

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

Wholesale Competition in Regions    )  
With Organized Electric Markets    )       Docket Nos.: RM07-19 and AD07-7

**COMMENTS OF BEACON POWER CORPORATION**

Beacon Power Corporation (“Beacon Power” or the “Company”) hereby submits Comments pursuant to the Federal Energy Regulatory Commission’s (“FERC” or the “Commission”) *Notice of Proposed Rulemaking for Wholesale Competition in Regions with Organized Electric Markets* (“NOPR” or “Notice”),<sup>1</sup> issued on February 22, 2007. In response to FERC’s request for comments, Beacon Power respectfully requests that FERC: (1) ensure that proposed regulations are applicable to all non-generation resources and not limited to demand response resources; (2) establish qualifying criteria and bidding parameters for all resources to offer competitive bids based upon an entity’s qualifications and design; and (3) mandate that ISOs implement practices and procedures designed to allow innovative technologies to participate in discussions about market development prior to their investing significant resources to provide the services. Without such rules and policies in place, FERC cannot ensure that the ancillary services marketplace is operating on a non-discriminatory basis and serving customers at just and reasonable rates.

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<sup>1</sup> *Wholesale Competition in Regions with Organized Electric Markets*, Advanced Notice of Proposed Rulemaking, 72 Fed. Reg. 36,276 (July 2, 2007), FERC Stats & Regs. 32,617 (2007).

## **I. COMMUNICATIONS**

Communications and correspondence related to this filing should be directed to the following representatives of Beacon Power Corporation:

John A. DeTore  
Andrew O. Kaplan\*  
Rubin and Rudman LLP  
50 Rowes Wharf  
Boston, Massachusetts 02110  
Phone: 617.330.7000  
Facsimile: 617.330.7550  
E-mails: [jdetore@rubinrudman.com](mailto:jdetore@rubinrudman.com)  
[akaplan@rubinrudman.com](mailto:akaplan@rubinrudman.com)

\* Person designated to receive service.

## **II. DESCRIPTION OF BEACON POWER CORPORATION**

### **A. Introduction**

Beacon Power Corporation (NASDAQ: BCON) has developed an innovative flywheel-based energy storage technology to provide ancillary Regulation and Frequency Response Service.<sup>2</sup> Beacon Power's technology operates by using flywheels to recycle excess energy when generated power exceeds load and delivers it to the grid when load increases. Beacon Power's flywheels are designed to store from and/or deliver excess power to the grid within four seconds of receiving a control signal for up to 15 minute duration in any one direction (*i.e.* regulation up or down). Beacon Power's proposed 20-megawatt ("MW") Commercial Frequency Regulation Plant is to be comprised of 200 high-speed, high-energy flywheels capable of providing 20 MWs of "up and down" regulation, equal to a 40 MW swing. Using a 25 kWh/100 kW flywheel system, Beacon

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<sup>2</sup> Regulation and Frequency Response Service is necessary to provide for the continuous balancing of resources (generation and interchange) with load and for maintaining scheduled Interconnection frequency at sixty cycles per second (60 Hz). Regulation and Frequency Response Service is accomplished by committing on-line generation whose output is raised or lowered (predominantly through the use of automatic generating control equipment) and by other non-generation resources capable of providing this service as necessary to follow the moment-by-moment changes in load. *Order No. 890* at Schedule 3.

Power will be able to achieve full up or down power in less than four seconds after receiving a control signal. Beacon's flywheel technology has a life-span of 20 years with extremely low maintenance requirements.

When commercially deployed, Beacon Power's energy storage technology will assist FERC's efforts to enhance system reliability, lower costs to ratepayers, integrate renewable resources, reduce CO<sub>2</sub> greenhouse gas emissions, and increase regional generation capacity. Beacon's technology has been successfully tested on grids in New York State and California with co-funding from the Department of Energy (DOE), New York State Energy Research and Development Administration (NYSERDA) and the California Energy Commission (CEC).

#### **B. Benefits of Flywheel Technology**

Beacon Power's flywheel technology offers many key advantages over using conventional fossil fuel generation resources for regulation. First, Beacon Power's technology provides a fast response solution for maintaining grid reliability. With a 25 kWh/100 kW flywheel system, Beacon's technology can respond to an ISO's control signal up to two orders of magnitude faster than what is offered by current generation solutions. As the amount of power generated by wind and other intermittent resources increases in order to meet state and federal Renewable Portfolio Standards, the need for high speed regulation will also increase.

Second, Beacon Power's flywheel technology is a lower cost alternative than conventional generation for regulation. Beacon has a fundamental operating cost advantage because it does not consume fossil fuel, but instead recycles existing power.

That coupled with its high operating efficiency and low maintenance makes Beacon Power a low cost regulation provider.

Third, Beacon Power's technology produces zero CO<sup>2</sup> greenhouse gas, particulates or other air emissions since it does not burn fossil fuel. Lack of emissions should make it possible to permit and site a 20 MW flywheel-based plant almost anywhere on the grid relatively close to a transmission line.

Fourth, existing fossil fuel-powered plants displaced by Beacon's energy storage regulation plant can be shifted to provide a corresponding amount of added peak generation capacity. In doing so, these plants can run at full capacity, improving their energy efficiency and reducing emissions. This regained capacity does not require permitting or construction time, enabling regions to increase peak power generation without the need for new power plants.

### **III. BACKGROUND**

On June 22, 2007, the Commission issued an Advanced Notice of Proposed Rulemaking ("ANOPR") wherein it identified four issues in organized market regions that were not adequately addressed or under consideration in other proceedings. These areas included: (1) the role of demand response in organized markets and greater use of market prices to elicit demand response during a period of operating reserve shortage; (2) increasing opportunities for long-term power contracting; (3) strengthening market monitoring; and (4) enhancing the responsiveness of RTOs and ISOs to customers and other stakeholders, and ultimately to consumers who benefit from and pay for electricity services.

After review of the comments received from over 100 interested participants, on February 22, 2007, FERC issued its NOPR seeking comments on its proposed modifications to its regulations. Beacon Power submits these comments in response to FERC's request for feedback on several its proposals.

#### **IV. COMMENTS**

##### **A. Bidding Parameters and Qualifications To Provide Ancillary Services Should Be Made Applicable to all Non-Generation Resources and not Limited to Demand Response Resources.**

Beacon Power commends FERC for its tireless efforts to eliminate barriers that now prevent non-generation resources from competing effectively in the ancillary services marketplace. As FERC acknowledges in its NOPR, participation in the organized power markets cannot take place until FERC ensures comparable treatment of all resources and allows non-generators to compete effectively in the marketplace. *See id.* at ¶37.

With the advent of new technologies, there are opportunities to develop non-generation resources that, once interconnected to the grid, are capable of providing ancillary services specific to the immediate needs of an ISO. Yet, despite the availability of these technologies to enter the marketplace, many ISOs have not yet modified their bidding rules and/or the qualifications to provide ancillary services, thereby maintaining rules that are only applicable to generators. As a result, clean, efficient, and low-cost resources have gone untapped.

In an attempt to alleviate this problem, FERC affirmed its policy to design rules that foster competition in wholesale electric power markets. *NOPR* at ¶12. In the short-term, FERC determined that authorizing demand response resources to provide ancillary

services, such as frequency response and regulation services, was most efficient because, those resources, in principle, are always available and able to provide a rapid and near real-time response to a control signal. *See id.* at ¶¶ 38 and 39.

However, other non-generation resources are also capable of providing ancillary services. For example, energy storage facilities, such as Beacon Power’s flywheels are able to provide ancillary services and to respond rapidly when called upon. In fact, Beacon Power’s technology is capable of providing 20 MWs of full “up and down” regulation within four seconds of receiving a control signal. The ability of Beacon Power’s energy storage flywheels to quickly and precisely respond to moment-by-moment changes in load make this technology ideally suited to provide Regulation Services.

Rather than define the non-generation market so narrowly as to include only demand response resources, FERC should affirm the policies it enunciated in *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890 (as affirmed in 890-A) and in *Midwest Independent Transmission System Operator*, Docket No. ER07-1372 et al., at ¶365 and ensure that ISOs’ regulations are designed to include a broad spectrum of non-generation resources such as energy storage facilities to enter the marketplace. The entrance of new technologies capable of providing specific ancillary services will result in true competition in the organized wholesale markets and enable FERC to meet its statutory mandate to ensure adequate and reliable non-discriminatory service at just and reasonable rates.

**B. Mandating Conformance by Non-Generation Resources with Bidding Parameters Designed for Legacy Generators Will Continue to Have a Detrimental Effect on the Competitive Ancillary Services Market**

As the Commission noted in its NOPR, the rules for bidding and participating in ancillary services markets were developed for generators and do not accommodate the operating characteristics of demand response or other non-generator resources. *See NOPR* at ¶ 41.

[M]any demand response resources can respond quickly and at a low cost if called upon for a short duration, which may make them well suited for providing operating reserves. If market rules require, however, that a single bid be made into a joint energy-plus-reserves market (also known as “co-optimized” market), those seeking to offer operating reserves risk being dispatched to provide energy or other ancillary services for which they are not well suited. As a result, a potential operating reserve provider that does not wish to be called upon frequently or for a prolonged period in the energy market may simply decide not to participate in a co-optimized market and consequently not be a source for providing demand response resources as operating rules.

Conversely, ISOs have argued that to achieve the lowest cost for services, all resources entering a co-optimized market must be available to provide energy. *See e.g., NOPR* at ¶ 54 *citing* NYISO Response to the Advanced NOPR. This argument not only contradicts FERC’s well-established policy to provide ancillary services on a non-discriminatory basis,<sup>3</sup> but is fundamentally flawed in that it fails to account for new technologies that are designed to provide specific ancillary services only, such as Beacon Power’s energy storage flywheels.

Beacon Power’s flywheels are designed to quickly and precisely respond to moment-by-moment changes in load for up to 15 minutes in any one direction (*i.e.* regulation up or down) making the technology ideally suited to provide Regulation and

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<sup>3</sup> *See* Order No. 890.

Frequency Response Services although not well suited to provide Energy. Despite its ideal design for the ancillary regulation services market, the requirement that Beacon Power must also bid into the Energy market makes participating in the regulation market cost prohibitive for Beacon Power. If ultimately Beacon Power is unable to supply the energy it was forced to bid, the Company will incur significant financial penalties. The risk of significant financial harm to Beacon Power and other resources looking to provide ancillary services but not energy is a major barrier to competition and innovation in the ancillary services markets. Until such time as the market rules allow resources to only bid into those markets in which it is capable of providing services, consumers will not realize the benefits that could be provided by clean, low-cost and efficient services offered by these new resources.

NYISO points out that market rules require a Generator to make itself available to supply energy in order to be eligible to provide ancillary services. Thus, NYISO argues, non-generation resources should be required to bid energy even if the resource is looking to provide ancillary services only. However, NYISO's argument is fundamentally flawed in that by design, a Generator is always capable of supplying energy and therefore does not face the financial risks and barriers that a non-generator faces if it is forced to bid into the energy market. Furthermore, for a Generator to provide Regulation Service, it must physically supply energy to regulate up and down. Unlike Generators, energy storage facilities operate at a zero MW setpoint, simply recycling existing energy from the grid. As designed, therefore, energy storage resources do not generate energy in order to provide regulation service. In fact, Beacon Power's technology has zero direct CO<sub>2</sub> emissions because it does not generate energy to provide Regulation Services. Moreover,



under the rules, Generators incapable of providing ancillary services are not required to bid for those services. If market rules in co-optimized markets, can accommodate the operating characteristics and limitations of generation resources, then those rules should accommodate the operating characteristics and limitations of non-generation resources.

NYISO's argument that FERC should establish bidding parameters that force resources to conform their bids to operate like generation resources contravenes FERC's well established policy that bidding parameters be designed to ensure that all resources are compared on a non-discriminatory basis. Instead, FERC should allow each resource to bid on only those services it is capable of providing.

NYISO's proposed solution is to require non-generators to specify: (1) the maximum duration in hours that a bid can be dispatched; and/or (2) the maximum number of times that a bid can be dispatched during a day; and/or (3) the maximum amount of energy that a resource can produce. This proposal does not go far enough to encourage non-generation resources to enter the ancillary services market. However, if FERC were to adopt these bidding parameters, then resources should be allowed to submit a response based upon the specific market. For example, to bid for Regulation and Frequency Response Services, Beacon Power would submit the following parameters

for one of its 20 MW Commercial Frequency Regulation plants:

Parameter	Energy Market	Regulation and Frequency Response Market
Maximum duration in hours that a bid can be dispatched	0 hours	24 hours
Maximum number of times that a bid can be dispatched during a day	0 times/day	21,600/day (Every 4 seconds)
Maximum amount of energy that a resource can produce	0 MW	N/A
Maximum amount of regulation that a resource can produce	N/A	20 MW

Enabling all resources capable of providing ancillary services to compete on a comparable basis in the market will ensure that FERC achieves its policy goals to increase the competitiveness of the ancillary services markets, reduce the price of ancillary services and improve the reliability of the grid.

**C. ISOs/RTOs Must Implement Practices and Procedures That Allow New Technologies to Assist with Market Development Before Having to Invest Substantial Monies to Enter the Market**

Beacon Power requests that FERC require ISOs to design practices that would allow new technologies to participate in the development of bidding parameters and market rules even before the entity entered the ancillary services marketplace. As a new technology entering the marketplace, Beacon Power has experienced firsthand how important it is to participate in the development of a market before expending significant resources to develop, site, construct and operate in the region.

Until ISOs welcome new technologies to meet with representatives to learn about becoming a viable competitor in a specific region, Beacon Power is faced with a classic “chicken and egg” problem. Specifically, the Company cannot justify investing in a market where the rules are not yet conducive to competition. However, some ISOs have

prohibited Beacon Power from participating in the development of a market until the Company invests significant resources to enter the market. To develop competition by encouraging innovative technologies to enter the marketplace, we recommend that each ISO include in its compliance filing its policies and procedures for responding to new technologies interested in the entering the marketplace. For example, ISOs could design a process that allows new technologies to “have a seat at the table” to discuss its market concerns before requiring a company to commit substantial resources in the market. Under such a scenario, ISOs could assign a representative to work with emerging resources and to assist new technology providers understand the market rules and navigate the tariffs and processes.

Accordingly, Beacon Power recommends that FERC encourage ISOs to design practices and policies that are inclusive of new technologies in discussions about market rules and to allow ISOs representatives to provide guidance about regional market rules and the effect those rules have on the ancillary services market.

## **V. CONCLUSION**

FERC has made extensive efforts to work with ISOs and interested participants in the regulation services marketplace and to mandate that ISOs design tariffs that ensure the operation of a competitive, non-discriminatory market. In its recent orders, FERC has reiterated its belief that tariffs be designed to allow new technologies, such as Beacon Power’s energy storage flywheel to compete in the regulation marketplace.

Allowing demand response resources, without other non-generation resources , such as energy storage facilities to provide Frequency Response and Regulation Services conflicts with FERC's mandates and policies and also undermines the grid operator's

commitment to consumers that it will develop and manage an efficient and competitive electricity wholesale market using clean, low-cost energy. Moreover, as detailed above, a crucial first step in the process is to ensure that bidding parameters and provider qualifications are based upon the services to be provided and not only the classification of an entity as a generator or non-generator.

Enabling all resources capable of providing ancillary services to compete on a comparable basis in the market, will achieve FERC's policy to increase the competitiveness of the ancillary services markets, help reduce the price of ancillary services, and improve the reliability of the grid.

Respectfully submitted,

**BEACON POWER CORPORATION**

By its attorneys,

/s/

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John A. DeTore  
Andrew O. Kaplan  
RUBIN AND RUDMAN LLP  
50 Rowes Wharf  
Boston, Massachusetts 02110  
(617) 330-7000

Dated: April 21, 2008

### **CERTIFICATE OF SERVICE**

I hereby certify that I have this day served electronically the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated in Boston, MA this 21st day of April 2008.

/s/

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Robert G. Clifford  
Paralegal  
Rubin and Rudman LLP  
50 Rowes Wharf  
Boston, MA 02110  
Phone: (617) 330-7157  
Fax: (617) 330-7550