

# Proposal to Enable Exchange Based Clearing of FTRs through Nodal Exchange

In the Report of the Independent Consultants on the GreenHat Default (“Independent Report”), the authors formally recommend that PJM “examine the specifics and the costs/benefits of outsourcing to a credible outside provider the administration of all or part of the FTR market.”

The sponsors of this proposal agree with this recommendation and present a comprehensive solution that cost effectively addresses the counterparty credit risk at the heart of the GreenHat Default, and the Tower default before it, by dramatically reducing both the occurrence and impact of any future defaults resulting from the FTR market.

## FTR Clearing Service Offering Description

The FTR Clearing service offered by Nodal Exchange<sup>1</sup> provides the mechanism for FTR participants to move their FTR positions to Nodal Exchange. Removing the positions from the PJM market removes risk of default from PJM and places FTR participants in the most robust and safest forward power market platform: CFTC regulated, exchange based clearing.

The sponsors encourage PJM to meet with FERC and declare that mandatory clearing of FTRs is the preferred solution to the credit risk associated with the FTR market. The sponsors believe the regulatory process with the FERC and the CFTC could result in one of three possible regulatorily approved<sup>2</sup> outcomes:

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<sup>1</sup> Note, Nodal Exchange is the only exchange to have detailed a proposal for FTR clearing, and the sponsors believe that Nodal Exchange is currently best positioned to manage the complex pricing and risk management challenges associated with FTR clearing. In the future, should another exchange emerge with the product, pricing, and risk expertise necessary to support FTR clearing, the sponsors would support providing participants with a choice of venues.

<sup>2</sup> All three alternatives are subject to regulatory approval.

1. Mandatory clearing is supported by the regulators and PJM proceeds with mandating that all FTRs are to be cleared at a CFTC regulated commodity exchange such as Nodal Exchange.
2. Mandatory clearing is possible but current hurdles mean that optional clearing should proceed first, with mandatory clearing to follow shortly thereafter (e.g., 6 months to 1 year).
3. At this time, mandatory clearing faces too many obstacles to be realistically addressed in the near term—better to launch with optional clearing and revisit mandatory clearing in 2-3 years.

Though mandatory clearing is preferred, the sponsors also acknowledge significant benefits accruing from optional clearing resulting from either scenario 2 or 3 above (see Benefits of FTR Clearing below). **As such, regardless of the outcome of the regulatory process, the sponsors believe that any of the three outcomes associated with FTR clearing described above is superior to not pursuing FTR clearing at all.**

For purposes of this proposal, therefore, both optional and mandatory clearing will be described and assessed.

### *Optional Model*

Under either optional or mandatory clearing, PJM will continue to run the FTR auctions and remain responsible for the execution of the FTR awards. This means that in addition to PJM management, the FERC will continue to have primary responsibility for providing market oversight, along with the Independent Market Monitor (“IMM”). While the CFTC has always retained the right to investigate and prosecute market manipulation in the FTR markets, direct supervision by the CFTC will begin once the FTRs are brought into the cleared exchange environment via an exchange for futures contracts.

All auctions (Long Term, Annual, and Balance of Planning Period) will be eligible for FTR clearing. Under optional clearing, it will be up to the FTR trading participant to select futures settlement and exchange the FTRs for economically equivalent pairs of futures contracts (one each for the FTR sink and source), or to retain the FTR awards within the PJM marketplace. In order to avoid “cherry picking,” or adverse risk selection that would somehow allow riskier positions to remain at PJM, a series of provisions to protect PJM are envisioned:

- The decision to exchange FTRs for futures will be made for **each auction**, with the following choices available to the FTR trader:

1. Exchange all awarded FTRs,
2. Exchange all awarded FTRs aside from self-scheduled FTRs, or
3. Retain all awarded FTRs in the PJM market.

This provision will prevent FTR participants from carefully selecting “riskier” individual FTRs to remain with PJM.

- As noted in Figure 1 below, PJM will incorporate Nodal risk model calculations into both the bid collateral and award collateral. This will ensure that PJM’s collateral calculations are at least as high as those required at Nodal Exchange, and for reasons detailed below, likely to be significantly higher. This provision will ensure that no trader will be selecting to retain FTRs at PJM because the collateral requirements are lower there, thus exposing PJM to greater risk than the same portfolio would at Nodal Exchange.
- The risk parameters PJM selects for the Nodal risk calculations should exceed those at Nodal Exchange to reflect the lack of clearing member protections at PJM and other differences. For example, PJM will likely require at least 2 weeks, and possibly up to 2 months to fully liquidate a default portfolio—in risk parameter terms, this translates into a requirement for PJM to hold 2.5 to 3 times more margin than the same portfolio would require at Nodal Exchange, and possibly more. This provision ensures that PJM margin requirements are not just equal to, but significantly greater than those expected at Nodal Exchange, which has two benefits:
  1. The correct incentives are in place to ensure that as many portfolios as possible will choose to move to Nodal Exchange, thus reducing the risk remaining at PJM.
  2. The collateral requirement for those portfolios that remain at PJM will accurately protect against the risk and difficulty of addressing a default at PJM.

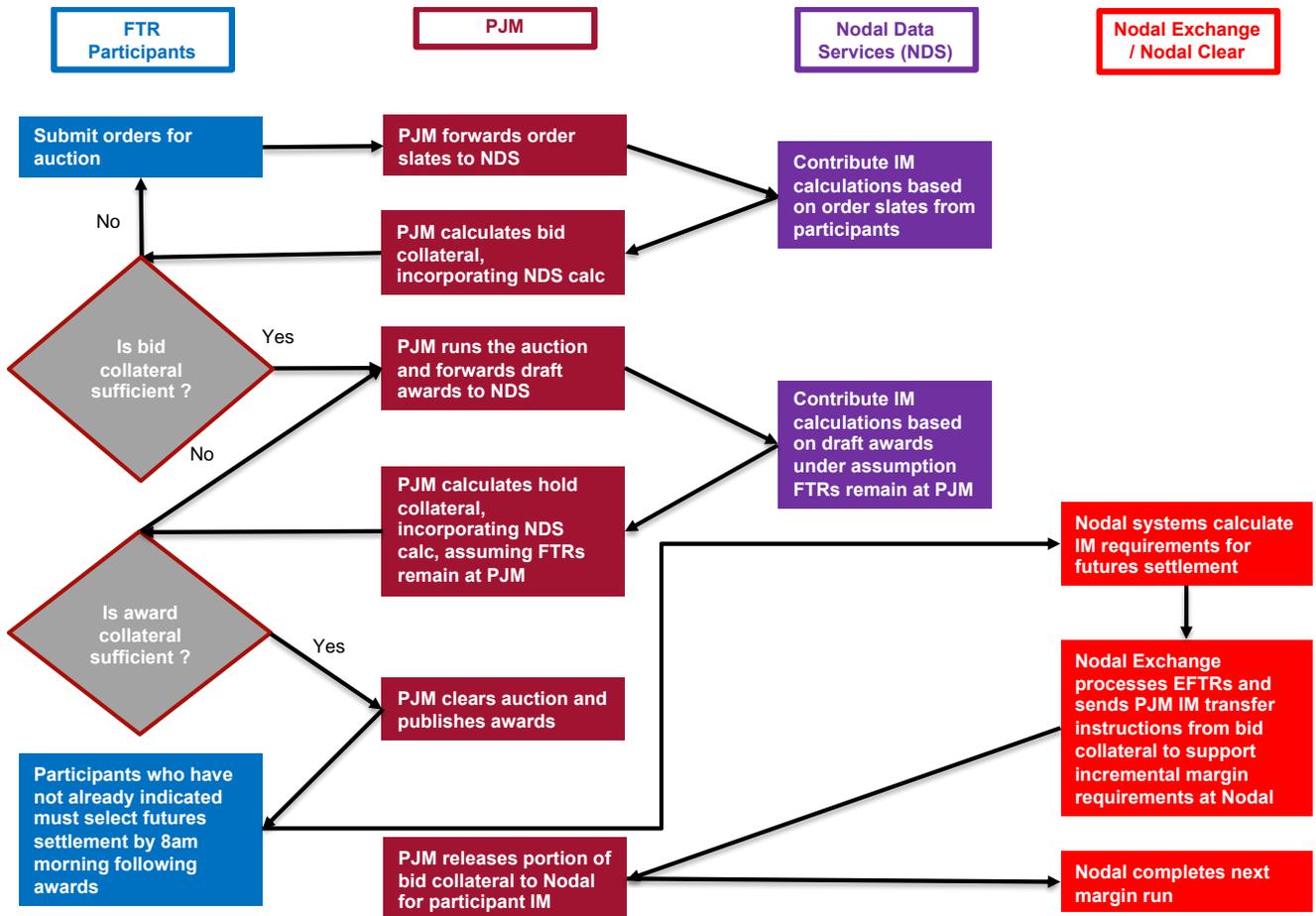
Under optional FTR clearing, very little will need to change during the auction workflow (see Figure 1 below). Following the submission of orders by participants to PJM’s portal, PJM will forward the order slates to Nodal Data Services<sup>3</sup> (“NDS”). NDS will then calculate bid collateral requirements using the Nodal Clear risk model with parameters selected by PJM’s Risk Team to be appropriate for PJM, and

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<sup>3</sup> Nodal Data Services would be a standalone company, owned by Nodal Exchange Holdings, but distinct from Nodal Exchange LLC and Nodal Clear, which would be created to support this effort, if necessary. It would not be a CFTC jurisdictional entity but would benefit from pricing and risk expertise and modeling developed by Nodal Exchange and Nodal Clear staff.

conservatively assuming all awarded FTRs remain at PJM. These calculations are then sent back to PJM to incorporate into their bid collateral requirement, assuming PJM Risk develops separate requirements that could theoretically be even higher.

Figure 1: Auction Workflow with Optional FTR Clearing



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Assuming the bid collateral is sufficient, PJM will run the auction and forward the draft award results to NDS, which will calculate award collateral for all the awarded slates in a similar manner to the bid collateral calculations: using PJM-dictated parameters and under the assumption that the awarded slates will remain with PJM. As with bid collateral, these calculations are then sent back to PJM to incorporate into PJM's award collateral requirement, assuming PJM Risk develops separate requirements that could theoretically be even higher.

Assuming the award collateral is sufficient, PJM will then publish the results of the auction, which typically occurs in the late afternoon. By the following morning, any FTR participants that prefer to exchange their FTRs for futures contracts at Nodal Exchange must indicate that choice, including whether all FTRs or all but self-scheduled FTRs should be exchanged.

Nodal Exchange will then process the transactions as Exchanges for FTR (“EFTRs,” similar to Exchanges for Swaps or Exchanges for Physicals) and establish futures positions that are economically equivalent to the FTRs. Since the futures contracts settle to the same day ahead prices as the FTRs, the cumulative profits and losses will be identical between the two settlement methods, although the cashflow timing will differ: futures positions will benefit from variation margin changing hands twice-daily from establishment of the position until settlement, while FTRs held at PJM will pay out in the final settlement month.

Any participant interested in moving their FTRs to Nodal Exchange will need to establish a relationship with a clearing member<sup>4</sup> of the exchange. Clearing members are for-profit entities that place their own balance sheets on the line when onboarding customers and guaranteeing customer performance on CFTC exchanges. They typically maintain multiple relationships with customers and have insights into various aspects of their customers’ business.

In this capacity, clearing members conduct significant Know Your Customer (“KYC”) and credit monitoring for the customers they onboard, thus augmenting any efforts that PJM might implement in this regard. It is important to note that clearing members do not operate a monopoly. If a participant is not satisfied with a clearing member’s verdict on its risk profile, that participant is free to seek the services of another clearing member.

If the optional model is implemented, the sponsors propose changing the loss allocations of any FTR defaults that occur at the ISO to impact only FTR traders, specifically only those FTR traders that selected to retain some or all of their FTRs at the ISO, in proportion to their share of the FTRs remaining at PJM. In order to guard against an inability to collect, PJM should implement a prefunded requirement,

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<sup>4</sup> See Appendix A for a list of Nodal Exchange clearing members, including those that act as Futures Commissions Merchants and are able to take on customer business.

equivalent to a clearing house guaranty fund, based on the initial margin requirements of the FTR portfolios that remain at the ISO. Such a fund would be the second resource to be used to cure an FTR default occurring at the ISO after the defaulter's initial margin. Since FTR interest transferred to Nodal removes this credit risk from PJM, these FTRs should be excluded from the loss allocation. Under the mandatory model, this tariff change is unnecessary because default risk associated with FTRs would effectively disappear.

### *Mandatory Model*

The mandatory model simplifies much of the structure and operations of managing the credit risk associated with the FTR market. PJM will effectively offload the entire credit risk function to Nodal Exchange and its clearing members, including all the KYC and credit monitoring that are necessary strictly for the FTR market. PJM will, of course, maintain a risk management function commensurate with the risks of operating the day ahead market, but would be able to repurpose much of the resources intended for the FTR market to cover other costs.

In addition to the critical role the clearing members play in participant review and monitoring, Nodal Exchange and Nodal Clear will take over all calculations of collateral requirements (replacing the concepts of bid and award collateral). The traditional collateral checks that occur on Nodal Exchange before clearing will occur with the bid slates, comparable in form to the bid collateral checks performed by PJM today. Bid collateral checks will apply probabilistic treatment to potential awards (i.e., they will not assume out of the money bids are as likely to be awarded as in the money bids) and will incorporate the potential for further price drift by using the gap between auction start and award publication as the effective holding period. These adjustments to the traditional Nodal Clear portfolio risk calculation will effectively balance both the uncertainty of the award size and the time risk associated with running the auction. **As a result of this approach, any bid slate accepted into the auction will yield awarded FTRs (if any are awarded) that can automatically clear at Nodal Exchange.**

Figure 2: Auction Workflow with Mandatory FTR Clearing

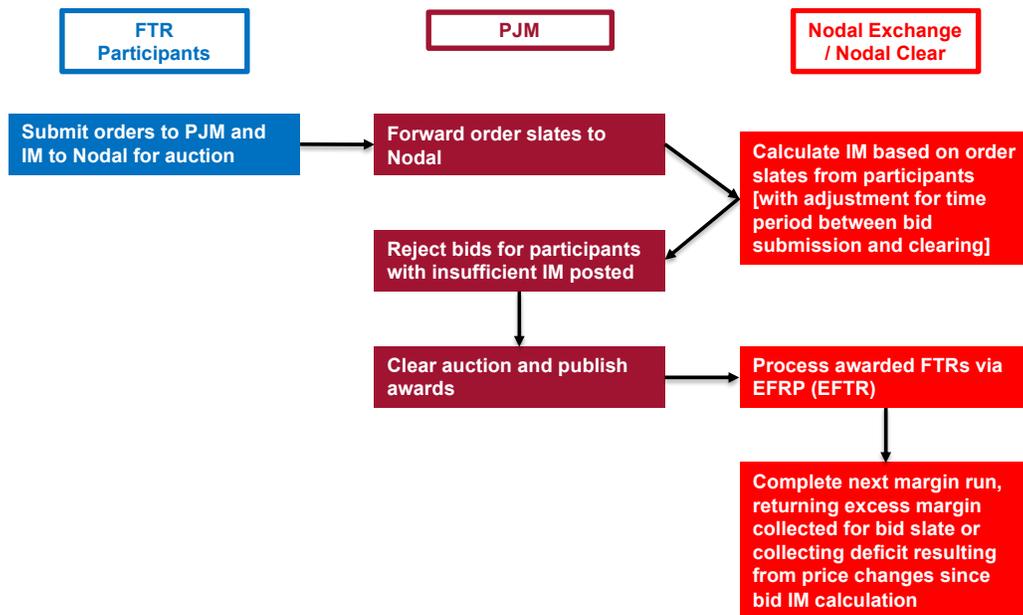


Figure 2, above, highlights the simplification of the auction workflow. Participants will be able to test the bid collateral requirements (and those of any expected award slates) using the Risk Manager tool on the Nodal Exchange website, eliminating the need for an iterative bid submission process. With mandatory clearing, there will also never be a need to run the auction more than once as bid slates accepted into the auction will create award portfolios that will automatically clear at Nodal Exchange.

## Benefits of FTR Clearing

### *Optional Model*

- Provides a comprehensive solution to FTR credit risk.
  - Greatly reduces default risk by removing up to 100% of the credit risk associated with FTRs from PJM and its members.
  - Further reduces the risk of socialized losses at PJM by incorporating daily price marks, variation margin, initial margin, and participant guaranty fund calculations from NDS to manage any FTR positions remaining at the ISO.
- Establishes proper risk incentives for all FTR participants by requiring significantly higher initial margin for those who choose to retain their FTR positions at PJM vs. moving positions to Nodal,

and by isolating any loss allocations stemming from a future default at PJM to those portfolios that remain at the ISO.

- FTR defaults that occur in portfolios that remain at PJM are isolated to those participants in proportion to the portfolio size and risk that remain. Moving positions from PJM to Nodal Exchange removes this risk for FTR participants.
- PJM will require margins expected to be at least 2-3 times Nodal Exchange requirements even before taking into account netting benefits with other power futures and natural gas portfolios at the exchange.
- These differences reflect longer liquidation period assumptions by PJM and the lack of the clearing member protections that make exchange-based clearing so safe.
- Participants are thus strongly incentivized to move their positions to Nodal Exchange; those who choose not to are properly risk managed and bear the risk of default at PJM.
- Increases transparency of forward price risk by providing twice daily marks to FTR participants at Nodal Exchange and daily price marks for portfolios that remain at PJM.
  - Variation margin is calculated twice daily using these prices to establish portfolio value of positions held at the exchange, reducing the magnitude of a potential default.
- Provides additional opportunities to manage portfolios that are transferred to Nodal Exchange via on-exchange (screen) and off-exchange (block) trading venues available to Nodal Exchange trading participants.
- Full integration with existing power and natural gas portfolios at Nodal Exchange allows for both initial margin *and* variation margin offset opportunities where appropriate based on full mark to market treatment of the FTR-derived positions at the exchange.
  - Full integration significantly reduces the strain experienced by market participants during the polar vortex of early 2014, for example, by providing identical mark to market treatment for both FTR portfolios and futures hedges used to manage the attending risks.
  - Clearing members applaud this feature as they bore the risk of default in the futures space from participants that could not directly benefit from the offsetting gains in their FTR portfolios during that period.

### *Mandatory Model*

The benefits of the mandatory model match those of the optional model above with the following differences:

- As a complete solution to FTR credit risk, the mandatory model removes 100% of the credit risk associated with FTRs from PJM risk management rather than *up to* 100%. In place of directly managing FTR credit risk, PJM can rely on the proven gold standard of credit risk protection for forward markets: the CFTC administered exchange clearing solution.
- The discussion of proper risk incentives in the second bullet above is no longer relevant as all portfolios awarded must be cleared at the exchange.
- Mandatory clearing provides greater risk protection than optional clearing at a reduced cost as PJM can meaningfully scale back resources required to manage residual portfolios under the optional model.

## Line of Credit

In order for PJM to offer either optional or mandatory clearing, the ISO will need to establish a line of credit (“LOC”) to bridge the difference in cashflow timing between the spot day ahead market and the true mark to market treatment of the cleared FTRs. While all FTR/ARR/Day Ahead market cash flows will net to zero by the final settlement of the FTRs, there could be differences in the schedule of day ahead market collections versus the twice-daily variation margin calls based on the futures market expectations of those final settlement prices.

The LOC will need to be sizeable to ensure that PJM will always be able to cover variation margin calls, regardless of the timing of collections from the day ahead market. Under the Nodal Exchange design, PJM will act as its own clearing member but will not be required to post initial margin, nor contribute to the guaranty fund, which are requirements for all other clearing members. Thus, the entire LOC will be dedicated to making variation margin calls, if required, until the FTR exposures reach final settlement, by which time the cash flows will balance to zero and any use of the LOC for the settled FTRs will be repaid.

Nodal Clear has sized the LOC requirements for PJM’s market to be \$1.5 billion. This size was reached by simulating the PJM FTR market dating back to 2013 to determine the LOC capacity required to allow PJM to make their cumulative variation margin and ARR payments, net of collections from the day ahead market. In practice, if PJM were to make use of a significant portion of the LOC (e.g., weather forecasts following an auction dramatically revalue the FTRs just awarded for significantly higher congestion), then PJM would be required to have the LOC resized larger to ensure a constant ability to make due on its

obligations. PJM will be given timely notice to minimize any potential for market disruption should the LOC utilization continue to climb before the expansion is approved by PJM's banking consortium. Once utilization is reduced, PJM will have the option to resize the LOC back down.

The following protections will be put in place to ensure the LOC is sufficient to meet any future variation margin obligation at all times:

- **Significant buffer in sizing<sup>5</sup>.** In the simulation analysis, the largest cumulative losses encountered ranged between \$735 million (assuming all portfolios cleared except for self-scheduled FTRs) and \$925 million (all portfolios clearing). This means that at a minimum, there would be more than a 60% buffer in place relative to the worst expected utilization of the LOC of the past 15 years (driven by the polar vortex of 2014).
- **Timely notice.** In order to ensure that PJM has enough time to receive an expansion of the LOC, Nodal Clear will require such expansion once less than \$1 billion of unused capacity remains (i.e., when more than \$500 million on the initial line was utilized).
- **Daily sizing.** Nodal Clear will resize the requirements of the line on a daily basis to ensure that early notification to the ISO is made in case any increase is required.

Despite the buffers and process safeguards built into managing the LOC, it is theoretically possible that an unforeseen event could lead to a situation where the LOC might not be sufficient to meet a potential variation margin payment. As a CFTC administered exchange and clearing house, Nodal Exchange is required to have rules in place to manage such an event, however improbable. Nodal Exchange is actively considering alternative mechanisms for addressing this situation including the following which has already been presented to regulators:

- **Reverse EFTR.** Under this rule, in the event that PJM has nearly exhausted its LOC capacity and had no other means of making a potential variation margin call, Nodal Exchange would execute a Reverse EFTR transaction on all the non-expired open interest of the original FTRs that were exchange for futures at Nodal Exchange. This transaction would create the opposite positions

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<sup>5</sup> Note, this analysis did not include load nodes being cleared. Nodal is currently reviewing the impact of load nodes on PJM LOC requirements but does not expect load nodes will add significantly to the requirements.

that were established on the exchange at the time of the original EFTR transactions (for non-expired positions only) and re-establish FTRs back on the ISO. Only the original FTR awardees who had executed EFTRs would be impacted, and no trader's combined forward exposure would be altered, which means:

- A trader who had not traded out of their open interest at Nodal Exchange prior to the Reverse EFTR would see their position at Nodal Exchange zeroed out and the FTR reestablished at PJM;
- A trader who had traded out of their open interest at Nodal Exchange prior to the Reverse EFTR would have a negative FTR exposure established at Nodal Exchange with the offsetting, original FTR position reestablished at PJM, leaving them with a balanced forward exposure, albeit across two different markets;
- A trader who had not participated in FTR auctions but had nevertheless established positions in these futures contracts at Nodal Exchange would be unaffected.

Once the FTRs are reestablished at PJM, at the latest settlement prices from Nodal Exchange, PJM would then settle the FTRs as it does today, based on cash collected from the FTR markets for only those portions of the FTR that had just settled. If and when PJM were to expand its LOC capacity and re-establish its ability to participate on the exchange (which could take a very short period of time), all of the affected FTRs could be returned to Nodal Exchange via EFTR.

## Next Steps to Support FTR Clearing

Nodal and PJM will be responsible for various changes to the status quo to support FTR clearing, outlined below.

## *Nodal Exchange*

- Expand the futures product offering to cover the full FTR offering with lot sizes (1/10 MW) to fully accommodate FTRs as they are traded today. The full node list<sup>6</sup> will be supported, including load nodes.
- Support PJM's efforts to establish the line of credit to ensure the most cost efficient and robust solution that meets the clearing requirements of Nodal Exchange.
- Provide its award-winning risk expertise to managing credit risk on the exchange.

## *Nodal Data Services (Optional Model Only<sup>7</sup>)*

- Establish this subsidiary of Nodal Exchange Holdings to offer data and consulting services, providing guidance and supporting documentation to help manage the credit and market risks associated with the FTR portfolios that remain with PJM
- Services expected to be provided could include:
  - Risk-related data services
    - Variation margin calculation sent daily for each FTR participant (based on daily price marks provided by Nodal)
    - Alternative Initial margin calculations sent daily for each FTR participant
    - Recommend position and concentration limits (accountability levels) with degree of usage per FTR participant sent daily
    - PJM FTR Guaranty Fund calculation alternatives sent for each FTR participant on a periodic basis (e.g., daily), with level monitored daily
  - Implementation of PJM membership requirements (onboarding) for all members including FTR traders (*optional addition*)
    - Services to include
      - Assessment of financial condition and other requirements
      - Due Diligence

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<sup>6</sup> Nodal Exchange is committed to offering the full node list and is in the process of confirming there are no constraints on the number of contracts from either the ISVs serving the clearing community or the clearing members themselves.

<sup>7</sup> Nodal Exchange would also be able to provide these services as needed to assist during any reverse EFRP scenario, which is highly unlikely.

- Credit/Financial Surveillance (ongoing reviews)

## *PJM*

File tariff changes to enact the following to support optional clearing:

- Isolate FTR credit defaults to FTR position holders that select to retain their positions at PJM, with allocations based on margin requirements. This proposal leaves PJM in a significantly better situation than it is today because it:
  - Isolates the consequences of an FTR default to those that generate the risk, the FTR participants
  - Creates the proper incentives to move up to 100% of the FTR positions out of PJM's risk pool and over to Nodal Exchange
  - Requires sufficient collateral to protect against default for those participants that retain FTR positions at PJM: PJM initial margin requirements are expected to be at least 2-3 times higher than those at Nodal Exchange due to PJM's longer liquidation period and lack of multi-tiered risk solution (Nodal Data Services to provide margin calculations to ensure this ratio holds)
  - Establishes a "participant guaranty fund" to act as a prefunded portion of this loss pool
    - The participant guaranty fund requirements will be limited to those participants with FTR positions that remain at PJM and will be sized according to participant risk assessments and portfolio size (e.g., 0-20% of the PJM initial margin requirements based on participant risk assessments by PJM)
- Establish a \$1.5 billion LOC with a bank consortium led by a Settlement Bank approved by Nodal Exchange and seek FERC approval for a \$3.0 billion line in case any future increases are required. Provide push/pull/view privileges to the LOC and to an associated deposit account to allow Nodal Clear to manage variation margin obligations.
- Coordinate excess bid/award collateral with Nodal Exchange to prevent double funding obligations on FTR participants who move their FTR positions to Nodal Exchange.

Under mandatory clearing, the key tariff change aside from mandating clearing of FTRs would be to establish the LOC.

## Cost Considerations

- Costs for establishing the line of credit have been estimated based on initial discussions with an existing Nodal Exchange settlement bank that will likely act as a lead organizer for a syndicated loan. Initial discussions suggest annual costs (combined origination fees and non-usage charges) around 0.30%, which for a \$1.5 billion LOC is equal to \$4.5 million. These costs should be allocated to all FTR participants on a pro rata basis according to FTR buy awards from the auctions. Based on 2018 transacted FTR volumes, this cost would equate to \$0.00069 per MWh on a path level.
- Interest costs stemming from usage of the line credit are expected to be priced at SOFR + 0.6%. SOFR rates have ranged between 1.5% and 2.0% over the last thirty days, so taking a midpoint of 1.75% + 0.6% would yield an annual interest charge of 2.35% at current levels. From June 2013 through Sept 2018 (i.e., including the polar vortex event of winter 2014), average utilization of the line was estimated to be \$105 million, with some years (2016 and 2017) averaging \$1-3 million of utilization assuming all FTR volume was exchanged for futures at Nodal Exchange. Over the 2013-2018 timeframe, \$105 million of average LOC utilization would have cost \$2.5 million dollars, which based on 2018 transacted FTR volumes would equate to \$0.00038 per MWh on a path level. The sponsors propose these costs should be allocated to those participants benefiting from the line's usage, (i.e., those receiving positive variation margin) at Nodal Exchange.
- Exchange and clearing transaction fees will total \$0.005 per MWh at the FTR path level, which represents a 75% discount of Nodal Exchange and Nodal Clear fees. These fees will only be charged to participants awarded FTRs, Nodal Exchange and Nodal Clear will charge no fees to PJM for transactions.
- For positions that extend to expiration, an additional \$0.0025 per MWh would be charged at the contract expiry level to participants (no fees charged to PJM). This settlement fee is based on positions, rather than transactions, and can be heavily impacted by the netting effects of FTR paths (i.e. FTRs of equal volume that look like A→B, B→C, C→D, and D→E will collapse to net positions on A and E only). For the market as a whole, only 20% of the transaction volume would experience a settlement fee charge assuming no additional trading occurred at Nodal Exchange would reduce the ratio even further.

- Clearing members also charge transaction fees which are privately negotiated and vary from client to client and from clearing member to clearing member. Historically, clearing member fees have been comparable to exchange transaction fees, albeit with the aforementioned variability.
- Under the optional model, Nodal Data Services would produce settlement prices, variation margin, initial margin, and participant guaranty fund calculations for \$2.5 million per year plus an additional \$1 million per year to support the implementation of PJM's planned KYC and credit monitoring requirements, if desired; presumably these services would potentially offset currently anticipated PJM expenses to replicate some of these functions. Under mandatory clearing, this service would not be required.

### Frequently Asked Questions:

1. What are EFTRs? Are they special FTRs or FTRs on Nodal Exchange?
  - a. No, EFTRs are not FTRs in any way. Put simply, an EFTR is a mechanism to convert an FTR into a pair of futures contracts on Nodal Exchange. EFTRs stand for Exchange for FTRs, which is a type of Exchange for Related Positions (EFRPs). EFRPs are CFTC approved transactions that move positions established off-exchange such as swaps (EFSs), physical forwards (EFPs), or, in this case FTRs (EFTRs) and exchange them for CFTC futures contracts. A participant executes an EFTR to establish futures positions on Nodal Exchange, just like a participant could execute a block trade or a screen trade to do the same thing. The key difference is that an EFTR will suspend the payment terms associated with the FTR that is being exchanged, in exchange for the identical economic exposure provided by the futures contracts.
2. How are FTR clearing and EFTRs related?
  - a. FTR clearing is industry shorthand for moving FTR exposure out of the ISO FTR markets and into a CFTC jurisdictional market such as Nodal Exchange. The mechanism to actually do this on Nodal Exchange is an EFTR, as described above in FAQ 1.
3. Once FTRs have cleared, am I able to adjust those positions as I do today?
  - a. Yes. In fact, clearing allows multiple ways to adjust FTR exposure:
    - i. The traditional manner of selling to close in a subsequent auction works just the same, as the "sell" FTRs can be cleared as well. This method of managing FTR

exposure has the benefit of changing both FTR ownership (i.e., the list of awardees maintained by PJM and used to allocate underfunding, for example) as well as the forward position held at Nodal Exchange.

- ii. The participant can trade futures on Nodal Exchange without transacting in a subsequent FTR auction, which allows for more flexible and frequent adjustments to exposure without the benefit of adjusting actual FTR ownership as maintained by the ISO.
4. In the optional model, once FTRs have cleared, am I able to send them back to PJM?
    - a. No. In the optional model, the decision to clear an FTR portfolio is a permanent one. This is one of the design features aimed at preventing gaming or adverse risk selection for the ISO.
  5. Does FTR clearing really improve credit risk protection for PJM, especially after PJM adopts proposed enhancements to its collateral model and to its KYC / credit monitoring policies?
    - a. Yes, and dramatically so. While the details of what PJM adopts for collateral model and KYC/credit monitor policies remains uncertain at this time, **FTR clearing is the only solution that actually removes the risk of default from PJM for the portfolios that clear**. Even with optional clearing, where some portfolios might remain with the ISO, the collateral requirements for portfolios that remain at PJM will both strongly incentivize clearing (for those still eligible to clear) and further protect PJM from a potential default by dramatically reducing the opportunities to again “game” PJM collateral requirements by incorporating Nodal risk model calculations directly into the collateral requirements of PJM.
  6. Does FTR clearing confuse FTR ownership, especially if positions established on Nodal Exchange after FTR clearing are changed by trading with another counterparty?
    - a. No, PJM will maintain a record of FTR ownership, which stays with the FTR awardee from the auction until that FTR is sold in a subsequent auction. The economic exposure of the FTR is transferred to the exchange via EFTR, but FTRs contain obligations other than the settlement cash flows that are suspended in FTR clearing. These obligations, such as underfunding, are unaffected by FTR clearing and are relied upon by the ISO to manage its market.

7. Does FTR clearing, mandatory or optional, impact the forfeiture rule<sup>8</sup> in a meaningful way?
  - a. No, it does not. The IMM can continue to calculate the forfeiture checks as it does today, based on the original FTR awards. The ISO can bill the participant who was awarded the original FTR on the forfeiture amount, if necessary, regardless of whether that participant has chosen to clear its FTRs. If a market participant that had moved its FTR exposure to Nodal Exchange had subsequently chosen to trade out of the offending FTR exposure at Nodal Exchange, the participant is free to share its trading history with the IMM to avoid paying the forfeiture charges, if the facts support that finding.
8. Does the ability of market participants to establish FTR-like exposures at Nodal Exchange without having purchased the FTRs in the auction (e.g., by trading with an FTR trader that subsequently moved its FTR exposure to Nodal Exchange) mean that the forfeiture rule can no longer be enforced?
  - a. No, it does not. The forfeiture rule today only applies to FTRs purchased in the auction, and it can continue to do so as described above. However, market participants assemble complex forward exposures to meet their hedging, commercial, or trading needs. These exposures are comprised of physical contract obligations, financial swaps, futures positions, in addition to FTRs. The ability to acquire FTR-like exposures already exists today in the physical, swap, and futures markets, and FTR clearing does not meaningfully change this dynamic.
9. How does FTR clearing solve underfunding?
  - a. It doesn't. Underfunding is not a credit problem, nor a liquidity problem, nor a price discovery problem, which are issues that are managed by an exchange and clearing house. Underfunding is a model design problem based on the fact that the day ahead market often does not fully replicate what is modeled in the FTR auctions. In a world with FTR clearing, underfunding will be allocated, as it is today, to participants based on their original FTR awards.
10. Does FTR clearing make underfunding worse?

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<sup>8</sup> The FTR Forfeiture Rule is intended to prevent market participants from using virtual transactions to create congestion that benefits their related FTR positions. Under the FTR Forfeiture Rule, an FTR holder forfeits the profit from its FTR when it submits an inc or a dec at or near the source or sink location of the FTR that results in a higher LMP spread in the day-ahead energy market than in the real-time energy market.

- a. No, it doesn't. Underfunding is completely unaffected by FTR clearing. If underfunding were to arise, PJM would separately bill all FTR awardees (which it continues to track after the FTR auctions) for any amounts due. The only way to remove underfunding risk as an FTR trader is to sell any previously acquired FTRs in the FTR auction, as is the case today.
11. Since underfunding is linked to the original FTR awardees, it's possible for a participant to trade out of an FTR-like exposure at Nodal Exchange (i.e., the futures positions established after an EFTR transaction) at a significantly different price than the FTR award, potentially immediately after the auction. Does this create the potential for a bifurcated market or arbitrage opportunity?
- a. No. The ability to trade out of FTR exposure on Nodal Exchange means there will be price discovery of what market participants estimate underfunding will look like at settlement, which is useful information, but this does not provide any kind of arbitrage (i.e., riskless profit) from the transaction. Let's consider an example. An FTR trader is awarded an FTR for \$3 per MWh and trades out immediately in Nodal Exchange's market with another participant for \$5 per MWh rather than take the FTR exposure to settlement. The trader immediately realizes a \$2 per MWh profit from the trade, which is the market estimate for underfunding at that time. Let's further assume the day ahead market ultimately settles at \$5. If at the time of settlement, underfunding results in 60% curtailment of payments to FTR recipients (i.e., rather than \$5 per MWh, only \$2 per MWh is paid), then PJM would separately bill the original FTR trader for \$3 per MWh that was earlier collected. This would mean that the trader underestimated the underfunding risk at the time they traded out of the exposure. It's possible the "bet" on underfunding could go the other way and result in a profit, but either way, it does not represent "riskless profit". Rather transactions on Nodal Exchange during a time of expected underfunding challenges could provide the market with up to the minute price expectations of how underfunding will play out.
12. Does FTR clearing interfere with payments to the ARR holders?
- a. No. The ISO will continue to operate the day ahead market, which provides the primary source of funding to the ARR holders. Any shortfalls (aside from underfunding, which would be billed separately) would be made up with variation margin (profit and loss collections) from Nodal Exchange. These payments are collectively guaranteed by the clearing members of Nodal Clear and by the full default management infrastructure in place if a clearing member were to default.

## Background on Nodal Exchange and Nodal Clear

Nodal Exchange is a derivatives exchange providing price, credit and liquidity risk management solutions to participants in the North American commodities markets. Nodal Exchange is a leader in innovation, having introduced the world's largest set of electric power locational (nodal) futures contracts. As part of EEX Group, a group of companies serving international commodity markets, Nodal Exchange currently offers over 1,000 contracts on hundreds of unique locations, providing the most effective basis risk management available to market participants. In addition, Nodal Exchange offers natural gas, environmental and trucking freight contracts. Nodal Exchange is a designated contract market regulated by the CFTC.

All Nodal Exchange contracts are cleared by Nodal Clear, which serves as the central counterparty for all Nodal Exchange transactions. Through the novation process, the clearing house becomes the buyer to every seller and the seller to every buyer, significantly reducing the credit risk exposure of Nodal Exchange participants. Nodal Clear's strong risk management practices create a sound market infrastructure for trading of Nodal Exchange contracts. Nodal Clear employs a tailored portfolio margining methodology that appropriately margins Nodal Exchange contracts and provides capital efficiencies to market participants. Nodal Clear is a CFTC registered derivatives clearing organization.

## Appendix A: List of Clearing Members at Nodal Exchange

The following institutions are clearing members for the Nodal Exchange market. Institutions that have been approved as FCM clearing members are designated with “FCM”.

ADM Investor Services Inc. (FCM)  
BNP Paribas Securities Corp. (FCM)  
BofA Securities, Inc. (FCM)  
Citigroup Global Markets, Inc. (FCM)  
E D & F Man Capital Markets Inc. (FCM)  
Goldman Sachs & Co. LLC (FCM)  
Macquarie Futures USA LLC (FCM)  
Mizuho Securities USA LLC (FCM)  
Morgan Stanley & Co. LLC (FCM)  
RBC Capital Markets LLC (FCM)  
Royal Bank of Canada  
SG Americas Securities LLC (FCM)  
Wells Fargo Securities LLC (FCM)