

**Southwest Power Pool  
PRICE FORMATION TASK FORCE MEETING**

**January 25, 2017**

**8:15 a.m – 12:00 p.m.**

**AEP Offices – Dallas, TX**

**• SUMMARY OF MOTIONS •**

**Motions:**

**Agenda Item 2 – Minutes Approval**

Carrie Dixon (Xcel) motioned to approve the minutes for November 16, 2016; Valerie Weigel (Basin) provided the second. The motion passed with no oppositions and no abstentions.

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**Southwest Power Pool  
PRICE FORMATION TASK FORCE MEETING**

**January 25, 2017**

**8:15 a.m. – 12:00 p.m.**

**AEP Offices – Dallas, TX**

**• Minutes •**

**Agenda Item 1 - Call to Order, Proxies, Agenda Discussion**

Matt Moore (GSEC) called the meeting to order at 8:17 a.m. The attendance was recorded and the group reviewed the agenda. See Attachment 1 - PFTF Attendance January 25 2017 and Attachment 2 - PFTF Agenda 201670125.

**Agenda Item 2 – Minutes Approval, November Minutes**

Carrie Dixon (XCEL) motioned, and Valerie Weigel (Basin) provided the second to approve the minutes for November 16 2016. The motion passed with no oppositions and no abstentions. See Attachment 3 – 11 16 2016 Minutes.

**Agenda Item 3 – RM17-3-000 Fast Start Resources**

Erin Cathey (SPP) reviewed the FERC NOPR RM17-3-000 Fast Start Resources and encouraged members and stakeholders to provide comments. Erin noted this NOPR will be discussed with the MWG during February meeting. See Attachment 4 – Fast Start Resources NOPR\_RM17-3.

**Agenda Item 4: Discuss PFTF Issues**

No discussion on this topic.

**Agenda Item 4a: Issue 9 – Over Production in Real-Time**

Matt Moore provided a brief explanation of the concern and noted the FERC NOPR on Fast Start Resources may provide some remediation.

**Agenda Item 4b: Issue 4 – Mitigation of Resource Offers to “Cost plus 10%”**

Matt Moore noted that the MWG discussed this issue during the January MWG meeting. Matt provided an update of the discussion. Matt stated that based on the MWG discussion he planned to bring a separate Revision Request that would focus only on the ‘cost plus 10%’ modification. Valerie Weigel (Basin) stated she would co-sponsor the revision request.

**Agenda Item 5: RR De-commitment Update**

Richard Ross (AEP) updated the PFTF on the status of the RR stating he is working to bring a draft to the MWG in the near future.

**Agenda Item 6: Review PFTF List of Concerns – Discuss Recommendation to MWG**

Matt Moore facilitated a review of the remaining issues to develop the basis for the PFTF's recommendation to the MWG for continued work to address price formation issues.

**Agenda Item 7: Review of New Action Items and Future Meetings**

**Action Items:**

No new actions.

**Future Meetings:**

The PFTF has been retired.

**Adjournment**

Matt Moore (GSEC) adjourned the meeting at 10.42 a.m. CPT.

*Respectfully Submitted –*

*Erin Cathey*

*Sr. Market Design Analyst & MWG Staff Secretary*

First Name	Last Name	Attending Through	Company
Matt	Moore	Person	GSEC
Erin	Cathey	Person	SPP (Staff Secretary)
Valerie	Weigel	Person	Basin Electric
Lee	Anderson	Person	LES
John	Luallen	Person	SPP
Kristen	Kitchens	Person	SPP
Clifford	Franklin	Person	Westar
Jack	Madden	Person	NTEC, ETEC, Tex-La
Ron	Thompson	Person	NPPD
Roy	True	Person	ACES
Carrie	Dixon	Person	XCEL
Chandler	Brown	Person	Sunflower
C. Richard	Ross	Person	AEP
Debbie	James	Person	SPP
Jim	Flucke	Person	KCPL
Terry	Wright	Person	
Jodi	Woods	Person	SPP
Chris	Winburn	Person	
Yassar	Bahbaz	Phone/Web	SPP
Patti	Kelly	Phone/Web	SPP
David	Daniels	Phone/Web	SPP
Ella	Caillouette	Phone/Web	
Ron	Chartier	Phone/Web	SECI
Russell	Quattlebaum	Phone/Web	SPP
Serhat	Gunney	Phone/Web	SPP
Shawn	McBroom	Phone/Web	OGE
Shawn	Geil	Phone/Web	KEPCO
Steve	Davis	Phone/Web	SPP
Walt	Shumate	Phone/Web	Shumate & Assoc.
Nick	Parker	Phone/Web	SPP MMU
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**PRICE FORMATION TASK FORCE**

**January 25, 2016**

**AEP Office – Dallas, TX**

**• A G E N D A •**

**Day 1: 8:15 a.m. – 11:00 a.m.**

- |   |              |
|---|--------------|
| 1. Call to Order, Proxies, Agenda Discussion                    | Matt Moore   |
| 2. Minutes Approval   | Matt Moore   |
| 3. RM17-3-000 Fast Start Resources                              | Matt Moore   |
| 4. Discuss PFTF Issues  |              |
| a. Issue 9 – Over Production in Real-Time                       | Matt Moore   |
| b. Issue 4 – Mitigation of Resource Offers to “Cost plus 10%”   | Matt Moore   |
| 5. RR De-commitment Update                                      | Richard Ross |
| 6. Review PFTF List of Concerns – Discuss Recommendation to MWG | Matt Moore   |
| 7. Review of Motions, New Action Items, and Future Meetings     | Erin Cathey  |
| 8. Adjournment  | Matt Moore   |



**Southwest Power Pool**  
**PRICE FORMATION TASK FORCE MEETING**  
**November 16, 2016**  
**AEP Offices – Dallas, TX**  
**• SUMMARY OF MOTIONS •**

**Motions:**

**Agenda Item 2 — Minutes Approval**

Carrie Dixon (Xcel) motioned, and Matt Moore (GSEC) seconded to approve the minutes for October 19, 2016. The motion passed with no oppositions and no abstentions.



**Southwest Power Pool**  
**PRICE FORMATION TASK FORCE MEETING**  
**November 16, 2016**  
**AEP Offices – Dallas, TX**  
**• Minutes •**

**Agenda Item 1 - Call to Order, Proxies, Agenda Discussion**

Matt Moore (GSEC) called the meeting to order at 8:00 a.m. The attendance was recorded and the group reviewed the agenda. See Attachment 1 - PFTF Attendance November 16 2016 and Attachment 2 - PFTF Agenda 20161116.

**Agenda Item 2a – Minutes Approval, September 21 2016 Minutes**

Valerie Weigel (Basin) motioned, and Jim Flucke (KCPL) provided the second to approve the minutes for October 19, 2016. The motion passed with no oppositions and no abstentions. See Attachment 3 – October 19 2016 Minutes.

**Agenda Item 3 – De-commit RR Update**

Topic deferred.

**Agenda Item 4 - Issue 9 – Over Production in Real-Time**

Topic deferred. Matt Moore (GSEC) stated Golden Spread will initiate a Revision Request. SPP MMU will provide comment when the RR is submitted.

**Agenda Item 5 - Issue 4 – Mitigation of Resource Offers to “Cost plus 10%”**

The discussed working to develop a new baseline. Matt Moore stated GSEC is drafting an RR for review during the December meeting timeframe. Chandler Brown (SUNC) voiced support of the effort.

**Agenda Item 6 - Review of Motions, Action Items and Future Meetings**

**Action Items:**

No new actions recorded. See Attachment 4 – PFTF Action Items.

**Future Meetings:**

**December 14, 2016** (8:00 a.m. – 12:00 p.m.)

Location: AEP Office – Dallas, TX

Room: 8<sup>th</sup> Floor

**Adjournment**

*Relationship-Based • Member-Driven • Independence Through Diversity*  
*Evolutionary vs. Revolutionary • Reliability & Economics Inseparable*





Matt Moore (GSEC) adjourned the meeting at 11:00 a.m. CPT.

Respectfully Submitted – Erin Cathey

*Relationship-Based • Member-Driven • Independence Through Diversity  
Evolutionary vs. Revolutionary • Reliability & Economics Inseparable*

157 FERC ¶ 61,213  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

18 CFR Part 35

[Docket No. RM17-3-000]

Fast-Start Pricing in Markets Operated by Regional Transmission Organizations and  
Independent System Operators

(December 15, 2016)

AGENCY: Federal Energy Regulatory Commission.

ACTION: Notice of Proposed Rulemaking.

SUMMARY: The Federal Energy Regulatory Commission is proposing to revise its regulations to require that each regional transmission organization and independent system operator incorporate market rules that meet certain requirements when pricing fast-start resources. These reforms should lead to prices that more transparently reflect the marginal cost of serving load, which will reduce uplift costs and thereby improve price signals to support efficient investments.

DATES: Comments are due **[INSERT DATE 60 days after publication in the FEDERAL REGISTER]**

ADDRESSES: Comments, identified by docket number, may be filed in the following ways:

- Electronic Filing through <http://www.ferc.gov>. Documents created electronically using word processing software should be filed in native applications or print-to-PDF format and not in a scanned format.

- Mail/Hand Delivery: Those unable to file electronically may mail or hand-deliver comments to: Federal Energy Regulatory Commission, Secretary of the Commission, 888 First Street, NE, Washington, DC 20426.

*Instructions:* For detailed instructions on submitting comments and additional information on the rulemaking process, see the Comment Procedures Section of this document.

FOR FURTHER INFORMATION CONTACT:

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157 FERC ¶ 61,213  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Fast-Start Pricing in Markets Operated by Regional  
Transmission Organizations and Independent System  
Operators

Docket No. RM17-3-000

NOTICE OF PROPOSED RULEMAKING

(December 15, 2016)

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1. In this Notice of Proposed Rulemaking (NOPR), the Federal Energy Regulatory Commission (Commission) is proposing to address the pricing of energy from resources that are able to start quickly (i.e., any resource that is able to start up within ten minutes or less, that has a minimum run time of one hour or less, and that submitted an economic energy offer to the market) (fast-start resources). In this context, fast-start pricing addresses the software algorithms by which a regional transmission organization (RTO) or independent system operator (ISO) incorporates the offers of fast-start resources into the market prices for energy and ancillary services.<sup>1</sup>

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<sup>1</sup> In the November 20, 2015 Order Directing Reports issued in Docket No. AD14-14-000, the Commission noted that inflexible resources “are generally referred to as block-loaded fast-start resources.” *Price Formation in Energy and Ancillary Services Markets Operated by Regional Transmission Organizations and Independent System Operators*, 153 FERC ¶ 61,221, at P 9 (2015) (Order Directing Reports). The Commission also stated that

[a]n inflexible resource generally refers to a resource that may not be able to physically operate much below its maximum output and therefore cannot be dispatched up or down. For this reason, the energy supply offer parameters for these resources may stipulate that they be dispatched either to zero or to a minimum level that is at (or close to) their maximum output, but not in between.

*Id.* P 9 n.8. The Commission further noted that “[a] block-loaded resource is a resource whose economic minimum operating limit is equal to its economic maximum output.” *Id.* P 9 n.9. While this NOPR seeks to address issues discussed in the Order Directing Reports and the subsequent reports and comments submitted in that docket, we do not limit terms used in this NOPR to the definitions provided in the Order Directing Reports.

2. Varied approaches exist among RTOs and ISOs to incorporate fast-start resources into energy and ancillary services prices (fast-start pricing). Fast-start resources are unique because they are often dispatched to their inflexible minimum or maximum operating limits, and are thus not eligible to set the locational marginal price (LMP).<sup>2</sup> In addition, fast-start resources are typically committed in real-time, very close to the interval when they are needed. As a result, the cost to commit these resources is incurred at roughly the same time the incremental energy costs are incurred, which raises the question of whether the commitment costs should be included in the LMP. Finally, fast-start resources can arguably respond quickly enough to be considered part of an RTO's/ISO's operating reserves even when they have not yet been committed. As a result of these unique characteristics, RTOs/ISOs have developed pricing specific to this class of resources. This pricing is designed generally to recognize that fast-start resources are, for all intents and purposes, the marginal resource used to meet the next increment of energy or operating reserves demand. Based on experience with the different fast-start pricing used by each RTO/ISO, we believe some practices have emerged over time that better represent the marginal cost of serving load.

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<sup>2</sup> At a high level, the LMP is set by the offer of the resource that is dispatched up to serve the next additional MW of demand or dispatched down to accommodate the next MW of reduced demand. Fast-start resources often have little or no dispatch range (i.e., their economic minimum operating limit equals their economic maximum operating limit). A resource that is operating inflexibly at its economic minimum operating limit or maximum operating limit is not dispatchable to serve an additional increment or decrement of load, and is thus not eligible to set the LMP.

3. We preliminarily find that some of these approaches may not result in rates that are just and reasonable for several reasons. We are concerned that some existing practices may not ensure that prices accurately reflect the marginal cost of serving load, potentially resulting in prices that do not reflect the value of fast-start resources, potentially creating unnecessary uplift payments, and potentially failing to provide incentives for market participants to make efficient investments. As a result, we propose to require that each RTO/ISO incorporate the following five requirements for its fast-start pricing. First, an RTO/ISO must apply fast-start pricing to any resource committed by the RTO/ISO that is able to start up within ten minutes or less, has a minimum run time of one hour or less, and that submits economic energy offers to the market. Second, when an RTO/ISO makes a decision to commit a fast-start resource, it should incorporate commitment costs, i.e., start-up and no-load costs, of fast-start resources in energy and operating reserve prices, but must do so only during the fast-start resource's minimum run time. Third, an RTO/ISO must modify its fast-start pricing to relax the economic minimum operating limit of fast-start resources and treat them as dispatchable from zero to the economic maximum operating limit for the purpose of calculating prices. Fourth, if an RTO/ISO allows offline fast-start resources to set prices for addressing certain system needs, the resource must be feasible and economic. Finally, an RTO/ISO must incorporate fast-start pricing in both the day-ahead and real-time markets.

4. We seek comment on these proposed reforms 60 days after publication of this NOPR in the *Federal Register*.

**I. Background**

5. In June 2014, the Commission initiated a proceeding, in Docket No. AD14-14-000, Price Formation in Energy and Ancillary Services Markets Operated by Regional Transmission Organizations and Independent System Operators, to evaluate issues regarding price formation in the energy and ancillary services markets operated by RTOs/ISOs (Price Formation Proceeding). The notice initiating that proceeding stated that there may be opportunities for the RTOs/ISOs to improve the price formation process in the energy and ancillary services markets. As set forth in the notice, prices used in energy and ancillary services markets ideally “would reflect the true marginal cost of production, taking into account all physical system constraints, and these prices would fully compensate all resources for the variable cost of providing service.”<sup>3</sup>

Pursuant to the notice, staff conducted outreach and convened technical workshops on the following four general issues: (1) use of uplift payments; (2) offer price mitigation and offer price caps; (3) scarcity and shortage pricing; and (4) operator actions that affect prices.<sup>4</sup>

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<sup>3</sup> Price Formation in Energy and Ancillary Services Markets Operated by Transmission Organizations and Independent System Operators, Notice, Docket No. AD14-14-000, at 2 (June 19, 2014).

<sup>4</sup> *Id.* at 1, 3-4.



6. In January 2015, the Commission requested comments on questions that arose from the price formation technical workshops.<sup>5</sup> As a result of these comments, the Commission identified, among other things, five technical topics with potential for reform to improve price formation, but for which further information was needed. In November 2015, the Commission issued an order that directed each RTO/ISO to report on these five price formation topics: fast-start pricing; managing multiple contingencies; look-ahead modeling; uplift allocation; and transparency.<sup>6</sup> The order directed each RTO/ISO to file a report providing an update on its current practices in the topic areas, outlining the status of its efforts (if any) to address issues in each of the five topics, and responding to specific questions contained in the order. This NOPR addresses the pricing of fast-start resources.

7. In the reports filed and the subsequent comments, RTOs/ISOs and other commenters addressed the issue of fast-start pricing, as discussed below.<sup>7</sup>

## **II. Discussion**

8. In RTOs/ISOs, LMPs reflect the system marginal cost of serving the next increment of load, taking into account transmission constraints and line losses. With

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<sup>5</sup> Notice Inviting Post-Technical Workshop Comments, Docket No. AD14-14-000 (Jan. 16, 2015).

<sup>6</sup>Order Directing Reports, 153 FERC ¶ 61,221).

<sup>7</sup> A list of commenters and the abbreviated names used in this NOPR appears in the Appendix.

certain exceptions, only resources that are dispatchable, i.e., those that can be dispatched up or down in response to changes in system conditions, are eligible to set prices.<sup>8</sup> In many situations, this eligibility requirement ensures that LMPs reflect the marginal cost of serving the next increment of demand. However, this eligibility requirement can distort LMPs when a fast-start resource is committed and dispatched to serve expected load during a particular interval. This restriction often prevents a fast-start resource from setting prices when the resource is dispatched at its economic minimum operating limit. Fast-start resources are often required to be dispatched at their economic minimum operating limit or are block-loaded.<sup>9</sup> Because the system may need fewer megawatts (MW) than the fast-start resource's economic minimum operating limit to meet load, other resources must be dispatched down. The resources that were dispatched down become the most economic option to serve the next increment of load. Therefore, despite the fact that a fast-start resource is essentially marginal, this restriction prevents a fast-start resource dispatched at its economic minimum operating limit from setting the LMP. To allow fast-start resources to set prices so that LMPs better reflect the marginal cost of serving load, some RTOs/ISOs modify the market rules and software. Typically, they treat fast-start resources as dispatchable in a pricing algorithm (i.e., pricing run) separate

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<sup>8</sup> Order Directing Reports, 153 FERC ¶ 61,221 at P 9.

<sup>9</sup> Block-loaded means the resource's economic minimum operating limit equals its economic maximum operating limit. The economic minimum and maximum operating limits are the minimum amount of electric power that a resource must be allowed to produce, and the highest level a resource can produce, while under economic dispatch, respectively.

from the dispatch algorithm (i.e., dispatch run). While the dispatch run meets all of the physical constraints of the resources, the pricing run relaxes the economic minimum operating limit of a fast-start resource so that the resource is treated as dispatchable by the market-clearing software and eligible to set prices.

9. Fast-start pricing can result in improved price signals, especially during tight or unexpected system conditions when the need for fast-start resources is the greatest. However, fast-start pricing can create a disconnect between prices and dispatch instructions, which can lead to over-generation. Specifically, fast-start pricing requires the pricing run to assume that fast-start resources can operate below the resources' economic minimum operating limit such that the pricing run also dispatches other units at levels greater than the level instructed by the dispatch run. Many RTOs/ISOs ensure that the disconnect in resource output levels between the pricing and dispatch runs are reconciled to avoid over-generation; however, some RTOs/ISOs do not reconcile the differences, leading to dispatch targets that produce energy in excess of what is needed to serve load, i.e., over-generation. Further, generation resources that are dispatched downward to accommodate the commitment of fast-start resources may have incentives to produce energy above their dispatch targets to capture the higher prices set by fast-start resources, leading to over-generation. Thus, fast-start pricing rules are typically paired with market rules to reduce the incentives for producing energy above dispatch targets.
10. Further, reflecting commitment costs in LMPs requires some judgment regarding how and when to include those commitment costs. Similarly, reflecting the costs of offline resources in LMPs requires some judgment regarding when these resources are

actually economically and technically able to address a reserve shortage or transmission constraint.

**A. Current RTO/ISO Approaches to Fast-Start Pricing**

11. Each RTO/ISO has developed its own unique pricing to accommodate the specific characteristics of fast-start resources in its respective market.

12. CAISO defines fast-start resources as those that can come online in under two hours and can be committed in CAISO's fifteen-minute market or the short-term unit commitment process. CAISO states that there is no special treatment for the commitment or pricing of generating units related to whether they are fast, medium, or long start.<sup>10</sup> However, CAISO applies special modeling logic to certain block-loaded or nearly block-loaded resources known as Constrained Output Generators.<sup>11</sup> CAISO currently allows minimum load costs to affect LMPs but does not include start-up costs.<sup>12</sup> In the day-ahead market, Constrained Output Generators are treated as dispatchable resources in

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<sup>10</sup> Report of CAISO, Docket No. AD14-14-000, at 4 (Mar. 4, 2016) (CAISO Report).

<sup>11</sup> CAISO defines a Constrained Output Generator as any generating unit with an operating range that is no greater than the highest of three MW or five percent of its maximum operating range. *Id.* at 1-2. Block-loaded resources in CAISO are required to register as Constrained Output Generators, while certain nearly-block loaded resources are permitted to register as Constrained Output Generators, if desired. CAISO notes that there are currently no resources registered as Constrained Output Generators. *Id.* at 11.

<sup>12</sup> *Id.* at 2. In CAISO, a Constrained Output Generator's calculated energy bid (which is the unit's minimum load costs divided by the MW quantity of the unit's maximum output) can set the LMP.

both the scheduling and pricing run; thus, in the day-ahead market, Constrained Output Generators can set prices. In the real-time market, the scheduling run does not allow Constrained Output Generators to be dispatched below their economic minimum operating limit, but in the pricing run the economic minimum operating limit is relaxed to zero. CAISO does not allow offline resources to set LMP.<sup>13</sup> CAISO states that because so few resources have registered as Constrained Output Generators, it has no anecdotal data that its Constrained Output Generator-related pricing logic results in over-generation issues. However, CAISO notes that over-generation could be a concern if a large number of resources were to register as Constrained Output Generators.<sup>14</sup> CAISO states that it is not currently working on any stakeholder initiatives to modify commitment or pricing logic related to fast-start units, but notes that some of its stakeholders have argued for an extended pricing mechanism similar to MISO's Extended LMP mechanism.<sup>15</sup>

13. ISO-NE recently proposed revisions to its process for dispatching and pricing fast-

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<sup>13</sup> *Id.* at 10.

<sup>14</sup> *Id.* at 8. Fast-start pricing could result in over-generation (i.e., producing energy in excess of what is needed to serve load) due to several factors. First, price signals generated by fast-start pricing could incent some resources to produce energy above their dispatch targets. Specifically, if LMP is higher than a resource's incremental energy offer, that resource would have an incentive to increase its profits by generating above energy dispatch targets, leading to over-generation. Second, an RTO/ISO may use a scheduling run that incorporates relaxed economic minimum operating limits and does not require that generation be equal to load, resulting in over-generation. *See* PJM Report on Price Formation Issues, Docket No. AD14-14-000, at 12-13 (Feb. 17, 2016) (PJM Report).

<sup>15</sup> CAISO Report at 8-9.

start units, which will become effective March 31, 2017.<sup>16</sup> ISO-NE defines fast-start resources as those with start-up times of thirty minutes or less and which have a minimum run time of one hour or less and a minimum down time of one hour or less.<sup>17</sup> ISO-NE states that its pricing mechanism will allow start-up and no-load costs to be included in LMPs. ISO-NE will have separate dispatch and pricing runs, with the pricing run following the dispatch run, where economic minimum operating limits are relaxed.<sup>18</sup> However, ISO-NE does not allow offline resources to set the LMP.<sup>19</sup> ISO-NE states that its revised fast-start pricing is being implemented in the real-time market only.<sup>20</sup> ISO-NE argues that its revised fast-start pricing logic will eliminate over-generation issues and states that it will compensate certain re-dispatched resources for their opportunity costs.<sup>21</sup>

14. MISO's fast-start pricing logic, referred to as Extended LMP (ELMP), became effective in 2015.<sup>22</sup> MISO defines a fast-start generating resource as a generating unit

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<sup>16</sup> *ISO New England Inc. and New England Power Pool Participants Committee*, Docket No. ER15-2716-000 (Oct. 19, 2015) (delegated letter order).

<sup>17</sup> Report of ISO-NE, Docket No. AD14-14-000, at 6 (Mar. 4, 2016) (ISO-NE Report).

<sup>18</sup> *Id.* at 16.

<sup>19</sup> *Id.* at 10.

<sup>20</sup> *Id.* at 3.

<sup>21</sup> *Id.* at 14-15.

<sup>22</sup> *Midcontinent Indep. Sys. Operator, Inc.*, 150 FERC ¶ 61,143 (2015).

with a start-up time of ten minutes or less and a minimum run time of one hour or less.<sup>23</sup> MISO allows a fast-start resource's start-up and no-load costs to affect the LMP. MISO also allows an offline fast-start resource to set LMPs but only under reserve or transmission scarcity conditions.<sup>24</sup> MISO's ELMP is applied to both day-ahead and real-time markets in order to facilitate price convergence between the two markets.<sup>25</sup> MISO states that, though it recognizes that fast-start pricing can result in over-generation, it has not observed any significant over-generation issues. However, MISO emphasizes that its settlement rules incentivize following dispatch instructions because it penalizes resources that deviate.<sup>26</sup> MISO states that it is currently planning to implement ELMP Phase II, which it states will expand upon Phase I principles by applying fast-start pricing to more peaking resources.<sup>27</sup>

15. NYISO does not apply fast-start pricing to all fast-start resources. Instead, NYISO applies special pricing logic, referred to as "hybrid gas turbine pricing logic," to all committed block-loaded resources qualified to provide 10-minute non-synchronous

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<sup>23</sup> Report of MISO, Docket No. AD14-14-000, at 9 (Mar. 4, 2016) (MISO Report).

<sup>24</sup> *Id.* at 11.

<sup>25</sup> *Id.* at 8.

<sup>26</sup> *Id.* at 15.

<sup>27</sup> *Id.* at 7.

reserves. This pricing logic allows block-loaded gas turbines to set prices.<sup>28</sup> Under this logic, start-up and no-load costs are not reflected in LMP. In the day-ahead market, all resources are modeled as dispatchable in the pricing pass of the Security Constrained Unit Commitment process, but NYISO states that this process does not employ the same fast-start pricing as is used in real-time.<sup>29</sup> NYISO explains that, in the real-time market, its hybrid gas turbine pricing logic allows block-loaded resources to be modeled as fully dispatchable to determine prices.<sup>30</sup> NYISO applies fast-start pricing during a fast-start resource's minimum run time if it is economic.<sup>31</sup> NYISO also allows offline fast-start resources to set prices and allows start-up costs for those resources to be reflected in the price.<sup>32</sup> NYISO states that it will be working with stakeholders during 2016 to allow all block-loaded units economically committed by the real-time commitment software to set prices.<sup>33</sup>

16. PJM's tariff and other governing documents do not include formal definitions for fast-start or block-loaded resources. For the purposes of its report, PJM describes a fast-

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<sup>28</sup> Corrected Report of NYISO, Docket No. AD14-14-000, at 9 (Mar. 23, 2016) (NYISO Report).

<sup>29</sup> *Id.* at 15.

<sup>30</sup> *Id.* at 3.

<sup>31</sup> *Id.* at 4.

<sup>32</sup> *Id.* at 6, 10.

<sup>33</sup> *Id.* at 3, 8.



start resource as a combustion turbine that can start within two hours and a block-loaded resource as one with an economic minimum operating limit equal to its economic maximum operating limit. In practice, PJM allows block-loaded resources to set prices.<sup>34</sup> PJM's pricing logic does not allow block-loaded resources' start-up or no-load costs to be included in prices. PJM states that in the day-ahead market, the pricing and dispatch runs are combined, while in the real-time market, the pricing run executes first, followed by the dispatch run.<sup>35</sup> PJM states that in both the day-ahead and real-time markets, it relaxes the economic minimum operating level of block-loaded resources up to ten percent.<sup>36</sup> However, PJM does not allow offline resources to set prices.<sup>37</sup> PJM explains that it allows resources with a limited operating range, other than block-loaded resources, to set prices when operating to control a specific transmission constraint.<sup>38</sup> PJM states that it is not currently working on any stakeholder initiatives regarding fast-start unit pricing.<sup>39</sup>

17. SPP has special pricing logic that it applies to what it refers to as quick-start resources. SPP defines a quick-start resource as a resource that (1) is registered as a

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<sup>34</sup> PJM Report at 2.

<sup>35</sup> *Id.* at 5.

<sup>36</sup> *Id.* at 5.

<sup>37</sup> *Id.* at 10-11.

<sup>38</sup> *Id.* at 14-15.

<sup>39</sup> *Id.* at 9.

quick-start resource; (2) has a cold start-up time of ten minutes or less; (3) has a minimum run time of one hour or less; and (4) has a total minimum down time of one hour or less.<sup>40</sup> SPP does not allow start-up or no-load costs to affect LMP directly, but does allow quick-start resources to include start-up and no-load costs in their mitigated energy offer curves for the purpose of unit commitment.<sup>41</sup> SPP's production run determines both dispatch and pricing for all resources but resources constrained by their economic minimum or maximum operating limits are not eligible to set LMP.<sup>42</sup> Specifically, SPP states that it relaxes the economic minimum operating limit of quick-start resources to zero in a screening run that is executed prior to the final production run, which includes both dispatch and pricing. SPP explains that if the quick-start resource is dispatched below its economic minimum operating limit in the screening run, it will be considered offline in the final production run. Conversely, SPP states that if the quick-start resource is committed at or above its economic minimum operating limit, it will be considered online in the final production run.<sup>43</sup> Additionally, SPP does not allow offline

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<sup>40</sup> Report of SPP on Price Formation Issues, Docket No. AD14-14-000, at 1-2 (Mar. 7, 2016) (SPP Report).

<sup>41</sup> *Id.* at 5, 8, 10.

<sup>42</sup> *Id.* at 2-3.

<sup>43</sup> *Id.* at 2-3.

quick-start resources to set LMP.<sup>44</sup> SPP reports that it intends to implement new fast-start pricing to commit quick-start resources more efficiently in real-time in the second quarter of 2017.<sup>45</sup>

**B. Comments on Fast-Start Pricing**

18. Multiple commenters support the use of fast-start pricing methods that allow resources dispatched at their operating limits to set LMP and allow start-up and no-load costs to affect prices.<sup>46</sup> EPSA/WPTF<sup>47</sup> argues that such fast-start pricing methods could improve pricing signals and help correct CAISO's "duck curve problem" by redistributing excess costs incurred during the middle of the day to the ramping periods.<sup>48</sup> Similarly, Exelon believes that RTOs/ISOs should ensure that start-up and no-load costs of resources dispatched at operational limits can affect prices by using a particular mathematical technique called "convex hull pricing," which would better reflect the cost of electricity, reduce uplift, and enhance incentives for all resources to perform.<sup>49</sup>

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<sup>44</sup> *Id.* at 8-9.

<sup>45</sup> *Id.* at 4-5.

<sup>46</sup> DC Energy, Inertia Power, and Vitol Comments at 8; EPSA Comments at 11; EPSA/IPPNY Comments at 6; EPSA/P3 Comments at 5; EPSA/WPTF Comments at 4-5; Exelon Comments at 7-8; PSEG Companies Comments at 8.

<sup>47</sup> EPSA filed multiple sets of comments paired with different groups as well as its own stand-alone comments.

<sup>48</sup> EPSA/WPTF Comments at 4-5.

<sup>49</sup> Exelon Comments at 6-7. Commenters frequently refer to a certain pricing methodology known as "convex hull pricing." This methodology allows the start-up and

19. Commenters identified a number of best practices across the RTOs/ISOs. Entergy, EPSA, and Westar generally support certain aspects of MISO's ELMP. EPSA believes that MISO's ELMP approach yields favorable results by ensuring that generators follow dispatch signals and that generators' minimum operating limits are satisfied in dispatch.<sup>50</sup> EPSA states that several components of MISO's ELMP can be widely adopted across all RTO/ISO pricing mechanisms.<sup>51</sup> Further, EPSA and PSEG Companies believe the approaches used by MISO and ISO-NE to relax the economic minimum limits represent a best practice.<sup>52</sup> Further, PSEG Companies states that ISO-NE's revised fast-start pricing method addresses over-generation concerns by paying lost opportunity payments to those resources that follow dispatch instructions but are subsequently re-dispatched down to their economic set point.<sup>53</sup> In addition, EPSA and EPISA/IPPNY are generally supportive of NYISO's fast-start pricing methods.<sup>54</sup>

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no-load costs of resources to affect prices by using a particular mathematical technique.

<sup>50</sup> EPISA Comments (on MISO Report) at 12.

<sup>51</sup> *Id.* at 6; EPISA Comments (on price formation) at 12-13.

<sup>52</sup> EPISA Comments (on MISO Report) at 6; PSEG Companies Comments at 4.

<sup>53</sup> PSEG Companies Comments at 7.

<sup>54</sup> EPISA Comments (on SPP Report) at 7; EPISA/IPPNY Comments at 5-6.

20. On the other hand, EPSA and Golden Spread express concern that the fast-start pricing methods employed by SPP are insufficient.<sup>55</sup> Specifically, Golden Spread states that certain aspects of SPP's market design features and operator practices result in inefficient market prices and fail to reflect the costs to start and operate fast-start resources or the value they provide to the system.<sup>56</sup>

21. In contrast, the PJM Market Monitor argues that relaxing economic minimum limits for price setting artificially overrides fundamental pricing logic in order to reduce uplift. The PJM Market Monitor argues that this can result in an increase in total production costs.<sup>57</sup> Specifically, the PJM Market Monitor opposes PJM's practice of reducing the economic minimum limit of certain resources to change LMPs. The PJM Market Monitor argues that this pricing logic is a form of subjective pricing because it varies from fundamental LMP logic based on an administrative decision to reduce uplift.<sup>58</sup>

**1. Fast-Start Resource Definitions and Resource Eligibility**

22. Commenters generally support applying enhanced technology-neutral fast-start pricing logic to an expanded set of resources. Exelon and IMG Midstream/Tangibl

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<sup>55</sup> EPSA Comments (on SPP Report) at 5; Golden Spread Comments at 1-2.

<sup>56</sup> Golden Spread Comments at 1-2.

<sup>57</sup> PJM Market Monitor Comments at 2-3.

<sup>58</sup> *Id.* at 2.

recommend that the definition of fast-start resources be technology agnostic.<sup>59</sup> EPSA and Entergy support expanding MISO's ELMP pricing to include units that can respond within thirty minutes and to include more emergency demand response resources.<sup>60</sup> EPSA/NEPGA also supports prioritizing fast-start demand response resource pricing.<sup>61</sup> IMG Midstream/Tangibl states that PJM's and CAISO's definitions of fast-start resources do not coincide with the definition used by other RTOs/ISOs, which define fast-start resources as being able to start up within ten minutes, rather than two hours as defined by PJM and CAISO. Further, IMG Midstream/Tangibl argues that PJM's definition inappropriately rewards less flexible resources.<sup>62</sup> IMG Midstream/Tangibl recommends that the Commission direct PJM and CAISO to define stricter start-up time requirements for fast-start resources, or create two different classes for these resources to better

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<sup>59</sup> Exelon Comments at 13; IMG Midstream/Tangibl Comments 4-5.

<sup>60</sup> EPSA Comments (on MISO Report) at 10; EPSA Comments (on price formation) at 13; Entergy Comments at 7.

<sup>61</sup> EPSA/NEPGA Comments at 6-7.

<sup>62</sup> IMG Midstream/Tangibl Comments at 2-4, 6-8.

differentiate those that are truly fast-start from those that are not.<sup>63</sup> With respect to CAISO's Constrained Output Generator commitment process, EPSA/WPTF points out that not all fast-start resources are registered or would qualify for this process.<sup>64</sup>

## 2. Inclusion of Start-up and No-load Costs in Prices

23. Multiple commenters believe that the start-up and no-load costs of fast-start resources should be allowed to affect LMPs, particularly when a unit is within its minimum run time.<sup>65</sup> According to EEI, including start-up and no-load costs in appropriate markets could minimize uplift and result in more complete and accurate price signals for market participants.<sup>66</sup> DC Energy, Inertia Power, and Vitol note that both ISO-NE and MISO use reasonable methods of amortizing a fast-start resource's start-up costs over its minimum run time, and that resource's no-load costs over its actual run time, which appropriately includes these costs in prices.<sup>67</sup>

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<sup>63</sup> *Id.* at 4-5. However, CAISO states that regardless of whether a unit is classified as fast, medium, or long start, there is no special treatment for the commitment or pricing of that unit. CAISO Report at 4.

<sup>64</sup> EPSA/WPTF Comments at 5.

<sup>65</sup> DC Energy, Inertia Power, and Vitol Comments at 8-9; EEI Comments at 3; EPSA/P3 Comments at 5-6; Exelon Comments at 9-10; IMG Midstream/Tangibl Comments at 8-9; PSEG Companies Comments at 9. Exelon also states that PJM's concern that resources will chase prices if start-up and no-load costs are included in price should be resolved by imposing a penalty to resources that deviate from dispatch instructions. Exelon Comments at 12.

<sup>66</sup> EEI Comments at 3-4.

<sup>67</sup> DC Energy, Inertia Power, and Vitol Comments at 9.

24. EPSA/IPPNY urges the Commission to direct NYISO to review whether the start-up and no-load costs of fast-start resources should be allowed to affect LMPs and supports NYISO's current efforts in this regard.<sup>68</sup> Similarly, Golden Spread, Westar, and EPSA believe that SPP should incorporate the start-up and no-load costs of fast-start resources into the LMP<sup>69</sup> in order to reduce uplift and prevent price suppression.<sup>70</sup>

25. Conversely, the PJM Market Monitor states that PJM appropriately explains in its report the likely negative impacts of including start-up and no-load costs in PJM's price-setting logic.<sup>71</sup> PJM argues that to account for start-up costs in LMP would involve assumptions regarding the run time of a fast-start resource in order to amortize these costs over that period. PJM contends that assumptions regarding actual run time would introduce uncertainty and error in LMP calculations and cause potential divergence between the dispatch instructions given to a resource and the LMP at the resource's location.<sup>72</sup> In addition, PJM explains that incorporating no-load costs into the calculation of LMP would represent a significant change to the status quo and produce negligible

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<sup>68</sup> EPSA/IPPNY Comments at 6.

<sup>69</sup> As noted previously, SPP determines a unit's offer curve by combining start-up and no-load adders with the unit's energy offer curve. However, only the energy component is used to set LMP. SPP Report at 8.

<sup>70</sup> EPSA Comments (on SPP Report) at 8; Golden Spread Comments at 1-2; Westar Comments at 3-4.

<sup>71</sup> PJM Market Monitor Comments at 1.

<sup>72</sup> PJM Report at 10.



benefits. PJM asserts that such a change would introduce a divergence between LMPs and dispatch signals for all resources.<sup>73</sup>

26. CAISO asserts that LMPs are intended to reflect the incremental cost of serving load, which does not include commitment costs, but states that the logic by which the no-load costs of block-loaded Constrained Output Generators are included in LMPs could be extended to other resources with a limited operating range.<sup>74</sup>

### 3. Relaxation of Economic Minimum Operating Limit

27. Several commenters argue that the economic minimum operating limit of block-loaded or fast-start resources should be relaxed to zero when determining prices. EPSA, EPSA/P3, Exelon, and PSEG Companies argue that PJM's practice of relaxing the economic minimum operating limit by at most ten percent limits the ability for block-loaded resources to set LMPs whenever they are required to meet load and prevents a full consideration of a block-loaded resource's costs.<sup>75</sup> PSEG Companies requests that the Commission find that relaxing a block-loaded fast-start resource's minimum operating limit to zero (i.e., relaxing the minimum operating limit by 100 percent) is the best practice because it ensures that block-loaded resources can set the price whenever they

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<sup>73</sup> *Id.* at 10.

<sup>74</sup> CAISO Report at 12.

<sup>75</sup> EPSA Comments (on MISO Report) at 6; EPSA/P3 Comments at 6; Exelon Comments at 12; PSEG Companies Comments at 4-5.

are needed.<sup>76</sup> PJM argues that because it limits the relaxation of the economic minimum operating limit by at most ten percent, over-generation is kept to a minimum and any imbalances are managed by existing grid services.<sup>77</sup>

28. EPSA encourages the Commission to direct all RTOs/ISOs to incorporate the principles exemplified by MISO's ELMP pricing logic, which it believes relaxes economic minimum operating limits in a pricing run that occurs after the dispatch run, and appears to have resulted in robust dispatch operations and not resulted in significant over-generation. EPSA states that such logic will help adequately compensate resources for their distinct capabilities through LMPs and lead to efficient and orderly dispatch.<sup>78</sup>

29. NYISO states that it allows block-loaded resources to be considered as fully dispatchable from zero to their upper limit when determining prices so that these resources can set the price whenever they are needed to meet load.<sup>79</sup> NYISO argues that not treating such resources as fully dispatchable could prevent these resources from setting prices, especially in load pockets within New York where only block-loaded resources are available to meet reliability needs.<sup>80</sup>

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<sup>76</sup> PSEG Companies Comments at 7.

<sup>77</sup> PJM Report at 12.

<sup>78</sup> EPSA Comments (on MISO Report) at 12-13.

<sup>79</sup> NYISO Report at 5.

<sup>80</sup> *Id.* at 5.

#### 4. Offline Fast-Start Resources

30. Several commenters express concern that allowing offline resources to set prices when they are not actually capable of resolving a transmission or reserve shortage could lead to inaccurate price signals.<sup>81</sup> Specifically, Entergy, EPSA, and Westar express concern that MISO is over-including offline resources in price setting even when they are not available to serve an increase in demand.<sup>82</sup> Westar further states that the use of offline unit costs can inappropriately prevent scarcity price signals, prevent online resources with higher costs from setting the price, lead to increased uplift, and result in prices that do not represent the true marginal cost of production.<sup>83</sup> To remedy this issue, EPSA argues that MISO must make significant improvements to its dispatch modeling and pricing processes in order to allow offline resources to set prices only when these resources are both economic and available.<sup>84</sup> MISO states that it allows offline fast-start resources to set LMP, but has, per guidance from its market monitor, revised its commitment methodology to better reflect unit economics and availability.<sup>85</sup>

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<sup>81</sup> Entergy Comments at 7; EPSA Comments (on MISO Report) at 6-8; Exelon Comments at 13; Westar Comments at 4-5.

<sup>82</sup> Entergy Comments at 7; EPSA Comments (on MISO Report) at 6-8; Westar Comments at 4-5.

<sup>83</sup> Westar Comments at 4-5.

<sup>84</sup> EPSA Comments (on MISO Report) at 6.

<sup>85</sup> MISO Report at 11-14.

31. CAISO does not believe that allowing offline resources to contribute to LMP would lead to the most economical market solution.<sup>86</sup> CAISO explains that it clears its markets using classical unit commitment methodologies where the objective is to minimize the overall system costs, including the commitment costs. Under this approach, CAISO states that offline resources would not be committed in CAISO markets because they are considered to not lead to the most economical solution. PJM and ISO-NE argue that, since LMP is based on the cost of the next incremental unit of energy at that moment in time and an offline resource cannot provide that next incremental unit of energy, offline resources should not be eligible to set prices.<sup>87</sup>

32. With respect to NYISO's treatment of offline resources, LIPA states that NYISO's model reflects the availability of offline units in LMPs while not accurately representing the actual flexibility of the system. LIPA explains that this leads to inefficient pricing and system dispatch, as well as excessive start-ups of offline units.<sup>88</sup>

##### **5. Day-Ahead and Real-Time Market Consistency**

33. Commenters also generally support the use of fast-start pricing in both the day-ahead and real-time markets. Some commenters contend that RTOs/ISOs should use consistent fast-start pricing for both day-ahead and real-time models to encourage price

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<sup>86</sup> CAISO Report at 10.

<sup>87</sup> PJM Report at 11; ISO-NE Report at 10.

<sup>88</sup> LIPA Comments at 4.

convergence, regardless of how infrequently fast-start units are committed in the day-ahead market.<sup>89</sup> Entergy supports MISO's past efforts to implement ELMP as a day-ahead and real-time market platform such that LMP reflects the true marginal cost of production.<sup>90</sup> PJM states that its fast-start pricing logic is applied to both markets in order to reflect the costs of resources operated to address transmission constraints in both day-ahead and real-time LMPs.<sup>91</sup> On the other hand, ISO-NE states that its revised fast-start pricing is being implemented in the real-time market only.<sup>92</sup> ISO-NE explains that implementation in the day-ahead market would have a smaller beneficial impact given that most fast-start resources do not clear in the day-ahead market. ISO-NE states that this is especially true with respect to fossil fuel fast-start resources, which have inherently high operating costs and primarily operate in response to unanticipated real-time system conditions.<sup>93</sup>

**C. Need for Reform of Fast-Start Pricing**

34. We preliminarily find that RTOs'/ISOs' existing practices regarding the pricing of fast-start resources may result in rates that are unjust and unreasonable.

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<sup>89</sup> DC Energy, Inertia Power, and Vitol Comments at 9-10.

<sup>90</sup> Entergy Comments at 7.

<sup>91</sup> PJM Report at 13.

<sup>92</sup> ISO-NE Report at 16-17.

<sup>93</sup> ISO-NE Report at 16.

35. The Commission has stated that the goals of price formation are to: (1) maximize market surplus for consumers and suppliers; (2) provide correct incentives for market participants to follow commitment and dispatch instructions, make efficient investments in facilities and equipment, and maintain reliability; (3) provide transparency so that market participants understand how prices reflect the actual marginal cost of serving load and the operational constraints of reliably operating the system; and (4) ensure that all suppliers have an opportunity to recover their costs.<sup>94</sup> The accurate pricing of fast-start resources can advance price formation goals by more transparently reflecting the marginal cost of serving load, which will reduce uplift costs and thereby improve price signals to support efficient investments in facilities and equipment.

36. While most RTOs/ISOs have incorporated some form of fast-start pricing into their market-clearing software, based on experience with the different fast-start pricing used by each RTO/ISO, we believe some practices have emerged that better represent the marginal cost of serving load. Specifically, we believe that some existing fast-start pricing practices, or a lack of fast-start pricing practices, may result in market prices that fail to accurately reflect the marginal cost of serving load. These prices may fail to reflect the value of fast-start resources and create unnecessary uplift payments.

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<sup>94</sup> See Notice Inviting Post-Technical Workshop Comments, Docket No. AD14-14-000 at 2 Price Formation in Energy and Ancillary Services Market Operated by Transmission Organizations and Independent System Operators, Notice, Docket No. AD14-14-000.

37. For the reasons outlined below, we preliminarily find that such market outcomes may produce rates that are unjust and unreasonable. First, we preliminarily find that some current RTO/ISO practices may fail to accurately reflect the marginal cost of serving load because fast-start resources are inappropriately prevented from setting prices.<sup>95</sup> Fast-start resources are often dispatched to meet real-time system needs but are often ineligible to set the clearing price because these resources are either dispatched at an economic minimum operating limit or are block-loaded. This is the case because LMP is set by the offer of the resource that is dispatched up to serve the next additional MW of demand or dispatched down to accommodate the next MW of reduced demand. Fast-start resources often have little or no dispatch range (i.e., their economic minimum operating limit equals their economic maximum operating limit). A resource that is operating inflexibly at its economic minimum operating limit or economic maximum operating limit is not dispatchable to serve an additional increment or decrement of demand, so is not eligible to set prices.<sup>96</sup> Rules or modeling practices that prevent fast-start resources from setting prices result in prices that fail to reflect the cost of the marginal resource on the system when that resource is needed to serve load.

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<sup>95</sup> See *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,067, at P 38 (2012) (finding that MISO’s LMP pricing algorithm, which prohibited fast-start resources from setting the market clearing price, “may produce an inaccurate price signal”).

<sup>96</sup> See Federal Energy Regulatory Commission, *Price Formation in Organized Wholesale Electricity Markets: Staff Analysis of Operator-Initiated Commitments in RTO and ISO Markets*, Docket No. AD14-14-000, at 26-27 (Dec. 2014), <http://www.ferc.gov/legal/staff-reports/2014/AD14-14-operator-actions.pdf>.

38. While PJM and NYISO allow certain block-loaded resources to set prices, they do not generally allow fast-start resources that are not block-loaded to set prices. CAISO allows only certain block-loaded and nearly block-loaded resources to set prices. In addition, PJM's practice of relaxing the economic minimum operating limits of block-loaded resources by at most ten percent could restrict the set of circumstances in which such a resource could set prices.

39. Second, even if fast-start resources were allowed to set prices, certain other aspects of some current RTO/ISO fast-start pricing practices, such as not choosing to include commitment costs, can prevent prices from accurately reflecting the marginal cost of serving load. Because of their operating characteristics, fast-start resources are uniquely situated to respond to unforeseen real-time system needs. When fast-start resources are committed in real-time, it is often at short notice to meet some system condition or market need over a short time period, and, as such, we preliminarily find that these commitment costs should be considered marginal costs. However, this is not the current practice in all RTOs/ISOs, and we preliminarily find that market rules in some RTOs/ISOs that prevent prices from reflecting commitment costs of fast-start resources may contribute to inaccurate price signals.

40. Third, some current practices regarding the use of offline resources to set prices in certain RTOs/ISOs may distort price signals. For example, MISO allows offline fast-start resources to set prices under transmission constraint violations or reserve shortage conditions, although sometimes such resources are not feasible (i.e., the resources are not able to start up quickly enough to address the shortage or transmission constraint



violation) or economic for addressing the shortage or transmission constraint violation.<sup>97</sup>

If an offline fast-start resource is not actually feasible or economic for addressing a shortage or transmission constraint violation, then the resulting prices could be inefficiently low and mute the price signals associated with shortages or transmission constraint violations.<sup>98</sup>

41. Fourth, we are concerned that implementation of fast-start pricing in the real-time market only, or implementation of fast-start pricing practices in the day-ahead market that are significantly different from the real-time market, can negatively impact day-ahead and real-time price convergence and may result in day-ahead market prices that fail to reflect the marginal cost of fast-start resources. Furthermore, even though some RTOs/ISOs have implemented some form of fast-start pricing in the day-ahead market, current rules limit which resources qualify as fast-start resources in a manner that is inconsistent with the requirements herein.

42. Accordingly, we preliminarily find that, based on experience with existing RTO/ISO fast-start pricing practices, some forms of fast-start pricing may result in prices that fail to reflect the marginal cost of production in intervals when fast-start resources

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<sup>97</sup> MISO, Informational Report on Extended Locational Marginal Pricing, Docket No. ER12-668-000, at 9 (Aug. 29, 2016). MISO states that for reserve shortages, 53 percent of participating offline fast-start units were feasible and economic. For transmission violations, it states that 77 percent of participating offline units were feasible and economic.

<sup>98</sup> See, e.g., Potomac Economics, 2015 State of the Market Report for the MISO Electricity Markets at 33 (June 2016).

are needed to serve load. As a result, prices in RTO/ISO energy markets in some periods may not reflect the value that fast-start resources provide. As a result, over the long run, prices in RTO/ISO energy markets may fail to reflect the need for fast-start resources and thus fail to provide appropriate incentives for investment.

43. We also preliminarily find that existing RTO/ISO fast-start pricing could create unnecessary uplift payments. For example, when prices do not sufficiently reflect a marginal fast-start resource's commitment cost, the resource must be compensated through out-of-market uplift payments. Compensating resources through uplift payments is less transparent than compensating resources through market clearing prices that reflect the marginal cost of production, which could be based on the costs of a fast-start resource. Additionally, uplift payments are often allocated more broadly, which can mute the investment signals provided by prices over longer time periods, therefore inhibiting efficient market entry and exit. In addition, resources with costs below the market-clearing price may also have a lower financial incentive to perform at times when

fast-start resources typically operate, such as during stressed system conditions, when the performance of all resources is particularly important.<sup>99</sup>

**D. Commission Proposal**

44. To remedy the potentially unjust and unreasonable rates caused by existing RTO/ISO fast-start pricing practices, we propose, pursuant to section 206 of the Federal Power Act,<sup>100</sup> to establish a set of fast-start pricing requirements in RTOs/ISOs. These requirements would ensure RTO/ISO day-ahead and real-time markets more accurately reflect the marginal costs of operating fast-start resources. Specifically, we propose to require each RTO/ISO to establish the following set of requirements for its fast-start pricing: (1) apply fast-start pricing to any resource committed by the RTO/ISO that is able to start up within ten minutes, has a minimum run time of one hour or less, and that submits economic energy offers to the market; (2) incorporate commitment costs, i.e., start-up and no-load costs, of fast-start resources in energy and operating reserve prices; (3) modify fast-start pricing to relax the economic minimum operating limit of fast-start resources and treat them as dispatchable from zero to the economic maximum operating limit for the purpose of calculating prices; (4) if the RTO/ISO allows offline fast-start resources to set prices for addressing certain system needs, the resource must be

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<sup>99</sup> *Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 825, FERC Stats. & Regs. ¶ 31,384, at P 58 & n.99 (2016).

<sup>100</sup> 16 U.S.C. 824e (2012).

feasible and economic; and (5) incorporate fast-start pricing in both the day-ahead and real-time markets. We seek comment on each of these proposals.

45. We expect that the proposed reforms will remedy current RTO/ISO fast-start pricing practices that potentially lead to unjust and unreasonable rates and will provide benefits that are consistent with the goals of the Commission's price formation initiative. For instance, the proposed reforms are intended to more accurately reflect the marginal cost of production in periods when a fast-start resource is the marginal resource and provide price signals that better inform investment decisions, including where and when fast-start resources should be built or maintained. The proposed reforms will also benefit markets by providing more accurate and transparent price signals that better reflect the actual marginal cost of serving load and reduce uplift.

**1. Fast-Start Resource Definitions and Resource Eligibility**

46. In order to establish consistent treatment for fast-start resources across RTOs/ISOs and ensure that prices appropriately reflect the cost of serving load, we propose to require that each RTO/ISO must define fast-start resources as resources that meet the following performance requirements:<sup>101</sup> (1) are able to start up within ten minutes or less; (2) have a minimum run time of one hour or less; and (3) submit economic energy offers to the market, i.e., not self-scheduling energy. We preliminarily find that this definition of fast-

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<sup>101</sup> RTOs/ISOs would need to routinely assess a resource's currently effective parameters and status prior to conferring fast-start pricing eligibility.

start resources will address the deficiencies in current RTO/ISO fast-start pricing practices that limit the eligibility of certain fast-start resources to set prices.<sup>102</sup> In addition, any resource, regardless of technology type, that meets the above definition would qualify as a fast-start resource and would then be covered by the fast-start pricing requirements, as defined further herein.

47. We preliminarily find that it is appropriate to include both dispatchable fast-start resources and block-loaded fast-start resources in the definition of a fast-start resource, as is done in ISO-NE and MISO. That is, some fast-start resources are committed and dispatched to an output level equal to the resource's economic minimum operating limit that is lower than the resource's economic maximum operating limit. Such a resource would not be eligible to set prices in all circumstances and would therefore create the same concerns we have regarding block-loaded fast-start resources. Further, if only block-loaded fast-start resources are included in the definition, as is done in CAISO and NYISO, certain resources could have the incentive to restrict the operating range in their energy supply offers.<sup>103</sup> Moreover, it appears that a variety of technologies beyond

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<sup>102</sup> *See supra* section II.C. We understand that this proposed definition of fast-start resource could require changes to previously approved RTO/ISO pricing practices. However, as discussed further below, we seek comment on this proposed definition, and will consider these comments in the development of any Final Rule in this proceeding.

<sup>103</sup> For example, if only block-loaded fast-start resources are eligible for fast-start pricing, some resources may have an incentive to reduce their dispatchable range, which could lead to inefficient results, such as a reduction in system flexibility.

conventional generation can and should be eligible for dispatch under fast-start pricing. For example, both MISO and ISO-NE allow certain demand response resources to set prices under their fast-start pricing.<sup>104</sup> Given that a variety of resources could be the last resource dispatched to serve load (i.e., the marginal resource), we propose to use the performance requirements noted earlier to define fast-start resources, rather than specific technological characteristics.

48. We seek comment on this proposed definition of fast-start resources. For example, we seek comment on whether the definition of fast-start resources should include resources that have start-up times of greater than ten minutes. Similarly, we seek comment on whether the definition of fast-start resources should include resources with minimum run times of longer than one hour. We also seek comment on whether there are other characteristics that should be included in the definition of fast-start resources. Additionally, we seek comment on any additional tariff changes that may be necessary to implement the reforms proposed herein. Finally, we seek comment on whether this proposed definition should instead define minimum standards for each operating characteristic necessary to be considered a fast-start resource, to, among other things, allow regional variation.

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<sup>104</sup> MISO, FERC Electric Tariff, Schedule 29A, ELMP for Energy and Operating Reserve Market: Ex-Post Pricing Formulations (40.0.0); ISO-NE, Transmission, Markets and Services Tariff, Market Rule 1, § III.2.4 (19.0.0).

## 2. Inclusion of Start-up and No-load Costs in Prices

49. We propose to require RTOs/ISOs to allow fast-start resources' commitment costs, i.e., start-up and no-load costs,<sup>105</sup> to be reflected in prices. Specifically, we propose to require that, in the pricing run, each RTO/ISO determine prices by calculating an enhanced energy offer for each fast-start resource that includes not just the incremental energy offer but also incorporates start-up and no-load costs. Specifically, the enhanced energy offer should include the following components: (1) the incremental energy offer; (2) the amortized start-up cost; and (3) an amortized portion of the no-load cost, as described below. The enhanced energy offer can only be used to set prices during the resource's minimum run time, as discussed further below.

50. To incorporate a fast-start resource's start-up and no-load costs into prices, we propose to define specific formulations. Recognizing that commitment costs may be determined in different ways in RTOs/ISOs, these proposals are not intended to alter how a resource's start-up and no-load costs are calculated. To incorporate a fast-start resource's start-up cost into prices, we propose to define a resource's amortized start-up cost as equal to its start-up cost divided by the product of its economic maximum operating limit and minimum run time. To determine the portion of a fast-start resource's no-load costs that is reflected in prices, we propose to define the amortized no-load cost

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<sup>105</sup> No-load costs are the theoretical costs in \$/hour for operating a resource at zero MW output.

as the no-load cost divided by the resource's economic maximum operating limit. For both amortized start-up and no-load costs, we propose to accept any mathematically equivalent formula.<sup>106</sup>

51. We preliminarily find that given the unique operating characteristics of fast-start resources, their commitment costs, i.e., start-up and no-load costs, should be viewed as marginal costs and, as such, should be included in prices. The Commission previously accepted MISO's ELMP methodology, which allows commitment costs to affect prices. There, the Commission found that incorporating the commitment costs of fast-start resources in prices leads to prices that better reflect the costs of committing and dispatching resources.<sup>107</sup> Moreover, incorporating a fast-start resource's start-up and no-load costs would ensure that prices reflect the actual marginal cost of production and will thus reduce uplift.

52. As noted above, we propose that the enhanced energy offer can only be used to set prices during the resource's minimum run time. While it could be argued that commitment costs for fast-start resources are still marginal costs of operating the system even beyond a fast-start resource's minimum run time, attempting to amortize start-up costs beyond the minimum run time is problematic from a practical standpoint,

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<sup>106</sup> For instance, the RTO/ISO could introduce a fractional commitment variable for fast-start resources within the market pricing algorithm. Adding such a variable provides an additional option of introducing a portion of the capability of a resource in the solution while adding only an equivalent fraction of the amortized commitment cost.

<sup>107</sup> *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,067 at P 39.



specifically in the real-time market. This is because, after the minimum run time is completed, the unit commitment algorithm may decommit the fast-start resource if it is no longer economic, making the total run time unknown. When the actual run time of the fast-start resource is unknown, it is difficult to define an appropriate period over which to amortize that resource's start-up cost. Given that the resource must operate for no less than its minimum run time, we believe that amortizing a fast-start resource's commitment costs during this period represents a reasonable approach.<sup>108</sup>

53. We seek comment on the proposal to include a fast-start resource's start-up and no-load costs as marginal costs. We also seek comment on whether to amortize commitment costs for the purpose of calculating prices, and the proposed formulas to amortize these costs. In particular, we understand that the amortization period for commitment costs acts as a proxy for the timeframe over which the committed fast-start resource is likely to be marginal. Therefore, we seek comment on whether there are better or alternative timeframes over which commitment costs for fast-start resources should be amortized. We also specifically seek comment on whether the economic maximum operating limit is the appropriate value to use when amortizing start-up and no-load costs or whether another capacity value may be more appropriate.

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<sup>108</sup> This proposal does not address RTOs/ISOs including no-load costs in prices beyond a fast-start resource's minimum run time.

### 3. Relaxation of Economic Minimum Operating Limit

54. We propose to require RTOs/ISOs, in the pricing run, to relax to zero each fast-start resource's economic minimum operating limit, thereby treating these resources as fully dispatchable for the purpose of calculating prices. Relaxing the economic minimum operating limit of a fast-start resource to zero will permit an inflexible or mostly inflexible fast-start resource to be treated as dispatchable by the RTO/ISO market software during the pricing run. The purpose of this proposal is to enable a fast-start resource to set the market clearing price if it is, indeed, the marginal unit needed to serve load. Additionally, RTOs/ISOs must ensure that they sufficiently address over-generation concerns. Specifically, each RTO/ISO must ensure that physical dispatch instructions to resources do not result in over-generation and must have market rules that address the potential for over-generation due to deviations from dispatch instructions. As noted above, RTOs/ISOs with fast-start pricing already use penalties and/or opportunity cost payments to ensure that resources adhere to scheduled dispatch instructions.<sup>109</sup> We propose that, as part of its compliance filing to any Final Rule, each RTO/ISO should either demonstrate that its current practices meet the requirements established here to address over-generation, or propose additional tariff changes to do so.

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<sup>109</sup> See *supra* section II.A; MISO, FERC Electric Tariff, § 40.3.4 (33.0.0) (charges for excessive or deficient energy deployment); ISO-NE, Transmission, Markets and Services Tariff, Market Rule 1, § III.F.2.3.10 (24.0.0) (lost opportunity cost credit for resources displaced by fast-start resources).

55. We seek comment on whether there are challenges associated with relaxing the economic minimum operating limit for the pricing run. We also seek comment on any over-generation concerns, such as whether over-generation can be managed through penalties for deviations, opportunity cost payments, or other existing mechanisms. Additionally, we seek comment on alternative methods to treat fast-start resources as fully dispatchable for the purpose of calculating prices.

#### **4. Offline Fast-Start Resources**

56. Allowing offline fast-start resources to set prices can better reflect the cost of providing energy at a given location or of meeting reserve requirements. For instance, if the real-time dispatch algorithm optimizes spinning reserve<sup>110</sup> supply among online resources and these online resources are not sufficient to meet the RTO's/ISO's spinning reserve requirements, the dispatch algorithm will determine there is a shortage of spinning reserve and implement the appropriate shortage pricing. However, in such circumstances, while online resources may not be sufficient to meet spinning reserve requirements, there may be offline fast-start resources that can quickly provide energy in the same time frame as spinning reserve. If RTOs/ISOs do not adequately consider all resources that are available to meet system needs, including fast-start resources that are offline, this may result in the use of administrative pricing or other measures (e.g., committing additional resources) that are less economically efficient because they

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<sup>110</sup> Spinning reserve refers to reserve capacity that is online and synchronized to the system and is ready to meet electric demand within ten minutes of a dispatch instruction by an RTO/ISO.

do not reflect the availability of less expensive fast-start resources that could resolve the issue and thus result in higher overall system costs. Allowing RTOs/ISOs to include offline fast-start resources may have benefits; however, we do not propose to require that all RTOs/ISOs allow offline resources to set prices. Instead, we propose to establish certain requirements for those RTOs/ISOs that choose to allow offline fast-start resources to set prices.

57. While allowing offline fast-start resources to set prices can be beneficial, it is imperative that the offline resources actually be feasible (i.e., able to start quickly) and economic for addressing certain system needs.<sup>111</sup> For example, an offline fast-start resource that has not reached its minimum down time would not actually be able to start to remedy a transmission constraint violation, energy shortage, or reserve shortage. Such an offline fast-start resource is not a feasible option to resolve the system issue and should not be allowed to set prices. Further, if online resources were not able to meet an RTO's/ISO's spinning reserve requirement, the dispatch algorithm would calculate the price based on an applicable shortage price. However, if offline fast-start resources are considered, there may be an offline fast-start resource that can be used to meet the spinning reserve requirement at a price lower than the shortage price. If, for example, the shortage price for spinning reserve was \$80/MWh, it would only be economic to

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<sup>111</sup> See Order No. 825, FERC Stats. & Regs. ¶ 31,384 at P 168 (“... we agree with Potomac Economics that if an RTO's/ISO's pricing model allows infeasible or uneconomic units to set prices, the offline units represent an artificial increase in real-time supply that will depress real-time prices.”).

allow a fast-start resource to set prices if the full cost to operate the resource was less than \$80/MWh. To accurately reflect the full cost of operating the fast-start resource, its offer would need to include start-up costs and no-load costs (amortized over a certain timeframe and capacity value). If the offline fast-start resource set prices at a level that did not reflect its full cost of operation, the resulting prices could be inefficiently low. For instance, if the offline fast-start resource set the spinning reserve price based on an offer that included only its incremental energy cost of \$75/MWh, the resource would be setting the spinning reserve price, even though, if its full cost of operation was considered, it may not be more economic than establishing the shortage price of \$80/MWh.

58. We propose to allow offline fast-start resources to be eligible to set prices if the resource is feasible and economic. As a threshold requirement, an offline fast-start resource may only be used to set prices (1) during a transmission constraint violation; or (2) if energy or ancillary service shortage conditions exist. Transmission constraint violations are defined as any instance where a transmission constraint is exceeded because the cost of redispatching resources to resolve the constraint is greater than the penalty factor associated with that constraint.<sup>112</sup> Energy or ancillary service shortage conditions are defined as any instance where prices for energy or ancillary services are calculated using administrative prices as defined in the RTO's/ISO's tariff. To be

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<sup>112</sup> See Comments of Potomac Economics, Docket No. AD14-14-000, at 20 (Feb. 24, 2015).

considered feasible, we propose that an offline fast-start resource must meet the following criteria: (1) have a start-up time of ten minutes or less; (2) have a generation shift factor of no less than 5 percent on the applicable transmission constraint that is being exceeded; and (3) must not have any operational constraints that would prevent the resource from starting and providing energy.<sup>113</sup> We preliminarily find that a start-up time of ten minutes or less will ensure that offline fast-start resources are feasible to address transmission constraint violations or reserve shortages in a timeframe that is consistent with applicable facility ratings and contingency reserve deployment periods. Similarly, we preliminarily find that requiring a generation shift factor of no less than 5 percent will ensure that an offline fast-start resource used to set price during a transmission constraint violation can actually relieve the constraint if started. This minimum generation shift factor is similar to the threshold used in MISO, which is 6 percent.<sup>114</sup> To be considered economic, the RTO/ISO's fast-start pricing must consider the full cost of an offline fast-start resource, including its amortized start-up and no-load costs. The offline fast-start resource's full cost must be less than the administrative shortage price for the shortage or transmission constraint violation the resource is resolving.

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<sup>113</sup> For example, the resource cannot be within its minimum down time and must not be prevented from starting due to environmental restrictions, fuel use restrictions, or other operational restrictions.

<sup>114</sup> MISO, FERC Electric Tariff, Schedule 29A, ELMP for Energy and Operating Reserve Market: Ex-Post Pricing Formulations (40.0.0), §§ II.B, III.B.

59. We seek comment on the proposal to reflect the costs of offline fast-start resources in prices in certain circumstances. Specifically, we seek comment on whether we should establish a standard amortization period for the commitment costs of offline fast-start resources for all RTOs/ISOs, similar to online fast-start resources, or whether RTOs/ISOs should be allowed to propose an amortization period on compliance. To determine a resource's full cost for the purpose of pricing, RTOs/ISOs could amortize a resource's costs over a particular time period. We also seek input on any additional rules for offline fast-start resources to ensure they will respond in time to meet the system needs beyond requiring that they be feasible and economic for addressing system needs. We also seek comment on the market conditions under which offline fast-start resources should be able to set prices (e.g., transmission constraint violations, energy or operating reserve shortages).

##### **5. Day-Ahead and Real-Time Market Consistency**

60. We propose to require RTOs/ISOs to incorporate fast-start pricing in both the day-ahead and real-time markets. We preliminarily find that doing so provides a more accurate price signal in the day-ahead market and supports price convergence between the day-ahead and real-time markets.

61. As discussed above, fast-start resources are frequently used to quickly respond to real-time system conditions. However, under certain market conditions, such as high day-ahead demand or persistent congestion patterns, fast-start resources may economically clear the day-ahead market. For reasons similar to the ones discussed above, we believe that when these resources economically clear the market, market prices

should reflect the marginal cost of these resources. By allowing fast-start resources to set prices, RTO/ISO markets will send a transparent price signal that more accurately reflects marginal costs.

62. We further preliminarily find that requiring consistent pricing practices in both the day-ahead and real-time markets will lead to better price convergence, and therefore we believe these benefits merit implementation of fast-start pricing in both the day-ahead and real-time markets. Absent consistent pricing in both the day-ahead and real-time markets, day-ahead and real-time market prices may be different even under similar market conditions. For example, the day-ahead and real-time markets in ISO-NE could produce different energy prices even under identical market conditions because the day-ahead market does not incorporate the commitment costs of fast-start resources in energy prices.

63. We seek comment on the proposal to incorporate consistent fast-start pricing in both day-ahead and real-time markets. Specifically, we acknowledge that implementation in the day-ahead market may have a smaller benefit given that most fast-start resources clear in the real-time market, and we thus seek comment on the extent to which there are benefits or drawbacks to applying the proposed reforms to both the day-ahead and real-time markets, as opposed to only the real-time markets. Further, we seek comment on whether there are any reasons for establishing different fast-start pricing practices in the day-ahead and real-time markets. In particular, we seek comment on including commitment costs in the day-ahead market given different forecast,



optimization, and commitment time horizons than the real-time market, where fast-start units can have brief dispatch periods to meet system needs.

## 6. Additional Comments Sought on This Proposal

64. We seek comment on the need for reform and on the five proposals outlined above.<sup>115</sup> We also seek comment on whether allowing fast-start resources to set prices could result in the exercise of market power. For example, the concentrated ownership of fast-start resources could raise market power concerns that are not addressed in existing RTO/ISO market power mitigation procedures.<sup>116</sup>

65. We recognize the potential that the proposed reforms may require significant changes to RTO/ISO software systems, which can be a complex and costly endeavor. We seek comment on the required software changes, updates to optimization modeling and parameter inputs, estimated costs and time necessary to implement aspects

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<sup>115</sup> These five proposals are: (1) an RTO/ISO must apply fast-start pricing to any resource committed by the RTO/ISO that is able to start up within ten minutes, has a minimum run time of one hour or less, and that submits economic energy offers to the market; (2) an RTO/ISO should incorporate commitment costs of fast-start resources in energy and operating reserve prices; (3) an RTO/ISO must modify its fast-start pricing to relax the economic minimum operating limit of fast-start resources and treat them as dispatchable from zero to the economic maximum operating limit for the purpose of calculating prices; (4) if an RTO/ISO allows offline fast-start resources to set prices for addressing certain system needs, the resource must be feasible and economic; and (5) an RTO/ISO must incorporate fast-start pricing in both the day-ahead and real-time markets.

<sup>116</sup> Such procedures could include any procedures or conduct and impact tests that provide offer and physical operating parameter mitigation for economic withholding, physical withholding, or out-of-market commitment.

of the reforms proposed in this NOPR, and any additional considerations for implementing the requirements proposed herein.

### **III. Compliance**

66. We propose to require that each RTO/ISO submit a compliance filing within 90 days of the effective date of any eventual Final Rule in this proceeding to demonstrate that it meets the proposed requirements set forth in any Final Rule. We note that this compliance deadline is for RTOs/ISOs to submit proposed tariff changes or otherwise demonstrate compliance with any Final Rule. We understand that implementing the reforms required by any Final Rule in this proceeding may be a complex endeavor. However, we preliminarily find that implementation of these reforms is important to ensure rates remain just and reasonable. Therefore, we propose that tariff changes filed in response to a Final Rule in this proceeding must become effective no more than six months after compliance filings are due. We seek comment on this proposed compliance timeline.

67. We seek comment on the proposed deadline for RTOs/ISOs to submit the compliance filing 90 days following the effective date of any Final Rule in this proceeding. Specifically, we seek comment on whether 90 days is sufficient time for RTOs/ISOs to develop new tariff language in response to any Final Rule.

68. To the extent that any RTO/ISO believes that it already complies with the reforms proposed in this NOPR, the RTO/ISO would be required to demonstrate how it complies in the compliance filing required 90 days after the effective date of any Final Rule in this proceeding. To the extent that any RTO/ISO seeks to argue on compliance that its

existing market rules are consistent with or superior to the reforms adopted in any Final Rule, the Commission will entertain those at that time.<sup>117</sup>

#### **IV. Information Collection Statement**

69. The Paperwork Reduction Act (PRA)<sup>118</sup> requires each federal agency to seek and obtain Office of Management and Budget (OMB) approval before undertaking a collection of information directed to ten or more persons or contained in a rule of general applicability. OMB regulations<sup>119</sup> require approval of certain information collection requirements imposed by agency rules. Upon approval of a collection of information, OMB will assign an OMB control number and an expiration date. Respondents subject to the filing requirements of an agency rule will not be penalized for failing to respond to the collection of information unless the collection of information displays a valid OMB control number.

70. The reforms proposed in this NOPR would amend the Commission's regulations to improve the operation of organized wholesale electric power markets operated by RTOs/ISOs. The Commission proposes to require each RTO and ISO implement market

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<sup>117</sup> See, e.g., Order No. 825, FERC Stats. & Regs. ¶ 31,384 at P 72; *Demand Response Compensation in Organized Wholesale Energy Markets*, Order No. 745, FERC Stats. & Regs. ¶ 31,322, at P 4 & n.7, *order on reh'g and clarification*, Order No. 745-A, 137 FERC ¶ 61,215 (2011), *reh'g denied*, Order No. 745-B, 138 FERC ¶ 61,148 (2012), *vacated sub nom. Elec. Power Supply Ass'n v. FERC*, 753 F.3d 216 (D.C. Cir. 2014), *rev'd & remanded sub nom. FERC v. Elec. Power Supply Ass'n*, 136 S. Ct. 760 (2016).

<sup>118</sup> 44 U.S.C. 3507(d).

<sup>119</sup> 5 CFR 1320.

rules that meet certain requirements when pricing fast-start resources. The reforms proposed in this NOPR would require one-time filings of tariffs with the Commission and potential software upgrades to implement the reforms proposed in this NOPR. The Commission anticipates the reforms proposed in this NOPR, once implemented, would not significantly change currently existing burdens on an ongoing basis. With regard to those RTOs/ISOs that believe that they already comply with the reforms proposed in this NOPR, they could demonstrate their compliance in the compliance filing required 90 days after the effective date of any Final Rule in this proceeding. The Commission will submit the proposed reporting requirements to OMB for its review and approval under section 3507(d) of the Paperwork Reduction Act.<sup>120</sup>

71. While the Commission expects the adoption of the reforms proposed in this NOPR to provide significant benefits, the Commission understands implementation can be a complex endeavor. The Commission solicits comments on the accuracy of provided burden and cost estimates and any suggested methods for minimizing the respondents' burdens, including the use of automated information techniques. Specifically, the Commission seeks detailed comments on the potential cost and time necessary to implement aspects of the reforms proposed in this NOPR, including (1) hardware, software, and business processes changes; and (2) processes for RTOs/ISOs to vet proposed changes amongst their stakeholders.

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<sup>120</sup> 44 U.S.C. 3507(d) (2012).

72. Burden Estimate<sup>121</sup>: The Commission believes that the burden estimates below are representative of the average burden on respondents, including necessary communications with stakeholders. The estimated burden and cost for the requirements contained in this NOPR follow.<sup>122</sup>

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<sup>121</sup> Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, disclose, or provide information to or for a federal agency, including: “. . . (ii) Developing, acquiring, installing, and utilizing technology and systems for the purpose of collecting, validating, and verifying information; (iii) Developing, acquiring, installing, and utilizing technology and systems for the purpose of processing and maintaining information; (iv) Developing, acquiring, installing, and utilizing technology and systems for the purpose of disclosing and providing information . . . .” 5 C.F.R. § 1320.3(b)(1) (2016). The time, effort, and financial resources necessary to comply with a collection of information that would be incurred by persons in the normal course of their activities (e.g., in compiling and maintaining business records) will be excluded from the “burden” if the agency demonstrates that the reporting, recordkeeping, or disclosure activities needed to comply are usual and customary.

<sup>122</sup> For this information collection, the Commission staff estimates that industry is similarly situated in terms of hourly cost (wages plus benefits). Based on the Commission’s average cost (wages plus benefits) for 2016, the Commission is using \$74.50/hour.

	<b>Number of Respondents (1)</b>	<b>Annual Number of Responses per Respondent (2)</b>	<b>Total Number of Responses (1)*(2) )=(3)</b>	<b>Average Burden Hours &amp; Cost Per Response<sup>123</sup> (4)</b>	<b>Total Annual Burden Hours &amp; Total Annual Cost (3)*(4)=(5)</b>	<b>Cost per Respondent ( (\$) (5)÷(1)</b>
Tariff filing costs	6	1	6	80 hours, \$5,920	480 hours, \$35,520	
Implementation costs	6	1	6	3,853 hours, \$285,122	23,118 hours, \$1,710,732	
<b>TOTAL (one-time in Year 1)</b>				3,933 hours, \$291,042	23,598 hours, \$1,746,252	\$291,042

Cost to Comply: The Commission has projected the total cost of compliance, all within six months of a Final Rule plus initial implementation, to be \$1,746,252. After Year 1, the reforms proposed in this NOPR, once implemented, would not significantly change existing burdens on an ongoing basis.

*Title:* FERC-516E, NOPR in RM17-3.

*Action:* Proposed revisions to an information collection.

*OMB Control No.:* TBD.

*Respondents for this Rulemaking:* RTOs and ISOs.

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<sup>123</sup> The Commission staff anticipates that the average respondent for this collection is similarly situated to the Commission, in terms of salary plus benefits. Based upon FERC's 2016 annual average of \$154,647 (for salary plus benefits), the average hourly cost is \$74.50/hour.

*Frequency of Information:* One-time during year one.

*Necessity of Information:* The Commission proposes this rule to improve competitive wholesale electric markets in the RTO and ISO regions.

*Internal Review:* The Commission has reviewed the proposed changes and has determined that the changes are necessary. These requirements conform to the Commission's need for efficient information collection, communication, and management within the energy industry. The Commission has assured itself, by means of internal review, that there is specific, objective support for the burden estimates associated with the information collection requirements.

65. Interested persons may obtain information on the reporting requirements by contacting the following: Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426 [Attention: Ellen Brown, Office of the Executive Director], e mail: [DataClearance@ferc.gov](mailto:DataClearance@ferc.gov), Phone: (202) 502-8663, fax: (202) 273-

0873. Comments on the collection of information and the associated burden estimate in the proposed rule should be sent to the Commission in this docket and may also be sent to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, DC 20503 [Attention: Desk Officer for the Federal Energy Regulatory Commission], at the following e-mail address:

[oir\\_submission@omb.eop.gov](mailto:oir_submission@omb.eop.gov). Please refer to Docket No.: RM17-3, FERC-516E, OMB Control No. 1902- 0286 in your submission.

**V. Environmental Analysis**

73. The Commission is required to prepare an Environmental Assessment or an Environmental Impact Statement for any action that may have a significant adverse effect on the human environment.<sup>124</sup> We conclude that neither an Environmental Assessment nor an Environmental Impact Statement is required for this NOPR under section 380.4(a)(15) of the Commission's regulations, which provides a categorical exemption for approval of actions under sections 205 and 206 of the FPA relating to the filing of schedules containing all rates and charges for the transmission or sale of electric energy subject to the Commission's jurisdiction, plus the classification, practices, contracts and regulations that affect rates, charges, classifications, and services.<sup>125</sup>

**VI. Regulatory Flexibility Act**

74. The Regulatory Flexibility Act of 1980 (RFA)<sup>126</sup> generally requires a description and analysis of proposed rules that will have significant economic impact on a substantial number of small entities. The RFA mandates consideration of regulatory alternatives that accomplish the stated objectives of a rule and that minimize any significant economic impact on a substantial number of small entities. The Small Business Administration's

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<sup>124</sup> *Regulations Implementing the National Environmental Policy Act of 1969*, Order No. 486, FERC Stats. & Regs. ¶ 30,783 (1987).

<sup>125</sup> 18 C.F.R. 380.4(a)(15).

<sup>126</sup> 5 U.S.C. 601-12.



(SBA) Office of Size Standards develops the numerical definition of a small business.<sup>127</sup> These standards are provided on the SBA website.<sup>128</sup>

75. The SBA classifies an entity as an electric utility if it is primarily engaged in the transmission, generation and/or distribution of electric energy for sale. Under this definition, the six RTOs/ISOs are considered electric utilities, specifically focused on electric bulk power and control. The size criterion for a small electric utility is 500 or fewer employees.<sup>129</sup> Since every RTO/ISO has more than 500 employees, none are considered small entities.

76. Furthermore, because of their pivotal roles in wholesale electric power markets in their regions, none of the RTOs/ISOs meet the last criterion of the two-part RFA definition of a small entity: “not dominant in its field of operation.”<sup>130</sup> As a result, we certify that the reforms required by this NOPR would not have a significant economic impact on a substantial number of small entities.

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<sup>127</sup> 13 C.F.R. 121.101.

<sup>128</sup> U.S. Small Business Administration, *Table of Small Business Size Standards Matched to North American Industry Classification System Codes* (effective Feb. 26, 2016), [https://www.sba.gov/sites/default/files/files/Size\\_Standards\\_Table.pdf](https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf).

<sup>129</sup> 13 CFR 121.201 (Sector 22, Utilities).

<sup>130</sup> The RFA definition of “small entity” refers to the definition provided in the Small Business Act, which defines a “small business concern” as a business that is independently owned and operated and that is not dominant in its field of operation. The Small Business Administration’s regulations at 13 CFR 121.201 define the threshold for a small Electric Bulk Power Transmission and Control entity (NAICS code 221121) to be 500 employees. *See* 5 U.S.C. 601(3) (citing to section 3 of the Small Business Act, 15 U.S.C. 632).

## **VII. Comment Procedures**

77. The Commission invites interested persons to submit comments on the matters and issues proposed in this notice to be adopted, including any related matters or alternative proposals that commenters may wish to discuss. Comments are due **[INSERT DATE 60 days after publication in the FEDERAL REGISTER]**. Comments must refer to Docket No. RM17-3-000, and must include the commenter's name, the organization they represent, if applicable, and their address in their comments.

78. The Commission encourages comments to be filed electronically via the eFiling link on the Commission's web site at <http://www.ferc.gov>. The Commission accepts most standard word processing formats. Documents created electronically using word processing software should be filed in native applications or print-to-PDF format and not in a scanned format. Commenters filing electronically do not need to make a paper filing.

79. Commenters that are not able to file comments electronically must send an original of their comments to: Federal Energy Regulatory Commission, Secretary of the Commission, 888 First Street NE, Washington, DC 20426.

80. All comments will be placed in the Commission's public files and may be viewed, printed, or downloaded remotely as described in the Document Availability section below. Commenters on this proposal are not required to serve copies of their comments on other commenters.

**VIII. Document Availability**

81. In addition to publishing the full text of this document in the Federal Register, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the Internet through the Commission's Home Page (<http://www.ferc.gov>) and in the Commission's Public Reference Room during normal business hours (8:30 a.m. to 5:00 p.m. Eastern time) at 888 First Street NE, Room 2A, Washington, DC 20426.

82. From the Commission's Home Page on the Internet, this information is available on eLibrary. The full text of this document is available on eLibrary in PDF and Microsoft Word format for viewing, printing, and/or downloading. To access this document in eLibrary, type the docket number excluding the last three digits of this document in the docket number field.

83. User assistance is available for eLibrary and the Commission's website during normal business hours from the Commission's Online Support at (202) 502-6652 (toll free at 1-866-208-3676) or email at [ferconlinesupport@ferc.gov](mailto:ferconlinesupport@ferc.gov), or the Public Reference Room at (202) 502-8371, TTY (202) 502-8659. E-mail the Public Reference Room at [public.referenceroom@ferc.gov](mailto:public.referenceroom@ferc.gov).

List of subjects in 18 CFR Part 35

Electric Power Rates

Electric Utilities

By direction of the Commission.

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

**Regulatory Text**

In consideration of the foregoing, the Commission proposes to amend Part 35, Chapter I, Title 18, *Code of Federal Regulations*, as follows:

**PART 35 – FILING OF RATE SCHEDULES AND TARIFFS**

1. The authority citation for part 35 continues to read as follows:

*Authority:* 16 U.S.C. 791a-825r, 2601-2645; 31 U.S.C. 9701; 42 U.S.C. 7101-7352.

2. Amend § 35.28 as follows:

Add a new paragraph (g)(10).

**§ 35.28 Non-discriminatory open access transmission tariff.**

\* \* \* \* \*

(g) \* \* \*

(10) *Pricing fast-start resources.*

(i) *Definition of fast-start resources.* A fast-start resource is any resource that is able to start up within ten minutes or less, that has a minimum run time of one hour or less, and that submitted an economic energy offer to the market.

(ii) *Application to both day-ahead and real-time markets.* A Commission-approved independent system operator or regional transmission organization with a tariff that contains a day-ahead and a real-time market must implement the following requirements

in both the day-ahead and real-time markets. Implementation of the following requirements must be consistent between the day-ahead and real-time markets.

(iii) *Start-up and no-load costs.* When a Commission-approved independent system operator or regional transmission organization makes a decision to commit a fast-start resource, it must calculate prices by determining a fast-start resource's enhanced energy offer, which includes the following components: the resource's incremental energy offer, amortized start-up cost, and amortized no-load cost. In using that offer to calculate prices for the real-time and day-ahead markets, each Commission-approved independent system operator and regional transmission organization must amortize a fast-start resource's start-up cost over the resource's minimum run time and its economic maximum operating limit and must divide a fast-start resource's no-load cost by the resource's economic maximum operating limit, but are only required to do so during the resource's minimum run time.

(iv) *Relaxation of economic minimum operating limit.* Each Commission-approved independent system operator and regional transmission organization must relax to zero each fast-start resource's economic minimum operating limit such that the resource is able to be treated as fully dispatchable for purposes of calculating prices. Each Commission-approved independent system operator and regional transmission organization must ensure that physical dispatch instructions to resources do not result in over-generation and must have market rules that address the potential for over-generation due to deviations from dispatch instructions.

(v) *Offline fast-start resources.* If a Commission-approved independent system operator or regional transmission organization uses offline fast-start resources to calculate prices, the resource must have a start-up time of ten minutes or less, must not have any operational constraints that would prevent the resource from starting and providing energy, and must set prices based on the resource's amortized full cost, including start-up and no-load costs, which must be less than the administrative shortage price for the shortage or transmission constraint violation the resource is resolving. In addition, an offline fast-start resource used to resolve a transmission constraint violation must have a generation shift factor of no less than 5 percent on the applicable transmission constraint that is being exceeded. Each Commission-approved independent system operator and regional transmission organization may use an offline fast-start resource to calculate prices only during a transmission constraint violation or during energy or ancillary service shortage conditions.

**The following appendix will not appear in the *Code of Federal Regulations*.**

**APPENDIX: List of Short Names/Acronyms of Commenters**

<u>Short Name/Acronym</u>	<u>Commenter</u>
<b>CAISO</b>	California Independent System Operator Corporation
<b>DC Energy, Inertia Power, and Vitol</b>	DC Energy, LLC, Inertia Power, LP, and Vitol Inc.
<b>EEI</b>	Edison Electric Institute
<b>EPSA</b>	Electric Power Supply Association
<b>EPSA/IPPNY</b>	Electric Power Supply Association and Independent Power Producers of New York
<b>EPSA/NEPGA</b>	Electric Power Supply Association and New England Power Generators Association, Inc.
<b>EPSA/P3</b>	Electric Power Supply Association and PJM Power Providers
<b>EPSA/WPTF</b>	Electric Power Supply Association and Western Power Trading Forum
<b>Entergy</b>	Entergy Services, Inc. commented on behalf of the Entergy Operating Companies (Entergy Arkansas, Inc.; Entergy Louisiana, LLC; Entergy Mississippi, Inc.; Entergy New Orleans, Inc.; and Entergy Texas, Inc.)
<b>Exelon</b>	Exelon Corporation
<b>Golden Spread Electric</b>	Golden Spread Electric Cooperative, Inc.
<b>IMG Midstream/Tangibl</b>	IMG Midstream LLC and Tangibl LLC
<b>ISO-NE</b>	ISO New England Inc.
<b>LIPA</b>	Long Island Power Authority and Long Island Lighting Company d/b/a Power Supply Long Island
<b>MISO</b>	Midcontinent Independent System Operator, Inc.
<b>PJM Market Monitor</b>	Monitoring Analytics, LLC



**NYISO**

New York Independent System Operator,  
Inc.

**PJM**

PJM Interconnection, L.L.C.

**PSEG Companies**

PSEG Companies (Public Service Electric  
and Gas Company; PSEG Power LLC;  
and PSEG Energy Resources & Trade  
LLC)

**SPP**

Southwest Power Pool, Inc.

**Westar**

Westar Energy, Inc.