts or so clearing at capacity performance is a reduction of 870 megawatts of demand response clearing in that CP category from the 1484 we saw last year.

On the energy efficiency side we had 1515 megawatts of energy efficiency clear this year. That is an increase of 269 megawatts from the 1246 we saw clear last year.

And unlike demand response, the majority of energy efficiency actually cleared CP. So 1058 megawatts out of that 1500 or so cleared as CP with the remaining 450 or so clearing as base capacity.

And that 1058 clearing as CP in the energy efficiency category was an increase of 171 megawatts that cleared as CP last year.

Looking on the renewables we cleared 335 megawatts of solar generation this year. That is the capacity value of the solar. So if you incorporate the 38% or so capacity factor for solar you get a nameplate energy value of about 880 megawatts.

That is almost double what cleared last year. So we cleared 184 megawatts last year, 151 megawatt increase this year to that 335 megawatts of capacity value. And all but a few tenths of a megawatt cleared as base capacity.

And then on the wind side we cleared 969 megawatts of wind capacity this year. Take into account the average 13% capacity factor. That is just shy of 7500 megawatts of nameplate energy.

And about 90 megawatts out of that 969 cleared as CP with about 880 megawatts of that wind resource clearing as base. Overall that 969 is a 112 megawatt increase from last year.

And then finally on the import side we cleared 3876 megawatts of imports from resources external to the PJM system. That is an 812 megawatt decrease from last year and about two thirds of those imports cleared as capacity performance.

About 2,744 megawatts with the remaining 1131 megawatts of imports clearing as base. So again about a third or about 30%.

So Julien those are sort of the highlights from the auction that I pulled out that I would highlight for your group. But at this point I would be happy to turn it over to you for any questions you had or any questions you want to take from the participants.

Julien Dumoulin-Smith: Great, yes we are getting a lot of questions. So I am going to try to summarize a few of them very quickly into each of the respective categories.

First you talk about 2.6 gigs less of coal. What is the impact from the Maryland Healthy Air Act? Did that not really impact and is that kind of an impact for the 2021 period from what you can tell?

Stu Bresler: You know I don't really recall off the top of my head Julien, specifically state by state sort of where those differences were. So it is difficult for me to opine on the impact of one state's regulation like Maryland. So I just don't have those specifics.

We do have some specifics on overall resources clearing in the auction on a normal basis. It is one of the tables in the report that we posted last night or late yesterday afternoon. So I would encourage participants to take a look and you know they seem to go into a lot of detail in the report.

Julien Dumoulin-Smith: Next, where was the nuclear? You talked about 1.5 gigs. I mean can you comment regionally where that occurred?

Stu Bresler: It is very difficult for me to do without being specific about ownership. I know that there was at least one press release this morning that I think I would direct people to as far as what the owners themselves are saying.

But again it is very difficult to talk locationally without revealing too much information.

Julien Dumoulin-Smith: One of the questions coming in asks, how do you think about the considerations for the \$72 of megawatt day upside predicted from the 18/19 auction from 100% CP implementation, i.e. on the sensitivities? See what I am saying?

Stu Bresler: Yes I am sorry you are talking about the sensitivities we ran last year?

Julien Dumoulin-Smith: Yes exactly sorry I apologize.

Stu Bresler: No it is okay. But again, you know, this auction we just ran this time was not 100% CP. This was 80% again.

Julien Dumoulin-Smith: Right.

Stu Bresler: So we will run another set of sensitivities this year and I am sure one of the sensitivities that we may as well just come out with because I am sure it will be requested is what if we had the 100% CP requirement in the auction this year?

It is certainly not the end all be all Julien by any stretch because I think one has to assume that offer behavior would not be exactly the same if we had 100% CP requirement.

But certainly it is a simulation and it is a data point that folks can use...

Julien Dumoulin-Smith: I suppose – the reason I ask it is just what the impact would have been from the 5 gigs of new build and the lower demand? In theory that would have mitigated down that \$72 I guess that is where the question comes from.

Stu Bresler: Yes I mean all else being equal those things would reduce the price from whatever otherwise would have been yes. But I guess what I am saying is, if what you are saying is the simulation we ran last year assuming a 100% CP requirement showed an increase of \$72 per megawatt day. And frankly I don't remember if it did or not.

All I am saying is that is a data point but I am not sure it really is a prediction because one has to assume that offer behavior would not have been exactly the same either.

Stu Bresler: But yes your conclusion about the supply and demand fundamentals having the same impact even if we had 100% CP in this auction I think is true yes.

Julien Dumoulin-Smith: Right all right great. Turning back to the regulations. We had the diesel backup generator rules get clarified or lack of clarified from EPA. Any sense of what diesel backups constituted within the makeup of demand response and how that impacts the auction?

Stu Bresler: Yes actually we did not think right after that rule came out (based on the survey we did some of our major curtailment service providers in the footprint) that that would have a major impact on the source of demand response in PJM. Because it seemed like many of our participants had backup plans already in place.

So, you know, we did see again a reduction of about 734 megawatts overall of demand response clearing in the auction. I think, you know, this could have had something to do with that.

Although we actually saw a higher number of offers from demand response or higher megawatt quantity of offers from demand response in the auction. I want to say by maybe 400 or 500 megawatts. I would have to go back and look. It was just more expensive.

So maybe some of that had to do with it is about a 150 megawatt increase or so in offered demand response across the system this year. But it just could have been more expensive because maybe some retrofit may need to be done to some of that backup generation to support that demand response. Or alternative mechanisms put in place which resulted in the reduction in the cleared quantity this year. So it is hard to say the exact impact but I guess it is not that surprising to me that it didn't have a major one.

Julien Dumoulin-Smith: And as we think about moving to 100% CP next year, one of the other questions coming in is most of the renewables there wind and solar are all clearing as base products.

How do they comply? I mean what is the conversation? It is obviously getting some amount of attention. What are you guys saying more broadly on that?

Given that most renewables are base.

Stu Bresler: Right. I think they are clearing that way this year because like last year the base price wasn't that great.

So they could clear as base and take on only the summer months reliability requirement if you will, the performance requirement. And still get paid, you know, almost as much from a capacity standpoint.

So I think next year, I think they are going to have to find creative ways to fulfill an annual requirement if they still want to beat capacity such as aggregating with other types of resource in order to firm up the portions of the year where they can't, you know, provide as much generation if you will.

On the wind side, they actually can provide more I think in the winter months than in the summer. So frankly like I said, I think they were looking at it probably from a risk standpoint of saying they would rather be base this and not to take that into account next year when they may be taking on a wintertime requirement.

But for wind I would think that that would be possible. For solar I think they are going to have to find something to partner with in order to make up that winter product.

Or, there is also the opportunity to make a capacity commitment but then take advantage of any bonus payments that result from non-performance if you actually have performance assessment hours during the delivery year.

Julien Dumoulin-Smith: Turning back here to some of the regions. Can you comment quickly? What is the reason for EMAAC price declines given little or no new supply in that region?

Stu Bresler: Yes again it is the multiple components of the supply and demand dynamic. So the combination of the load forecast decrease and increase in CETL for Eastern MAAC resulted in something along the lines of 1400 or 1500 megawatts of difference just in Eastern MAAC.

I think the reliability requirement declined by like 900 megawatts and then there was a 450 megawatt or so increase in the transfer limit into Eastern MAAC for this auction.

So certainly that has a significant impact and the rest I would put on the competitiveness of the offers that we saw in that area.

Julien Dumoulin-Smith: Got it. All right that makes sense. More broadly here, can you comment real quickly. I mean you guys have talked about offer behaviors and the use of third party marketers to help firm up gas supplies as provided options for ensuring performance that may not have been at least previously contemplated?

Can you elaborate a little bit more on what you are seeing on the bidding side of the equation here? I mean what are those products? I will let you comment.

Stu Bresler: Yes I don't have real specific visibility into a whole lot of these arrangements. We only have sort of anecdotal indications from those suppliers, those generation suppliers that we are kind of canvassing and surveying as to how they are getting ready for CP.

But certainly firming up with fuel supplies is one action that is being taken and there is real dollars being spent I think in order to acquire that level of flexibility and fuel security as far as particularly in natural gas fuel supplies.

And one of the things again, anecdotally that we are hearing is that third party intermediates may have the ability to offer packages that can help these resources firm up their supply arrangements. Obviously there is a cost to that but that is a cost we are willing to pay in order to qualify a CP.

And then obviously some of the other actions that are being taken are investment in the mechanical if you will, capabilities of these resources as well as some are even going as far as putting in dual fuel capabilities where, firm gas supplies can't be arranged.

Julien Dumoulin-Smith: And then can you comment real quickly on the imports? Why the shift here? I mean any visibility on why the decline and then ultimately perhaps can you comment broadly around why is it that they cleared RTO rather than the region they are importing into? I mean I suppose the first is more relevant.

Stu Bresler: Well let me hit the second one first because I think it is an easier answer. The areas that split out and really this is true for any locational deliverability area inside PJM. Their transfer limits are established from everywhere outside that LDA.

So any import into the PJM RTO by definition delivers to the RTO because they are again by definition outside of any constrained LDA And that is because the LDA is defined as any import into that LDA.

So there really is no way for an external resource to deliver and clear into a constrained LDA absent potentially a brand new DC tie that has no impact on the surrounding transition system and actually results in an injection inside that constrained LDA. So that is the answer to the second question.

The first one again, you know, I can't speak to every specific because I can't go to the market sensitivity. **But I was actually more struck by the division of capacity performance versus base where we had at least a third of the imports that cleared clearing as a base product type as opposed to capacity performance.**

Julien Dumoulin-Smith: How does that compare year over year?

Stu Bresler: Last year, I don't have the exact numbers off the top of my head Julien. But last year I believe the vast majority cleared as CP last year.

And so I think as the process of establishing the dynamic transfer arrangements. You know what we call pseudo ties to qualify CPs progress.

My hunch and it is exactly that just a hunch. Is that, some of these external resources may have seen some of the risk of being dispatched down if you all are curtailed by due to vocal constraints on an external system.

And therefore maybe wanted to wait a little while to take on the CP risk. Because having to reduce output in order to manage a local constraint would not forgive one of CP penalties during an emergency condition.

So there may have been some of that risk that was expressed as part of the offer prices to be CP from external resources. Again that is just a hunch.

I think this is appropriately reflecting what it takes for an external resource to be a capacity resource in PJM and really to be able to deliver on exactly the same basis as an internal resource.

Julien Dumoulin-Smith: Got it. So perhaps next question let's just keep with the import thesis. I suppose someone is asking how does ComEd bind when there is 5000 megawatts of CETL capacity to import?

Stu Bresler: I am sorry I am probably going to sound flip in the answer and I certainly don't intend to. But the answer basically is that all 5000 of that CETL was used up.

So the resources that were cleared economically at the clearing price that was established inside ComEd were on the basis of needing to maintain transfers into that area at that established CETL limit.

Julien Dumoulin-Smith: Any clues on demand response participation as a CP resource next year that we should think of? You know obviously there is a good chunk of it that clears as base still.

Stu Bresler: Yes but there is one pretty decent clue in the report and I am looking for the right table so bear with me for a second. It is a long report.

But there is a table in here that shows you for couple of offers between base and CP. The quantity of demand response that is actually offered as CP capable either as part of a coupled resource or individually.

And I want to say that if you sum up the individual and the coupled there was about 4700 megawatts or so, 4600 megawatts or so that offered risk CP capability. So that is some clue at least as a starting point as to what we might be able to expect in the future when everything has the be CP.

And it is Table 3C. If I look at the sum of the demand response that is offered as either CP part of a coupled resource or just CP only it is about 4721 megawatts. So a little over 4700 megawatts.

So that is at least some clue at least as of right now the quantity of demand response that believes it could lead to CP requirements. It will be interesting to see how much more offers in to be able to meet those requirements in the next auction.

Julien Dumoulin-Smith: All right moving over to the new generation that came in. I suppose there has been a lot of talk out here about how much of these new assets were actually kind of limited prevented from putting in collateral in the last auction. And only were able to clear in the current auction given the time period involved with the CP approval last year.

It is a longwinded way to say how much of this new capacity was “new” versus limited versus having sought in the last year a MOPR Exemption to be able to bid and moving through the motions and simply got deferred or delayed into the current year?

Stu Bresler: Well I mean certainly resources are generating units that request MOPR exceptions but then don't offer is not a new phenomenon. We routinely every year see 12,000, 13,000 megawatts of generators that request an exception from the MOPR.

And then we have maybe half or 60% of that that actually offer. So that certainly is not new. The reasons behind that I don't know because I have never surveyed or specifically asked the developers that requested the exception but then didn't offer why they chose not to.

I guess, you know, collateral requirements could have something to do with that. I certainly will acknowledge that but I don't know how much of it was that versus, you know, look it is free to ask for a MOPR Exemption.

So let's ask for it and get it and then we can decide closer to the auction whether or not we actually are in a position to be able to commit that capacity given the timeline for when we believe the resource will actually be in commercial operations.

Julien Dumoulin-Smith: What are you guys seeing when it comes to activity on new project development? I suppose there is still a litany of projects that sought MOPR Exemptions or granted MOPR Exemptions that didn't clear. So there is still something of a backlog. But I would be curious what you are seeing out there on that front?

Stu Bresler: You mean resources that are still considering?

Julien Dumoulin-Smith: Potential for continued new entry next year at 100% CP.

Stu Bresler: Yes I mean that is hard to say. **The quantity of new entry and economic new entry that we saw this year was surprising to me.** And given where load growth is or isn't as is appropriate going forward.

I would not expect to see 5000 plus megawatts of new entry year over year. I don't think that is really all that sustainable. But I have been *surprised* before and there is a lot of generation certainly in our interconnection queue that is investigating the possibility.

So that is very hard for me to predict. But on the other hand, like I said **I think competitive pressures are going to continue in these markets.** I mean that certainly has been the track record thus far.

Julien Dumoulin-Smith: Can you comment briefly if bidding levels for existing generation assets were generally lower? I presume that would indeed be the case.

And when you are comparing the supply demand balances shown in the scenarios modeled off of the last auction you would assume a higher price for this auction net net. This would imply lower bidding. The question is: aren't you seeing lower bidding behaviors from existing generators?

Stu Bresler: I don't have statistics to offer you as far as percentages higher or lower or anything like that. But in the aggregate my impression would be yes that from existing generators I would say that we probably saw somewhat lower offers this year than we did last.

Julien Dumoulin-Smith: And what is driving that? Just to be clear.

Stu Bresler: I don't know unless I canvas the actual owners that are making the offers. I don't see what is behind the offers. I only see the offers themselves.

But one would speculate that some of the enhancements or upgrades or, you know, investment that is necessary to be CP has been made and therefore may be a sunk cost at this point given the fact that some resources have committed to BCP starting next week.

And there may be some recognition that the investments required to be CP aren't quite as great as one might originally thought. So that is probably a combination of those kinds of factors.

Julien Dumoulin-Smith: So how much of the price reduction is attributable ultimately to the lower load forecast versus reduction driven by solar PV? I know that breaks apart the load forecast.

Basically how much is solar PV on a net metered basis impacting the load forecast now?

Stu Bresler: Yes I know there is some in there Julien but I don't have a breakdown of that off the top of my head. We may be able to get the planners to be able to split that out but I don't have that.

Julien Dumoulin-Smith: And then in the aggregate did existing generators bid lower than two years ago when everything cleared at 120 hours per megawatt-day without capacity performance?

So I suppose we talked about it relative to last year when there was a comparable level of CP in the market. But I would be curious on that front too.

Stu Bresler: Yes I am sorry I didn't do a comparison of this year versus two years ago. So I am not really all that comfortable speculating on that. I know we saw probably similar quantities of new entry two years ago.

Let me see, two years ago for the 17/18 we saw about 6000 megawatts of new generation. A reduction last year to just under 3000 and then back up to, you know, 5300 this year. So certainly the new entry wasn't the primary driver this year versus two years ago. So certainly something else was up there.

What I will say is that two years ago I forget where it was before we started the enhancements that resulted in the reduced load forecast. So I think the combination of those load forecast reductions was fairly significant. It probably contributed a bit to the higher prices that we saw two years ago.

Julien Dumoulin-Smith: And let's talk about the reserve margin quickly. Given the 22.4% base residual auction which seems like a multi-year high despite the pickup in CP requirements in the last couple of auctions.

Over time what is your view on reducing the reserve margin target? As generators should be responsible for delivery and the overall outage rates perhaps of the unit improve?

Stu Bresler: Yes that will flow right through the normal IRM calculation. So the IRM we utilize the peak load forecast obviously and then we use an overall forced outage rate and sort of load forecast uncertainty if you will to come up with the reserve margin target.

So as we see that forced outage rate decrease because of the investments being made in order to satisfy the CP requirements. That reduced forced outage rate will flow right through those calculations. And in and of itself result in a reduction of the target and small reserve margin.

It will take a little time for it to roll through the calculations but that will happen sort of naturally over time. Assuming that we actually do see the reduction and forced outage rate which is a rational expectation I think given the CP requirements.

Julien Dumoulin-Smith: Right. But said differently, you are not evaluating a formal reduction in the reserve margin target outside of expecting the forced outage rates to improve over time. And subsequently would lower the total amount procured.

Stu Bresler: No we are not at this point. The target hit the target and if we hit the target then that is the right number.

I was just going to say the fact that we lined up with an actual reserve quantity that is greater than the target is a function of the way RPM is intended to work to ensure that excess capacity is appropriately valued as opposed to having a vertical demand curve we had before RPM.

Julien Dumoulin-Smith: Got it. For demand response are you seeing demand response coupled with renewables? Like wind and solar to enable renewables to bid into the auction? How can you have a CP compliant renewable?

And then the other follow up is if you can provide more color on what is the typical compliance strategy that you are seeing most pervasive out there? What are these kinds of contracts?

Stu Bresler: As far as the aggregation we did not see any DR aggregated offers with other types of resources in this auction. **Again with the base categories still available it probably just was seem to not be necessary.** We will have to see how that changes between now and next year.

As far as the types of investments or arrangements that are being made. Again we only have a small sample size of the suppliers that we have talked to. We talked to as many as would talk to us over the last few months.

And we have a sample size of I think somewhere around 20,000 megawatts of generation units. And I sort of went through the range of investments that are being made. Everything from staffing increases to retrofits of equipment including pollution control equipment in order to avoid retirements.

Firming up fuel supplies. We are seeing some arrangements that are amounting essentially to no noted service even in the winter where resources can have that flexibility to have a flexible burn profile on a firm basis even in the winter period.

So we are seeing some resources that actually have been able to obtain that type of service from their pipelines. Again **all the way to dual fuel capability where resources are feeling it is necessary.**

So really I mean even though we have a relatively small sample size we are seeing sort of that broad range of investment that is being made in order to meet CP requirements.

Julien Dumoulin-Smith: Another question quickly here. Bonus depreciation. Any discussion of that with the new generators bidding in the auction in terms of their timeline? Either accelerating to take advantage of it or otherwise that you have heard?

Stu Bresler: No sorry Julien I haven't had any conversations on that with any of them.

Julien Dumoulin-Smith: Got it. **On the reform front what is on the menu now?** Every year we have some element of change to the auction parameters time. Anything that you guys are thinking about needed clarification going into the 100% CP step up, et cetera? Anything up for rehearing? I will leave it open ended.

Stu Bresler: Well I have got to tell you from my perspective I was deliriously happy that we were actually running two auctions in a row under the same rules and I think probably our market participant community was equally pleased about that.

Given that at least the certainty that provided one year to the next. So I would frankly love to be able to go forward on a similar basis.

That being said, **there are a couple of issues that are under discussion.** Our stakeholder process one of them has to do with how resources manage the risk of penalties under the CP requirements.

A bit hard to tell exactly where that is going to go. FERC has some things to say about that in there. Orders on the rehearing request. So you know we will have to see where that stakeholder discussion goes from here.

The other one has to do with continued participation of seasonal capacity resources. So think, you know, summer demand response for example.

Again FERC pretty firmly confirmed its CP order, you know, in the regard for the requirement 100% annual CP going forward. So PJM had some thoughts on the table as far as being able to facilitate the aggregation of multiple resources into annual resources as part of the auction clearing.

We think that might be a good place to focus in order to get something done by the timeframe necessary to file any enhancements along those lines for the next auction.

And then the only other thing I think that you know PJM has on file with FERC we **expect an answer in the next week or so is refinements to when a resource can be forgiven penalties during a performance assessment event.**

Particularly one that is following PJM dispatch instructions according to the physical capability parameters that PJM has approved. And should a resource that is doing that incur a CP penalty if it is not at its full output during a performance assessment event.

So that is actually in front of FERC right now and **again we expect an answer by May 31** which is next week.

So those are the things I would highlight Julien. **I do certainly not see any major structural changes between this year and next.** You know because there is nothing really in front of the stakeholders or FERC that would result in those major changes to the auction rules prior to the next.

Julien Dumoulin-Smith: Right. Outside of the move to 100% CP.

Stu Bresler: Yes I am sorry, I didn't consider that a change because that is already in the plans. But yes you are correct.

Julien Dumoulin-Smith: Right yes. Anything else to track within the move to 100% CP that we should be paying attention to here? I mean we have kind of talked about how demand response will comply.

How imports will comply. How renewables will comply to meeting the CP. Any other angles that you are focused on in terms of that transition and how various kinds of resources comply?

Stu Bresler: Those are the big ones I can think of Julien.

Julien Dumoulin-Smith: Right. I mean maybe to ask bluntly - are you hearing about peakers and legacy steam fired -- let's call them like steam fired technologies -- which are less nimble being able to comply? You kind of alluded to gas marketing and the ability of fuel. What about just simply being less nimble in terms of capacity?

Stu Bresler: Well I mean you know certainly there is the more I won't characterize it that way. There is the higher default offer cap in place as a result of CP. So there is that net CONE times the offer cap in the auction.

And in the aggregate I will say that there is a fair number of those theme units like you referred to that take advantage of that and utilize the ability to submit multiple segments in their offers at higher prices.

That, you know seem to be maybe hedging against that type of risk by either requiring a higher clearing price or they don't get that higher clearing price sort of holding back some of that capability. And reserving the potential for bonus if they can actually perform well enough during a performance assessment event.

So you know since you specifically asked about traditional steam generators. You know that is certainly one thing in the aggregate that we have seen resources do. I don't think that is telling any secrets talking in the aggregate sense.

From the standpoint of combustion turbines, those can't really get what you would consider firm fuel supply for a natural gas supply because human needs take the precedence during the winter months.

Yes some of those are going to have to do something different like aggregate or something like that if they are going to be CP because they are going to have a really hard time meeting the annual requirement in the winter.

So yes there are still some resources I think other than sort of the other ones you mentioned that are going to have to evaluate their strategies when 100% CP rolls around.

Julien Dumoulin-Smith: And just to be clear when you said the higher prices in for the higher offer cap for the steam units and taking advantage of that. That is in bidding the capacity markets?

Stu Bresler: Yes exactly.

Julien Dumoulin-Smith: Not energy bids.

Stu Bresler: No, I am talking capacity here. That Net CONE times the offer cap was really derived from the opportunity cost traded off of either taking on a capacity commitment or not taking off on a capacity commitment and instead getting bonus payments during a performance assessment event.

So all I am saying is resources are I think evaluating that tradeoff when they submit their capacity bids.

Julien Dumoulin-Smith: Great. I know it is 2:32. I want to respect your time. Anything else we should be talking about with respect to the auction outcomes? Any kind of concluding thoughts on your side that you want to make sure we address and keep in mind?

Stu Bresler: Well you know my takeaways from this auction Julien were again **significantly ample resources for 19/20's delivery year. Significant amount of economic new entry. Lower capacity costs** which obviously you know consumers will be happy about.

But obviously we recognize the competitive pressures and the challenges that presents for the supply community as well.

And we certainly recognize that that's the case and we will obviously continue our stakeholder deliberations that I mentioned as well to see how we go forward and whether or not any rule changes are necessary in the future.

But really I think those are the major takeaways from this auction.

Julien Dumoulin-Smith: Great excellent. Well thank you very much Stu. I appreciate it. For you and everyone else taking the time this afternoon appreciate all the questions. Hopefully we got to most of them here.

So good day everyone and with that we will conclude.

END

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|-------------------|---|-----------------------|--------------------------|
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