UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Integration of Variable Energy Resources) Docket No. RM10-11-000

COMMENT OF THE FEDERAL TRADE COMMISSION
April 8, 2010

I. Introduction and Summary

The Federal Trade Commission (FTC) appreciates this opportunity to comment on the Federal Energy Regulatory Commission's (FERC's) Notice of Inquiry (NOI) on integration of variable energy resources (VERs).[1] The NOI focuses on (1) potential discrimination against VERs; (2) existing provisions that could serve as barriers to VERs and to their integration; and (3) reliability.[2] FERC intends the NOI to initiate a general review of how FERC can (or should) support the integration of intermittent power sources[3] into reliable grid operations.[4]

Electric systems need to balance the quantity of power produced with the quantity consumed second-by-second to avoid brownouts and surges. Traditional "thermal" generating technology – including fossil-fueled and nuclear plants – produces power predictably, following a schedule and a system operator's instructions to adjust the schedule to deal with equipment failures, transmission conditions, and fluctuations in consumption. VERs, such as wind and solar generators, are now becoming increasingly important, and FERC is exploring whether and how to modify markets and operating procedures to allow such resources to compete to serve consumer needs at the lowest cost to society[5] and to "integrate" them into the carefully choreographed process of keeping the quantity of power produced in balance with the quantity consumed. The following comment addresses, *inter alia*, ways in which FERC might make electricity market institutions a closer match for VERs' costs and constraints. We discuss how this could be accomplished by, for example, establishing new, intermittent electricity products,

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[1] 75 Fed. Reg. 4316 (Jan. 27, 2010), *available at* http://frwebgate1.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=922305154694+1+2+0&WAISaction=retrieve.

[2] NOI P 10.

[3] "Intermittent" resources such as wind farms are a type of VER. This comment uses the two terms "variable" and "intermittent" interchangeably.

[4] NOI P 13.

[5] Costs to society include both (1) the direct costs of building and operating the power system that are charged to customers and (2) indirect costs from pollution (*i.e.*, externalities).

or by allowing the aggregation of geographically dispersed VERs in order to make the generation patterns of the VER aggregation more predictable.

In the NOI, FERC forswears any changes that would discriminate in favor of specific types of generation[6] but notes that the power industry developed with generation sources that could store their respective fuels (*e.g.*, coal, nuclear fuel, natural gas). As a result, existing rules – which reflect that historical development – may not be a good match to a future fuel mix that relies less on storable fuels.[7] The NOI describes several recent instances in which FERC has revised its policies and regulations to allow an increased role for power from renewable resources. FERC states that it will use responses to the NOI to help determine what more should be done in recognition of this potential shift in generation sources.

The NOI specifically identifies the following areas for examination: (1) data and reporting requirements, including the use of accurate weather forecasting tools; (2) scheduling practices, flexibility, and incentives for accurate scheduling of VERs; (3) forward market structure[8] and reliability commitment processes;[9] (4) coordination and/or consolidation of balancing authorities;[10] (5) the suitability of reserve products,[11] together with reforms necessary to encourage the efficient use of such products; (6) reforms to the capacity markets tasked with ensuring that enough generation is available to prevent blackouts or brownouts; and (7) changes in power plant operation on short notice ("redispatch and curtailment") necessary to accommodate VERs in real time.

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[6] NOI P 10.

[7] FERC mentions concerns about environmental impacts and the sustainability of the Nation's current electricity supply portfolio. *Id*. P 2. Sustainability concerns can include the balance of trade and the reliability of fuel supply from nations that are politically unstable or frequently express views antagonistic to those of the United States.

[8] Forward market structures govern trading of power in advance.

[9] Reliability commitment processes choose the generators to run (on a minute-by-minute basis), considering both their cost and the engineering challenges of ensuring that the system stays in balance even when a generator or transmission line fails.

[10] Balancing authorities are the entities that give operating instructions to generating units on a minute-by-minute basis.

[11] Reserve products consist of generating capacity (or customer participation, *i.e.*, "demand response") that can be brought on line quickly in order to address unscheduled changes in supply or demand.

For the first time, the electricity system is adding a significant number of VERs. FERC should examine opportunities that would make electricity markets better represent the costs, constraints, and realities of VERs so as to encourage cost-reducing operational choices and investments. As FERC points out, VERs face markets for power that developed almost entirely with generation based on storable fuels. The trading of power generation services that more closely align with the generation patterns for VERs could enable markets to do a more efficient job of using VERs and compensating them for their generation. For example, electricity markets could trade a commodity consisting of a contract to provide (on average) a megawatt of power over an hour that allows significant flexibility about when the power will arrive within that hour. Some retail electricity customers may be quite willing to buy this kind of energy for applications such as recharging electric vehicles and pumping and heating water. We encourage FERC to consider changing commodity definitions in connection with several aspects of the NOI, including reserve commitment intervals, imbalance charges, and participation in day-ahead and in capacity markets.

If FERC chooses not to adjust the portfolio of commodities, another policy option to facilitate integration of VERs could be to allow geographically dispersed VERs (or combinations of VERs and dispatchable, renewable generation sources or energy storage devices) to bid as single units in order to bring the predictability of their generation patterns closer to that of conventional generators. Of course, if this approach is taken, care must be exercised to avoid a level of cooperation among VERs that would raise antitrust concerns.

We also discuss elements of the NOI pertaining to improved weather forecasting, coordination or consolidation of balancing areas, and capacity market reforms. Our comment indicates that detailed wind forecasting may improve the efficiency of wind generation and the utilization of reserves. Coordination or consolidation of balancing areas should be keyed to the geographic scale needed to include VERs whose low-generation periods seldom overlap. Aggregations of VERs may be positioned to participate in capacity markets more effectively than individual facilities if the VERs in the aggregation have low-generation periods that are unlikely to overlap.

II. <u>Interest of the Federal Trade Commission</u>

The FTC is an independent agency of the United States Government responsible for maintaining competition and safeguarding the interests of consumers, both through enforcement of the antitrust and consumer protection laws and through competition policy research and advocacy. The FTC often analyzes regulatory or legislative proposals that may affect competition or allocative efficiency in the electric power industry. The FTC also reviews proposed mergers that involve electric and natural gas utility companies, as well as other parts of the energy industry. In the course of this work, as well as in antitrust and consumer protection research, investigation, and litigation, the FTC applies established legal and economic principles and recent developments in economic theory and empirical analysis. The energy sector, including electric power, has been an important focus of the FTC's antitrust enforcement and competition advocacy.[12] The FTC's competition advocacy program has produced two staff reports on electric power industry restructuring issues at the wholesale and retail levels.[13] The FTC staff also contributed (as did FERC staff) to the work of the Electric Energy Market Competition Task Force, which issued a *Report to Congress* in 2007.[14] In addition, the FTC has held public conferences on energy topics, including *Energy Markets in the 21st Century* (April 10-12, 2007)[15] and *Carbon Offsets & Renewable Energy Certificates* (January 8, 2008).[16]

The FTC and its staff have filed numerous competition advocacy comments with FERC and participated in FERC technical conferences on market power issues. For example, in March 2007, the Deputy Director for Antitrust in the FTC's Bureau of Economics served as a panelist for a technical conference on FERC's merger and acquisition review standards under Federal Power Act (FPA) Section 203 (Docket No. AD07-2-000). Similarly, the FTC submitted

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[12] *See, e.g.* Opening Remarks at the FTC Conference on *Energy Markets in the 21st Century: Competition Policy in Perspective* (Apr. 10, 2007), *available at* http://www.ftc.gov/speeches/majoras/070410energyconferenceremarks.pdf. FTC merger cases involving electric power markets have included the *DTE Energy/MCN Energy* (2001) (consent order), *available at* http://wwwftc.gov/os/2001/05/dtemcndo.pdf; and *PacifiCorp/Peabody Holding* (1998) (consent agreement), *available at* http://www.ftc.gov/os/1998/02/9710091.agr.htm. (The FTC subsequently withdrew the *PacifiCorp* settlement when the seller accepted an alternative acquisition offer that did not pose a threat to competition.)

[13] FTC Staff Report, *Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform: Focus on Retail Competition* (Sept. 2001), *available at* http://www.ftc.gov/reports/elec/electricityreport.pdf; FTC Staff Report, *Competition and Consumer Protection Perspective on Electric Power Regulatory Reform* (July 2000), *available at* http://www.ftc.gov/be/v000009.htm (compiling previous comments from the FTC staff provided to various state and federal agencies).

[14] *See* http://www.ferc.gov/legal/fed-sta/ene-pol-act/epact-fina-rpt.pdf.

[15] Conference materials *available at* http://www.ftc.gov/bcp/workshops/energymarkets/index.shtml.

[16] Conference materials *available at* http://www.ftc.gov/bcp/workshops/carbonoffsets/index.shtml. Other programs have included the FTC's public workshop on *Market Power and Consumer Protection Issues Involved with Encouraging Competition in the U.S. Electric Industry*, held on September 13-14, 1999 (workshop materials *available at* http://www/ftc.gov/bcp/elecworks/index.shtm); and the Department of Justice and FTC workshop on *Electricity Policy*, held on April 23, 1996.

comments in December 2009 in FERC's proceedings on possible elements of a National Action Plan on Demand Response (Docket No. AD09-10-000)[17] and on transmission planning processes (Docket No. AD09-8-000),[18] and in March 2010 on performance metrics for regional transmission organizations (RTOs) and independent system operators (ISOs) (AD10-5-000).[19] The FTC also has commented on FERC's initiatives to promote wholesale electricity competition and on various state issues associated with restructuring the electric power industry.[20]

III. Issues Involved in the Integration of VERs

In this section, we discuss two general observations on the policy setting of the NOI and then comment briefly on specific aspects of the NOI.

A. FERC's policies should support competition among technologies to deliver desired outcomes at the lowest cost to society.

FERC should structure electricity markets to accommodate VERs so that the electricity system will allow existing generators and new technologies to compete to deliver the greatest net benefits to society. In the short term, efficient markets require existing plants and firms to compete to supply power and meet environmental goals and renewable portfolio requirements[21] at the lowest cost to ratepayers. In the long term, emerging demand- and supply-side technologies should be able to compete with incumbent thermal and renewable technologies. Markets must compensate each technology based on its costs and benefits to society. VERs pose challenges for electricity markets that differ from the challenges raised by traditional generation technologies.

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[17] This comment is available at http://www.ftc.gov/os/2009/12/V100002ferc.pdf.

[18] This comment is available at http://www.ftc.gov/os/2009/12/V100001ferc.pdf.

[19] This comment is available at http://www.ftc.gov/os/2010/03/100319performancemetrics.pdf.

[20] *See*, *e.g*., Federal Trade Commission, Comment before the Federal Energy Regulatory Commission on Wholesale Competition in Regions with Organized Electric Markets, FERC Docket Nos. RM07-19-000 and AD07-7-000 (Apr. 17, 2008), *available at* http://www.ftc.gov/be/v070014b.pdf. A listing of FTC and FTC staff competition advocacy comments to federal and state regulatory agencies (in reverse chronological order) is available at http://www.ftc.gov/opp/advocacy_date.shtm.

[21] Renewable portfolio standards and other environmental policies are efforts to reduce costs to society and to make costs to ratepayers better reflect costs to society.

Historically, electricity markets traded commodities suitable for a system dominated by predictable thermal generators. The keystone commodity traded on these markets is the megawatt-hour of power, which consists of one megawatt of energy flowing during every moment within an hour. In fact, however, this commodity is a bundle of several components, including (1) a total amount of energy, (2) temporal certainty about when that energy will be delivered, and (3) the assurance that there will be no need to respond quickly to a change in output. The move to establish open access transmission and wholesale power markets began the disaggregation of this energy commodity. The introduction of locational marginal pricing (LMP) disaggregated the megawatt-hours of power sold in a region into smaller markets that were split by the physical limits on moving power over the grid. LMP ensures that the commodities traded on electricity markets better reflect the physical realities of the system.

The expansion of VERs may require further disaggregation or the addition of new commodities (services) to power markets. This could enable markets to dispatch the system more efficiently by rewarding the facilities and programs that can supply power and ancillary services at least cost to society. This, in turn, should prompt more efficient investment decisions. For example, electricity markets could trade a commodity (service) consisting of a contract to provide (on average) a megawatt of power over an hour that allows significant flexibility about when the power will arrive. A 4-megawatt wind farm that is experiencing gusty winds – and thus expects to produce at an average of 25 percent of its capacity (*i.e.*, one megawatt) during an hour – could sell this contract. Such a contract could be paired with contracts sold to buyers with variable demands, so that the system operator could utilize both variable supplies and variable demands to ensure system stability and reliability. Within this example, buyers could contract for the lower-cost, variable supply to run hot water heaters, create stockpiles of crushed rock that can be mixed with concrete, charge plug-in electric or hybrid vehicles, or pursue similar flexible end-uses. As discussed at several points in the remainder of this comment, trading an electricity commodity that better reflects the output patterns of VERs could improve integration of VERs in several aspects of power markets. Demand-side purchases of power with an uncertain schedule may be an effective way for customers to participate in keeping electricity systems in balance. It might be more effective than existing approaches that allow customers to sell (as a separate service) their ability and willingness to reschedule consumption.

Just as RTOs use LMP to address transmission congestion, FERC may wish to consider whether RTOs should develop nuanced ways to compensate temporal flexibility and certainty. LMP uses an exquisitely detailed portrait of conditions on the transmission system to price power in specific places each hour. It increases compensation to the generators that can deliver power where it is needed most; it also tracks the costs of transmission congestion. LMP is an economic institution that addresses the physical reality that each transmission line has a limited ability to move power. Status quo, real-time markets often experience price spikes when there is a large need for adjustments in power output because only a few plants in the market are capable of changing output ("ramping") quickly enough to meet the change in demand. Further, the current economic model may not be nuanced enough to optimally deploy and compensate resources that can react quickly. A comparable economic institution may be needed that addresses the physical limits on how quickly conventional generators can ramp.

Plants operating at 100 percent of capacity cannot increase output even if they are capable of ramping quickly. Similarly, energy storage facilities that are not charged cannot deliver power. A resource can solve a problem only if transmission grid conditions allow it to get power to the area that needs it. Rapid reaction is likely to have greater value when weather conditions (such as gusty winds or broken clouds) create greater fluctuations in VERs' output. A good institution will both (1) improve incentives to invest in generation, demand response, and storage resources located in areas where rapid changes in power output are valuable and (2) encourage resources' owners to operate them in ways that deliver the greatest benefit to ratepayers.

Section III.C.2 of FERC's NOI directly addresses a flaw in current commodity definitions when it explores a possible change in the current practice of acquiring reserves (standby generating capacity) in the form of 24-hour (*i.e.*, round-the-clock) commitments. This requirement for a 24-hour commitment precludes certain intermittent generators from participating in markets for reserves and unnecessarily raises costs, wasting ratepayers' money. For example, solar thermal facilities – which use heat from the sun to boil water to drive generators – may be able to sell reserves whenever they have heat available, but typically are unable to generate during the early morning hours. We agree that shortening reserve commitment intervals would yield a more appropriate commodity to trade that would facilitate VERs' participation in reserve markets, increase competition, and thus benefit ratepayers.

Similarly, with regard to NOI Section III.E, FERC should consider the implications of how electricity markets trade and pay for reserves. Such trades affect both existing generation and the incentives to develop and introduce new generation and substitute technologies. For example, energy storage devices that can respond quickly for a limited duration may be less expensive per unit than those whose response lasts longer. Availability requirements that make sense for reserves from thermal generators may not make sense for storage devices that need time to recharge or even hydroelectric plants with a limited amount of water in their reservoirs. Although it makes sense to price the availability of a thermal plant to provide reserves, it may make more sense to trade the option to inject a set amount of energy into the grid from a portfolio that includes energy-limited hydroelectric facilities or storage devices. There are scenarios in which rapid response by reserves has significant value to grid operators. Prices that do not reflect the value of both the speed and the duration of response can distort the development and installation of reserve technologies. Indeed, fast-responding technologies may be particularly valuable because, while wind and solar output can drop suddenly, many conventional generating technologies ramp gradually.

As it considers changing the basic commodities traded in electricity markets, FERC should evaluate both the benefits of the changes and the one-time cost of altering the considerable software, institutional and regulatory infrastructure, and human knowledge that have developed to run the existing system. It may make sense to bear significant short-run costs to modify markets because running an advanced electricity system with the existing price-setting rules and muted price signals is likely to be quite inefficient. Future electricity systems will likely have much more wind generation and empower millions of consumers to save by helping to solve power system problems through smart grid technologies.

Existing electricity markets already experience price spikes when they need to increase output from some plants suddenly, and that situation may become far more common when VERs play a more active role in generation. This suggests paying greater attention to the institutions that value and compensate generators (and customers) for their ability to deal with sudden changes in the need for power. Adjusting pricing to reflect the costs to the power system of abrupt, unpredictable changes in either consumption or generation may create significant social savings. At the same time, the price charged for consumption that is unusually flexible (in accepting abrupt changes in supply) might be relatively low because of the lower reliability costs associated with supplying it.

The NOI does not mention either various forms of dispatchable renewable generation or alternative ways to achieve policy goals that often prompt investment in VERs. Inappropriate pricing of VERs that fails to capture the whole social cost of integrating and balancing such resources may lead to the use of VERs even when renewable, dispatchable generation,[22] energy efficiency programs, or demand response could meet the same goals at a lower cost to society. Well-structured electricity markets are technology-neutral systems that reach social goals at the lowest social cost.

1. Scheduling incentives (Section III.B.2)[23]

Section III.B.2 of the NOI focuses on FERC's new approach to imbalance penalties. Electricity markets charge a facility an imbalance penalty when the facility's actual output diverges from its scheduled output. Unexpected changes in a generator's output create

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[22] Generation based on some renewable energy sources (including geothermal, biomass, tidal, and some other hydrokinetic and conventional hydroelectric sources) is not dependent on weather conditions or time of day and may be dispatchable, much like conventional generation.

[23] References to "Section" in the remainder of this comment are to sections of the NOI.

significant costs and risks for grid operators. Inflexible demand exacerbates these costs. Imbalance penalties were introduced to discourage the imposition of such costs when a generator's deviation from the grid operator's schedule was an anomaly that might reflect questionable maintenance and operating decisions. By contrast, wind and solar photovoltaic output typically varies from minute to minute. The cost of managing output intermittency may affect the cost effectiveness of investments in wind and photovoltaic facilities. These new technological realities may justify the consideration of more nuanced and accurate ways to price unexpected changes in generation output.

FERC's new approach sets higher penalties for large real-time imbalances and creates a cap on imbalance penalties faced by intermittent resources. Numerous real-world experiences corroborate the economic theory's lesson that charging different prices for the same product leads to adverse consequences. Trading a new commodity – namely, a megawatt of power over an hour (on average) that allows flexibility about when the power will arrive – would sidestep the assumption that sellers promise and buyers expect continuous, uniform delivery, which necessitates imbalance charges. FERC could consider charging each plant's contribution to the cost of keeping the system in balance, determined roughly as follows:

- Each plant could pay for its share of the system's physical capacity to respond to a sudden change in its output by buying options on fast-reacting resources that can make offsetting changes. Plants would buy these options based on an analysis of (1) the frequency and magnitude of (and the required speed of response to) unscheduled output changes from that plant or similar plants and (2) how these deviations correlate with other deviations from similar plants in the system. Making this work is likely to require careful and complete definitions of property rights – a potentially difficult exercise that nonetheless could be worthwhile if analysis suggested that the benefits of doing so will outweigh the costs.[24]

- A plant would pay the actual cost of increasing or decreasing generation at other plants when its output changed suddenly. These costs would include reimbursing customers for the value of lost load should a sudden drop in the plant's output cause a blackout.

2. Participation in day-ahead market and reliability commitments (Section III.C.1)

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[24] For example, the combination of the output from a new wind farm and an adjacent, existing wind farm creates a correlated output fluctuation risk to the system. Appropriate property rights determine who pays for the new correlated output fluctuation risk in a way that gives wind developers the right incentives to build new plants.

FERC asks whether there is any reasonable way for VERs to participate in RTO/ISO day-ahead markets, given the financial risks entailed and the uncertainty about future weather conditions. As we noted above, VERs often produce commodities different from those produced by conventional generators. VERs could easily trade a commodity that better matches their intermittent output both on day-ahead markets and, potentially, even long-term. For example, they could engage in bilateral transactions with buyers that can accommodate intermittent consumption. VERs could sign forward contracts with entities capable of "shaping" intermittent production to make it predictable (*e.g.*, using onsite energy storage capability).

If it chooses not to adjust the portfolio of commodities, FERC may wish to consider whether portfolios of geographically dispersed VERs could confidently participate in existing day-ahead markets, even though individual facilities would have difficulty doing so without a paired energy storage facility or a demand response partner. If economies of massed reserves[25] are significant, networks of VERs could be an effective substitute for pairings of VERs with energy storage devices at every location. FERC should explore whether there are regulatory barriers to aggregating such portfolios and whether there should be joint consideration of transaction costs and antitrust concerns.

B. Efficient institutions create rules and commodities that let consumers and suppliers play a role in keeping supply and demand balanced.

FERC invites commenters to take a broad perspective on the issue of integrating intermittent renewable generation.[26] Although this NOI understandably focuses on the supply-side elements of generation and reserves, FERC must keep in mind that integration and reliability depend on the *interaction* of supply with demand. Consumers can help balance the system by responding either to accurate, frequently-varying prices or to signals from system operators. Such consumer participation programs are likely to be important in integrating VERs. Consumer participation may be less costly than balancing the system by building and maintaining fast-reacting power plants. Electric systems generally pay to operate such plants at their minimum capacity while they are on standby. Demand- and supply-side solutions compete, and good markets allow them to do so on their respective merits. A policy that puts the entire onus on the supply side to integrate intermittent generation is likely to be inefficient and more costly than a balanced approach that uses both sides of the market. The increasing role of VERs is likely to change the role of demand response by creating more frequent, shorter, and less predictable opportunities for consumers to adjust or reschedule their consumption in order to

[25] James Mulligan, "Economies of Massed Reserves," 73 *Am. Econ. Rev*. 725 (1983).

[26] NOI P 13.

help solve challenges facing electricity system operators. For this reason, we encourage active demand-side involvement as a technique for integrating VERs into the electric power system. FERC should integrate analysis of how markets and institutions can best harness demand- and supply-side resources in this context.[27]

For example, the value of integrated analysis is apparent in considering FERC's request for comments about the implications of using finer intervals in power plant operation schedules. Shorter intervals are likely not only to accommodate VERs, but also to better match demand response technologies. Some demand response providers might be unwilling to reduce consumption over an hour interval but agreeable to commit to such a reduction over a shorter interval. For example, a customer with a food refrigeration system might be willing to provide demand response for 15-minute intervals but unwilling to respond for an hour if such a prolonged shutoff risked exceeding the maximum allowed temperature for foodstuffs.[28]

C. Other Elements of the NOI.

1. Data and forecasting (Section III.A)

FERC offers suggestions for better weather forecasting as a way to ease the task of integrating intermittent generation (and thus to lower costs for consumers). The premise is that better warnings about fluctuations in renewable generation will facilitate the use of lower-cost reserves to integrate this generation. We applaud efforts to improve supply forecasts where the benefits are found to exceed the costs. We note that better micro-forecasting reportedly can be used to increase the efficiency of wind generation.[29] This also could increase productivity and reduce consumer costs.

A broader perspective is that variability at any stage of production in the power industry can pose a problem for reliability, because the stability of the system requires that consumption match generation continuously in real time. Moreover, as we noted in our recent comment on

[27] The original FTC staff report on retail electricity markets, issued nearly a decade ago, included a chapter entitled "Supply and Demand: The Sound of One Hand Clapping" to portray the long-lived and lingering problems created by widespread non-dynamic retail pricing of electric power. FTC Staff Report, *Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform: Focus on Retail Competition*, *supra* note 13. This has been a theme of several FTC comments to FERC and to state regulators.

[28] This example was previously presented in Section IV of the FTC comment to FERC on Wholesale Competition in Regions with Organized Electric Markets, *supra* note 20.

[29] Tyler Hamilton, "Laser Sensors for Wind Turbines," *Tech. Rev*. (MIT, Nov. 6, 2008), available at http://www.technologyreview.com/energy/21643.

the National Action Plan on Demand Response,[30] better forecasting of demand – including the level and persistence of consumer participation in demand response – would help maintain reliability at the lowest cost.

2. Balancing authority coordination/consolidation (Section III.D)

FERC asks whether small balancing authorities lead to higher integration costs for VERs and, if so, what should be done. Two potential solutions would be (1) coordination between small balancing areas and (2) consolidation of small balancing areas into larger areas. We encourage FERC to examine this question from the perspective that integration of VERs can be less costly if the geographic scale of the balancing authority is sufficient to include VERs whose low-generation periods are unlikely to coincide with each other. In practice, selectively coordinating or combining existing control areas may be a feasible and practical approach to reducing the costs of integrating VERs.

3. Capacity markets (Section III.F)

FERC points out that VERs typically receive less revenue per unit of output than other sources of generation, both because of their operating characteristics and because they seldom participate in day-ahead markets (due to the risk associated with VERs' intermittent character). The NOI asks whether the existing payment system discriminates against VERs and thereby constitutes a barrier to VERs' entry. Although output from a single wind farm is sensitive to the weather conditions in its location, which vary enormously from day to day, the output of groups of geographically dispersed VERs acting together as a single generation source is more predictable. With this increase in predictability, portfolios of output from geographically dispersed VERs, if allowed to bid as a group, may be sufficiently certain to participate in capacity markets. Allowing entry into capacity markets should increase competition, but aggregating facilities raises obvious antitrust concerns. FERC should do appropriate antitrust analysis of any policies that allow aggregation of firms or outputs.

FERC should consider ways in which capacity markets can support a transition from the status quo thermal system (with limited demand-side participation and aggressive price mitigation that substitutes for demand elasticity) to a future system in which VERs and consumer participation in demand response play a larger role, and in which administrative interventions such as price caps and capacity markets are less important.

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[30] Federal Trade Commission, Comment before the Federal Energy Regulatory Commission, Discussion Draft of Possible Elements of a National Action Plan on Demand Response (Dec. 11, 2009), *available at* http://www.ftc.gov/os/2009/12/V100002ferc.pdf.