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DEPARTMENT OF ENERGY  
Federal Energy Regulatory Commission

Third-Party Provision of Reactive Supply and Voltage Control and Regulation and  
Frequency Response Services  
Docket No. AD14-7-000  
Notice of Workshop

Take notice that Federal Energy Regulatory Commission (Commission) staff will convene a workshop to obtain input on third-party provision of reactive supply and voltage control and regulation and frequency response services. The workshop will be held on April 22, 2014 in the Commission Meeting Room at the offices of the Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426. Members of the Commission may attend.

Advance registration is not required, but is encouraged. You may register at the following webpage: <https://www.ferc.gov/whats-new/registration/04-22-14-form.asp>.

Those wishing to participate in the program for this event should nominate themselves through the on-line registration form no later than March 14, 2014 at the following webpage: <https://www.ferc.gov/whats-new/registration/04-22-14-speaker-form.asp>.

The Commission will issue a subsequent notice providing the detailed agenda for the workshop.

In Order No. 784, the Commission revised its regulations to foster competition and transparency in ancillary services markets.<sup>1</sup> Among other things, the Commission revised Part 35 of its regulations to reflect reforms to its *Avista*<sup>2</sup> policy governing the sale of ancillary services at market-based rates to public utility transmission providers. The Commission implemented these reforms out of a concern that the *Avista* restriction limiting the sale of ancillary services at market-based rates absent a showing of lack of market power to a public utility

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<sup>1</sup> *Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies*, Order No. 784, 78 Fed. Reg. 46,178 (July 30, 2013), FERC Stats. & Regs. ¶ 31,349, at PP 2-3 (2013).

<sup>2</sup> *Avista Corp.*, 87 FERC ¶ 61,223, *order on reh'g*, 89 FERC ¶ 61,136 (1999) (*Avista*).

transmission provider for purposes of satisfying its open access transmission (OATT) requirements was proving to be an unreasonable barrier to entry, unnecessarily restricting access to potential suppliers.<sup>3</sup> Based on the record developed in that proceeding, the Commission relaxed the *Avista* restrictions with respect to the sale of Energy Imbalance, Generator Imbalance, Operating Reserve-Spinning and Operating Reserve-Supplemental services.

However, the Commission found that the technical and geographic requirements associated with Reactive Supply and Voltage Control (Schedule 2) and Regulation and Frequency Response (Schedule 3) services precluded application of the existing market power screens to the sale of those services. Instead, the Commission provided other options for such sales (price cap and competitive solicitation, described further below) and stated its intention to gather more information regarding the technical, economic and market issues concerning the provision of these services in a new, separate proceeding. The Commission stated that such proceeding will consider, among other things, the ease and cost-effectiveness of relevant equipment upgrades, the need for and availability of appropriate special arrangements such as dynamic scheduling or pseudo-tie arrangements, and other technical requirements related to the provision of Schedule 2 and Schedule 3 services.

Consistent with the Commission's stated intent in Order No. 784, staff would like to receive input from interested persons regarding the technical, economic and market issues concerning the provision of Schedule 2 and Schedule 3 services. To facilitate this discussion, staff provides additional background regarding Commission policies and recent actions with respect to reactive power, frequency response, and frequency regulation.

### Reactive Power

Reactive power is a critical component of operating an alternating current (AC) electricity system, and is required to control system voltage within appropriate ranges for efficient and reliable operation of the transmission system. At times generators or other resources must either supply or consume reactive power for the transmission system to maintain voltage levels required to reliably supply electricity from generation to load.

Payments for reactive power capability vary by region. Some regions do not pay for reactive power capability within the required power factor range, finding that it is a requirement of generator operation under good utility practice.

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<sup>3</sup> See Order No. 784, FERC Stats. & Regs. ¶ 31,349 at P 9.

Other regions pay generators a cost-based rate for reactive power capability, since generators incur costs to provide that capability and paying generators aligns incentives with desired behavior for system flexibility. Where such cost-based rates are paid, providers of reactive power generally are authorized to receive payment pursuant to tariffs on file with the Commission. The *Avista* policy permitting some ancillary service sales without a showing of lack of market power, did not apply to Schedule 2 service.<sup>4</sup> Accordingly, suppliers wishing to sell Schedule 2 service at market-based rates have always needed to demonstrate a lack of market power with respect to the reactive power product before such sales would be authorized.

In Order No. 784, the Commission nevertheless evaluated whether the existing market power screens could be applied to the sale of Schedule 2 service without significant modification.<sup>5</sup> The Commission found that the more stringent technical and geographic considerations associated with Schedule 2 service suggest that it is not the simple combination of basic energy and capacity products. The Commission noted that most comments addressing the sale of Schedule 2 service agree that the set of resources considered by the existing market power screens for energy and capacity would differ too significantly from the set of resources that would be considered by market power analyses designed specifically for Schedule 2 service. The Commission therefore concluded that the record before it did not support application of the existing market power screens without significant modification to Schedule 2 service. Instead, the Commission allowed market-based sales of Schedule 2 service to a public utility that is purchasing ancillary services to satisfy its OATT requirements if the sale is made pursuant to a competitive solicitation that meets certain specified requirements,<sup>6</sup> or when such sale is made at or below the buying public utility transmission provider's own Schedule 2 rate.<sup>7</sup>

At the workshop, staff would like to discuss the following:

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<sup>4</sup> *See id.* n.17.

<sup>5</sup> *Id.* PP 59-61.

<sup>6</sup> *Id.* P 99.

<sup>7</sup> *Id.* PP 82-85.

- The extent to which reactive power can be traded across balancing areas in a manner consistent with existing market power screens for energy and capacity;
- Whether there should be payment for reactive power capability within the required power factor range;
- How cost-based payments for reactive power capability should be structured; and
- What are the obligations of generators receiving payment for reactive power capability?

### Frequency Response and Frequency Regulation

In Order No. 784, the Commission also evaluated whether the existing market power screens for sales of energy and capacity could be applied to the sale of Schedule 3 service without significant modification.<sup>8</sup> The Commission discussed Schedule 3 as a single service in Order No. 784, focusing primarily on AGC-based frequency regulation. However, frequency response is distinct from frequency regulation.<sup>9</sup> Frequency response involves the autonomous, automatic, and rapid reaction of an individual turbine-generator or other resource to change its output to rapidly dampen large changes in frequency, generally through appropriate governor settings. Frequency regulation is produced from either manual or automated dispatch (through Automatic Generation Control (AGC)) from a centralized system.<sup>10</sup> In Order No. 888, the Commission found that governor-based autonomous frequency response did not merit a separate ancillary service because at the time the same resources that respond to regulation signals also provided governor response under then-standard industry practices.<sup>11</sup> As a

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<sup>8</sup> *Id.* PP 59-61.

<sup>9</sup> As used herein, frequency response refers to primary frequency response and frequency regulation refers to secondary frequency response.

<sup>10</sup> See *Frequency Response and Frequency Bias Setting Reliability Standard*, Order No. 794, 146 FERC ¶ 61,024 at PP 8-9 (2014).

<sup>11</sup> “While the services provided by Regulation Service and Frequency Response Service are different, they are complimentary services that are made available using the same equipment.” *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, (continued...) Order No. 888, FERC Stats. & Regs. ¶ 31,036, slip at 212 (1996), *order on reh’g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048, *order on reh’g*, Order No. 888-

result, the language of Order No. 888 discussing Schedule 3 was focused primarily on AGC-based central dispatch.<sup>12</sup>

While it remains true that most generating units capable of providing frequency regulation are also capable of providing frequency response, standard industry practices have changed and it is no longer clear that most resources providing frequency regulation are also providing frequency response. Accordingly, staff is evaluating whether additional market mechanisms are needed to facilitate the provision of either frequency response or frequency regulation in the organized or bilateral markets. For purposes of considering the technical, economic and market issues concerning the provision of Schedule 3 service, staff believes it would be productive to focus on frequency response and frequency regulation separately.

### *Frequency Regulation*

Frequency regulation is used to balance generation, interchange and demand by managing the response of available resources within minutes.<sup>13</sup> Frequency regulation is provided under different market mechanisms in the organized and bilateral markets. Regional transmission operators (RTOs) and independent system operators (ISOs) generally procure frequency regulation through auction-based market mechanisms in which payments are intended to cover the range of costs incurred to provide service.<sup>14</sup> Resources wishing to sell frequency regulation in RTO/ISO markets are authorized to do so pursuant to their MBR tariffs.

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B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in relevant part sub nom. Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002).

<sup>12</sup> “Regulation and Frequency Response Service is accomplished by committing on-line generation whose output is raised or lowered (predominantly through the use of automatic generation control equipment)....” *See* OATT Schedule 3.

<sup>13</sup> Order No. 794, 146 FERC ¶ 61,024 at P 9. The level of frequency regulation required for each balancing authority area is not fixed, but is set by each balancing authority area to meet the requirements of NERC Reliability Standards.

<sup>14</sup> *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, FERC Stats. & Regs. ¶ 32,324, at PP 6-11(2011), *reh'g denied*, Order No. 755-A, 138 FERC ¶ 61,123 (2012).

Outside the RTO/ISO markets, *Avista* authorizes suppliers who cannot show a lack of market power with respect to Schedule 3 service to nevertheless sell that service with certain restrictions.<sup>15</sup> One such restriction is that the authorization provided by *Avista* does not apply to sales to a public utility that is purchasing ancillary services to satisfy its own OATT requirements to offer ancillary services to its own customers.<sup>16</sup> In Order No. 784, the Commission evaluated whether the existing market power screens could be applied with respect to the sale of Schedule 3 service without significant modification, as a way to permit such sellers to avoid the otherwise applicable *Avista* restriction.

As in Order No. 888, the Commission's evaluation of this issue in Order No. 784 focused primarily on frequency regulation, not frequency response.<sup>17</sup> The Commission concluded that the existing market power screens for energy and capacity were inadequate for analyzing Schedule 3 service because there are significant technical requirements, such as the need for AGC equipment, that limit the set of resources capable of supplying Schedule 3 service. The Commission agreed in principle with commenters that potential competitors could be viewed as existing competitors for purposes of market power analysis if it is known that they can install needed equipment rapidly and profitably in response to appropriate price signals, but found that the record does not conclusively support the notion that such equipment upgrades (e.g., to install AGC equipment in an existing generator) can be accomplished in such a manner. The Commission also noted that the record indicates that third-party sellers of Schedule 3 service might need to enter into or facilitate special transmission service arrangements between neighboring balancing authorities, such as dynamic scheduling or pseudo-tie arrangements, in order to make sales outside of their home balancing authority area. Because this fact could impact the appropriateness of using the default geographic market reflected in the existing market power screens for sales of energy and capacity, and thus the ability to apply those screens to sales of Schedule 3 service without significant modification, the Commission concluded that the record before it did not support application of the existing market power screens for sales of energy and capacity to sales of Schedule 3 service. Instead,

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<sup>15</sup> Additionally, any seller who can successfully demonstrate a lack of market power with respect to Schedule 3 service would receive authorization from the Commission to sell to any entity without restrictions, including public utility transmission providers.

<sup>16</sup> See *Avista*, 87 FERC ¶ 61,223 at n.12.

<sup>17</sup> Order No. 784, FERC Stats. & Regs. ¶ 31,349 at PP 59-61.

the Commission allowed market-based sales of Schedule 3 service to a public utility that is purchasing ancillary services to satisfy its OATT requirements if the sale is made pursuant to a competitive solicitation that meets certain specified requirements,<sup>18</sup> or when such sale is made at or below the buying public utility transmission provider's own Schedule 3 rate.<sup>19</sup>

At the workshop, staff would like to discuss the technical, economic and market issues concerning the provision of Schedule 3 service as it relates to frequency regulation outside of the RTO regions, including:

- To what extent do existing resources lack the necessary AGC equipment to provide frequency regulation?
- Why do existing resources that have AGC equipment choose not to use it?
- What is the ease and expense of adding AGC equipment to an existing resource?
- Are any special transmission scheduling provisions needed to enable the provision of frequency regulation from one balancing authority area to another? If so, what is the ease and expense of implementing them?
- Are there efforts underway to make the provision of frequency regulation easier?

#### *Frequency Response*

Sufficient frequency response is necessary to stabilize frequency within an interconnection immediately following the sudden loss of generation or load. The ability of a power system to withstand a sudden loss of generation or load depends on the presence and adequacy of resources capable of providing rapid incremental power changes to counterbalance the disturbance and arrest a frequency deviation. Most frequency response is provided by the automatic and autonomous actions of turbine-generators that have appropriate governor settings, with some response being provided by load resources that have capabilities similar to autonomous governor response.<sup>20</sup>

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<sup>18</sup> *Id.* P 99.

<sup>19</sup> *Id.* PP 82-85.

<sup>20</sup> Order No. 794, 146 FERC ¶ 61,024 at P 6. Once it becomes effective, NERC Reliability Standard BAL-003-1 will establish a minimum frequency response obligation for each balancing authority area.

On January 16, 2014 the Commission issued Order No. 794, Frequency Response and Frequency Bias Setting Reliability Standard. The now-approved NERC Reliability Standard BAL-003-1 establishes a minimum Frequency Response Obligation for each balancing authority areas or frequency response sharing group; provides a uniform calculation of frequency response measure; establishes Frequency Bias Settings that set values closer to actual balancing authority frequency response; and encourages coordinated AGC operation.<sup>21</sup> By imposing a requirement on balancing authority areas and frequency response sharing groups to provide frequency response, Order No. 794 will have the effect of transitioning frequency response from what was historically considered an interconnection-wide system characteristic to a distinct balancing service that specific entities must deliver. Recognizing this, the Commission issued a separate docket in July 2013 to explore the market implications of the new frequency response and frequency bias setting requirements, including potential impacts of the frequency bias setting being different from actual frequency response; potential market and commercial impacts of not accounting for transmission limitations and historical flows when calculating frequency response obligations; crediting load resources as part of the frequency response obligation; the potential need for compensating frequency response resources; and any other potential impacts on transmission capacity or ancillary services.<sup>22</sup>

Although a public utility transmission provider using its own resources to provide Schedule 3 service would likely recover most of its costs of providing governor-based frequency response along with its costs for AGC-based frequency regulation under OATT Schedule 3, to the extent the same units are providing both services, there are few market mechanisms in place regarding compensation for frequency response as a stand-alone service. Unlike frequency regulation, frequency response has not been defined as a product in the RTO/ISO markets. And while the authorization provided in *Avista* would apply to frequency response, the restriction on sales to a public utility that is purchasing ancillary services to satisfy its own OATT requirements to offer ancillary services to its own customers effectively precludes development of a market for frequency response. These concerns along with the recently authorized reliability standard have created the need for Commission Staff to request input regarding existing regulatory and tariff provisions as well as potential market implications for frequency response service.

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<sup>21</sup> *Id.* P 1

<sup>22</sup> *Market Implications of Frequency, Response and Frequency Bias Setting Requirements*, Notice of Request for Comments, 144 FERC ¶ 61,058 (2013).

At the workshop, staff would like to discuss the technical, economic and market issues concerning the provision of Schedule 3 service as it relates to frequency response, including:

- To what extent should existing resources be required to provide their inherent quantity of frequency response as part of their existing obligations, with any shortfall in achieving the balancing authority area's frequency response obligation being procured through tariff or market mechanisms such as in ERCOT;
- Could competitive, market-based procurement of primary frequency response performance be structured to address potential market power concerns;
- Whether provision of autonomous governor response could be traded in a manner that is consistent with the existing market power screens for sales of energy and capacity;
- To what extent can existing resources be equipped with governors, or other control equipment that can serve the same function, and how expensive or time consuming would such a retrofit be;
- Since governor-based autonomous frequency response would not require any dispatch signal from a balancing area operator, would any special dispatch or transmission scheduling provisions be needed to provide the service from resources in a neighboring balancing authority area;
- Could competitive procurement of primary frequency response be structured to avoid increases in Transmission Reliability Margin, avoid barriers to non-conventional resources, and assure the performance will be consistent with the Commission-approved balancing authority area obligation, assure the generators providing primary frequency response achieve appropriate speed and magnitude of power output;
- How could cost-based payments for primary frequency response performance be structured;
- To what extent do existing resources lack the necessary equipment or fail to utilize the appropriate settings on that equipment to provide primary frequency response;
- Why do existing resources that have the necessary equipment to provide primary frequency response choose not to use it or to absorb response; and,
- Are penalties for deviating from generation schedules viewed as a serious impediment to the provision of frequency response?

The workshop will not be transcribed. However, there will be a free webcast of the workshop. Anyone with Internet access interested in viewing this workshop can do so by navigating to the FERC Calendar of Events at [www.ferc.gov](http://www.ferc.gov) and locating this event in the Calendar. The event will contain a link to its webcast. The Capitol Connection provides technical support for the webcasts and offers the option of listening to the workshop via phone-bridge for a fee. If you have any questions, visit [www.CapitolConnection.org](http://www.CapitolConnection.org) or call (703) 996-3100.

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Kimberly D. Bose,  
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