March 19, 2010

POWER SYSTEM BALANCING AUTHORITY INNOVATION

Malcolm McLellan and Carol Opatrny[1]

Electricity, once generated, follows the "path of least resistance" to a load that immediately consumes the electricity. Since electricity cannot generally be routed in a specific direction, the electric system must be monitored in real time, 24 hours a day and 365 days a year, to ensure a consistent and ample supply of electricity.[2] This monitoring is performed by Balancing Authorities pursuant to standards developed by the North American Electric Reliability Corporation (NERC) and overseen by the Federal Energy Regulatory Commission (FERC) in the United States and governmental authorities in Canada. These standards require all loads and generators to be managed by individual Balancing Authorities so that the bulk electric system, as a whole, is continuously in proper balance, as the term implies. In the United States, the Energy Policy Act of 2005 made compliance with approved standards mandatory on all users, owners and operators of the bulk-power system.[3]

The decision of how to assimilate load or generation into a Balancing Authority Area is currently under debate.[4] Generally, there are three options available to existing as well as new loads and generators: (1) integrate into the Balancing Authority Area that operates the system to which the load or generation is interconnected; (2) choose to certify a new Balancing Authority Area and register as a Balancing Authority using owned or contracted-for resources to manage the Balancing Authority's requirements; and (3) integrate into an existing Balancing Authority Area with the expectation of self-supplying or executing "buy-through" arrangements (purchasing services from independent generation or from other Balancing Authorities).[5] These choices are

---

1 Malcolm McLellan is a Member of Van Ness Feldman, PC, a law firm focused on energy and natural resource law in Seattle, Washington and Washington, D.C.; Carol Opatrny is President of Opatrny Consulting Inc., an energy consulting firm in Battle Ground, Washington. This paper represents the views of the authors; it does not necessarily represent the views of any clients of the authors.

2 NERC, *Understanding the Grid*, http://www.nerc.com/page.php?cid=1|15.

3 16 U.S.C. § 824(e) (2006). *See also* NERC, *Company Overview*, http://www.nerc.com/page.php?cid=1|7.

4 *E.g.*, *Notice of Inquiry - Integration of Variable Resources*, FERC Docket No. RM10-11-000 (Jan. 21, 2010) (*Notice of Inquiry*); Mizumori and Nickell, *Balancing Area Applications in the Western Interconnection* (Nov. 24, 2008) (Unpublished) (*WECC Paper*).

5 NERC Reliability Standards, BAL-005-0.1b, R1 (2009), http://www.nerc.com/files/Reliability_Standards_Complete_Set_2010Jan25.pdf. The North American Electric Reliability Council (NERC) maintains an official glossary of terms used in its reliability standards. A **Balancing Authority Area** refers to "The collection of generation, transmission, and loads within the metered boundaries of

stimulating innovation in the manner in which generation (including intermittent renewable generation) and load are incorporated into the electric grid. This innovation is the direct result of FERC's vigilance in removing barriers to entry and NERC's functional model that assigns electric reliability responsibility based upon the ownership structure and operational functions a business chooses to assume.

The existence of these choices, though, has brought about questions concerning their impact on reliability. This paper challenges the simplified perception that additional Balancing Authorities are inherently bad and Balancing Authority consolidation is inherently good.[6] Without question, the addition of or access to services from different Balancing Areas changes the complexion of the industry. This is true even in the case of Balancing Authority consolidation. Furthermore, consolidation alone does not spark innovation in terms of greater diversity of energy services or competition for wholesale and ancillary services.[7] Given the universal applicability of the NERC standards to all Balancing Authorities, reliability is, by design, not negatively impacted by the addition of new Balancing Authorities.[8] Moreover, the addition of new Balancing Authorities or facilitation of inter-Balancing Authority transactions arguably achieves the same results that some associate with consolidation, namely, higher effectiveness, greater transparency, greater access to market opportunities and greater

---

the Balancing Authority. The Balancing Authority maintains load-resource balance within this area." A **Balancing Authority** refers to "The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time." *NERC Glossary of Terms Used in Reliability Standards*, http://www.nerc.com/docs/standards/rs/Glossary_2009April20.pdf.

6 *See WECC Paper*; *Special Report: Accommodating High Levels of Variable Generation*, at 36, paragraph 3.1, NERC (April 2009) ("***Industry Action***: State, provincial and federal agencies and policy makers should consider: … The issues and opportunities associated with larger balancing areas and the desirability of shorter resource scheduling intervals or regional dispatch optimization.") (*NERC Special Report*), http://www.nerc.com/files/IVGTF_Report_041609.pdf; *Notice of Inquiry*.

7 One of the most important results of additional Balancing Authorities is the conversion of a portion of existing generation to automatic generation control (AGC) which ensures that NERC's reliability standards can be met. By converting a greater portion of generation to AGC, generation and in some cases, demand-response arrangements, can better respond to momentary movement of load and generation so that individual Balancing Authorities and the bulk electric system as a whole are continuously in balance.

8 *See, e.g.*, NERC Balancing Authority (BA) Certification of Griffith Energy, LLC (Nov. 21, 2008), http://www.nerc.com/files/Griffith%20CT%20Final%20Report%20Rev0%20.pdf; NERC Balancing Authority (BA) Certification of NaturEner Glacier Wind Energy 1, LLC (Sept. 11, 2008), http://www.nerc.com/files/NaturEner%20Final%20Report.pdf; NERC Balancing Authority (BA) Certification of Plum Point Energy Associates and Osceola Municipal Light & Power (July 17, 2009), http://www.nerc.com/files/Confidential-Plum_Point_and_Osceola_CT_Report.pdf.

efficiencies.[9] Therefore, FERC and NERC should continue to remove barriers that may impede the implementation of new business models, ideas, and technologies. Efforts should continue to be made to ensure that existing structures do not act as barriers to new entrants and to encourage new approaches that enhance the efficient use of existing resources and enable the efficient incorporation of new resources.

In this paper we provide insight as to why the co-existence of choice in Balancing Authority service models facilitates competition and is consistent with our system of reliability. We start by providing some background describing NERC's role in terms of identifying, registering and overseeing all entities responsible for complying with Reliability Standards (**Section 1**); then, we specifically focus on the standards applicable to Balancing Authorities (**Section 2**). Next, we discuss issues that arose during the certification of a number of the recently added Balancing Authorities and the solutions implemented (**Section 3**); and then, we identify the drivers behind the choice to: interconnect with an existing Balancing Authority Area; register as a Balancing Authority while managing to reliability standards; or, interconnect and seek self-supply services or buy-through arrangements from independent generators or other Balancing Authorities, making the point that the ultimate decision is purely a business decision (**Section 4**). We conclude (**Section 5**) with the point that it is only through vigilance that we ensure existing structures and traditional approaches do not become barriers to new market entrants and innovation.

Section 1: NERC's Role – Certification, Registration and Compliance

To ensure that all consumers have a reliable source of power at all times, various NERC-certified agencies constantly monitor the generation, interconnection, transmission, and metering of the North American electric grid.[10] Certified authorities monitor flows from diverse sources of generation including hydroelectric dams, coal-fired resources, wind turbines, oil and gas-fired turbines, biomass and geothermal resources, solar panels and demand-response arrangements. Due to the somewhat variable nature of many of the more recently integrated renewable resources, the task of

---

9 It is noteworthy that the establishment of separate Balancing Authorities may in and of itself prove beneficial in terms of improving or enhancing system security.

10 North America is divided into eight regions each having its own regional reliability organization that works with NERC to improve the reliability of the Bulk Electric System. A map of the regions is found at http://www.nerc.com/page.php?cid=1|9|119. The regional entities operate under a Delegation Agreement from NERC that allows some autonomy and independent oversight and regional control of the Bulk Electric System within their territory. *See About WECC*, http://www.wecc.biz/About/Pages/default.aspx. Each regional entity oversees the registered entities in its region. Registration Program: http://www.nerc.com/page.php?cid=3|25.

monitoring reliability and ensuring a constant and continuous source of power has introduced new complexities that require innovation to overcome.

To ensure reliable operation of the grid, NERC maintains a registry and certification program for the purpose of identifying those entities responsible for compliance with approved reliability standards.[11] As of February 24, 2010, 1,889 entities are registered with NERC and, therefore, subject to meeting the Reliability Standards associated with their applicable function(s). Statistical data from NERC's compliance registry is republished below. The matrix provides a list of the functions by regional entity and the current total number of organizations registered in each category.[12]

NERC Compliance Registry Matrix

Statistical Data

Registration Status as of 2/24/2010

Region	# of Registered Entities	BA	DP	GO	GOP	IA	LSE	PA	PSE	RC	RP	RSG	TO	TOP	TP	TSP	Total # of Functions
ERCOT	217	1	48	111	80	1	30	1	41	1	1	0	29	1	24	1	370
FRCC	72	11	26	30	30	11	17	13	27	1	14	1	25	16	12	8	242
MRO	124	20	54	46	45	6	57	6	73	3	34	2	37	21	23	13	440
NPCC	294	6	64	136	133	6	55	6	87	5	6	2	34	14	17	14	585
RFC	365	13	90	145	140	3	58	4	163	2	15	1	36	15	14	3	702
SERC	232	32	73	97	87	28	74	19	85	7	31	6	46	25	27	18	655
SPP	126	16	48	51	49	2	52	1	64	1	25	1	37	18	21	10	396
WECC	459	34	176	211	202	1	150	29	148	1	56	3	82	54	46	36	1229
TOTALS:	**1889**	**133**	**579**	**827**	**766**	**58**	**493**	**79**	**688**	**21**	**182**	**16**	**326**	**164**	**184**	**103**	**4619**

While entities generally identify the function they perform, NERC may assign functional responsibilities where it believes a reliability gap would otherwise exist.[13]

---

11 NERC Rules of Procedure, section 501 (2010), http://www.nerc.com/files/NERC_Rules_of_Procedure_EFFECTIVE_20100205.pdf.

12 *NERC Compliance Registry Matrix*, http://www.nerc.com/files/NERC_Compliance_Registry_Matrix_Summary20100129.pdf. The full names of the regional entities listed in the first column are as follows: Florida Reliability Coordinating Council; Midwest Reliability Organization; Northeast Power Coordinating Council; Reliability First Corporation; SERC; Southwest Power Pool; Texas Regional Entity; and Western Electricity Coordinating Council. The full names of the functions listed along the top and an explanation of many of the functions are found in the *NERC Glossary of Terms Used in Reliability Standards.* For example, **BA** means **balancing authority**, see footnote 5 for its definition. **DP** means **distribution provider**, "Provides and operates the 'wires' between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage. **GO** means **generation owners**, "Entities that own and maintain generating units." **PSE** means **purchasing-selling entity**, "The entity that purchases or sells, and takes title to, energy, capacity, and Interconnected Operations Services. Purchasing-Selling Entities may be affiliated or unaffiliated merchants and may or may not own generating facilities." **TO** means **transmission owner**, "the entity that owns and maintains transmission facilities."

13 *New Harquahala Generating Co., LLC*, 123 FERC ¶ 61,173 (2008).

Once NERC certifies the entities for their respective functions, if required, they are registered with NERC and assume responsibility for the reliability requirements associated with those functions.[14] This process ensures that: (1) all areas are under the oversight of only one reliability coordinator in its respective reliability coordinator area; (2) all balancing authorities and transmission operators are under the responsibility of only one reliability coordinator in their respective reliability coordinator area; (3) all transmission elements are under the responsibility of only one transmission planner, planning authority and transmission operator; and, (4) all loads and generators are under the responsibility and control of only one balancing authority.[15]

In most cases, registration categories are a function of asset ownership (e.g., Generation Owner (GO), Transmission Owner (TO), Distribution System Owner /Provider (DP)) and operational responsibility. Other functions are arguably "optional" such as registering as a Balancing Authority or a Purchasing-Selling Entity (PSE). Deregulation of the industry and technological advancements, paired with industry experience has enabled these functions, or specific responsibilities, to be contracted out to third-party organizations, or formally delegated to third-party organizations.[16]

Important to this discussion is the fact that the NERC certification and registration process does not limit the number of entities that are allowed to perform the various responsibilities associated with each function, and does not require that any specific organization take on "optional" roles such as a Balancing Authority. This latitude provides generators and load-serving entities the choice of taking on more operational control without compromising reliability and is consistent with United States energy policies designed to foster wholesale electric competition and remove barriers to entry.[17]

---

14 NERC Rules of Procedure section 501(2).

15 *Id.*, section 501(1.4).

16 Compensation paid to entities and the third-party organizations that perform the reliability functions has the potential to negatively affect reliability. Organizations should be paid for the performance of stated operational and management services and should not be influenced by market conditions, trading positions or market prices.

17 *FERC Strategic Plan (FY 2009 – 2014)* at Section 1.1 (September 2009) ("Enhance competition by allowing non-discriminatory market access to all supply-side and demand-side energy resources. Promote operational efficiency in wholesale markets through the exploration and encouragement of the use of software and hardware that will optimize market operations."); *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs., Regs. Preambles 2006-2007 ¶ 31,241 at PP 11-25 (2007), *order on reh'g*, Order No. 890-A, FERC Stats. & Regs., Regs. Preambles 2006-2007 ¶ 31,261 (2007), *order on reh'g and clarification*, Order No. 890-B, 123 FERC ¶ 61,299 (2008) (Historic overview of the development of wholesale electric competition); *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs., Regs. Preambles 1996-2000 ¶ 31,089 (1999) (Enhance competition and increase efficient of wholesale electric market operations. Increase non-

Section 2: Reliability Standards for Balancing Authorities

As mentioned above, the reliability of the electric system is governed by a comprehensive set of Reliability Standards that require planning, real-time monitoring, and ongoing reporting.[18] NERC and its regional entities monitor and enforce this comprehensive set of standards to ensure reliability of the electric system.[19]

Relevant to this discussion of Balancing Authorities is the Reliability Standard requiring that, "[a]ll generation, transmission, and load operating within an Interconnection must be included within the metered boundaries of a Balancing Authority Area."[20] At a technical level, Balancing Authorities maintain a balance between resources and loads (or between scheduled and actual generation) within their respective Balancing Authority Area in real time, which is measured by the Balancing Authority's Area Control Error (ACE).[21] Specific Balancing Authority tasks may include balancing: (a) load and generation; (b) load and confirmed interchange; (c) generation and confirmed interchange; or (d) generation, load, and confirmed interchange.[22] Other Balancing Authority requirements are provided in Table 1 (below) which may be taken on solely by the registered Balancing Authority, or they may be assigned in full or in part to other organizations that meet the requirements.

---

discriminatory access to the transmission grid); Order No. 890-B at P 1 ("The pro forma OATT was intended to foster greater competition in wholesale power markets by reducing barriers to entry in the provision of transmission service.").

18 NERC develops these reliability standards in accordance with specific procedures specified in its Rules of Procedure. These procedures require that NERC provide reasonable notice and opportunity for pubic comment, due process, openness, and a balance of interests in developing reliability standards. In the United States, FERC has the regulatory responsibility to approve reliability standards. *See* Petition of the North American Reliability Corporation for Approval of Formal Interpretations of Reliability Standards, FERC Docket No. RM06-16-000 (2007); *Supra*, Footnote 3.

19 *See* NERC BAL Standards, *available at* http://www.nerc.com/page.php?cid=2\20.

20 NERC Reliability Standard, BAL-005-0.1b, R1.

21 NERC Reliability Functional Model Technical Document, Version 5 at 8. (September 2009). Area control error (ACE) is, "The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error." *NERC Glossary of Terms Used in Reliability Standards.*

22 NERC Reliability Functional Model, Function Definitions and Functional Entities, Version 5 at 33 (September 2009).

Table 1: Balancing Authority Tasks[23]	
1. Review generation availability, planned dispatch, and capability against forecasted load and commitments.	**8.** Deploy reliability-related services.
2. Formulate an operational plan (determine needs for reliability-related services) for reliability evaluation. Communicate with other reliability entities as appropriate.	**9.** Implement emergency procedures.
3. Approve Arranged Interchange.	**10.** Monitor and report control performance and disturbance control scores.
4. Implement Confirmed Interchange.	**11.** Perform energy accounting (including hourly checkout of Implemented Interchange and Actual Interchange).
5. Calculate ACE for the Balancing Authority Area.	**12.** Maintain required operating procedures, communications equipment (voice and data), and tools for monitoring and analysis.
6. Operate the Balancing Authority Area to maintain load-interchange-generation balance, including administration of inadvertent energy paybacks.	**13.** Employ appropriately NERC-certified operating personnel to monitor the Balancing Authority Area at all times.
7. Operate the Balancing Authority Area to contribute to Interconnection frequency.	**14.** Maintain a training program to ensure operating personnel have the skills and knowledge to operate as a Balancing Authority.

The decision to register as a Balancing Authority is a serious decision that involves the assumption of a number of responsibilities that are verified in the certification process. These responsibilities carry with them financial costs that are not realized by generators and/or load-serving entities that do not assume these responsibilities. As long as a generator or load-serving entity considers the responsibilities and consequences of registering as a Balancing Authority, exercising this option provides additional tools to enhance efficiency and contain expenses as a result of greater operational and control precision. Furthermore, the ability to become a Balancing Authority encourages competition by providing generators and load-serving entities with opportunities not otherwise available to a resource-deficient, inefficient or expensive "host" Balancing Authority.[24]

To qualify as a Balancing Authority, a generator or load-serving entity must undergo a certification audit to prove that it has the processes, procedures and tools in

23 Note that a system of computer technology used to monitor, control and optimize performance of generation and/or transmission systems known as EMS (Energy Management System)/SCADA (Supervisory Control and Data Acquisition) is needed to perform these tasks.

24 *Supra*, footnote 17.

place so that it can perform the Balancing Authority function in accordance with NERC's Reliability Standards.[25] The process by which a Balancing Authority is certified involves months of preparation before an audit team, composed of NERC and regional entity representatives, comes on site. Also, similar to a compliance audit, the organization seeking to become certified is required to document the tools and procedures that will be used to comply with each applicable Reliability Standard for review by the audit team. Once the certification team is assured of the capability to operate reliably as a Balancing Authority, including demonstrating the establishment of necessary infrastructure and required procedures with adjacent Balancing Authorities and Transmission Operator(s), it provides an audit report to committees within the affected regional entity for review and approval.

Once certified and registered, the Balancing Authority must operate in compliance with reliability standards applicable to the Balancing Area function. The Resource and Demand Balancing (BAL) reliability standards are the primary metrics against which a Balancing Authority's performance is measured.[26] The operational activities and performance standards governed by the BAL standards include the Control Performance Standard, the Disturbance Control Standard, maintenance and deployment of contingency reserves, frequency bias calculations, participation in time error corrections, and accurate accounting of inadvertent balances.[27] Each Balancing

---

25 NERC Rules of Procedure Section 501.2, 502 and Appendix 5 (March 21, 2008); *See* WECC Control Area Certification Procedures. These procedures specify a detailed process that WECC will conduct to ensure reliability before certification as a control area or Balancing Authority. As part of this process, a potential Balancing Authority must fill out an extensive questionnaire and agree to comply with all of the reliability standards adopted by NERC before being considered as a certified Balancing Authority. See NERC Balancing Authority Questionnaire, *available at* http://www.nerc.com/files/BA_Questionnaire_ORCS_012408.doc.

26 Each NERC function is required to adhere to the reliability standards associated with that function. NERC maintains a matrix allocating standards and functions found at http://www.nerc.com/docs/standards/rs/VRF_Standards_Applicability_Matrix_2009Oct21.xls.

27 *See* NERC BAL Standards, http://www.nerc.com/page.php?cid=2\20; **Area control error** (ACE) is defined as "The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error." **Disturbance** is defined as "An unplanned event that produces an abnormal system condition, any perturbation to the electric system, or the unexpected change in ACE that is caused by the sudden failure of generation or interruption of load." **Contingency reserve** is defined as "The provision of capacity deployed by the Balancing Authority to meet the Disturbance Control Standard (DCS) and other NERC and Regional Reliability Organization contingency requirements." **Frequency response** is defined differently depending on whether you are referring to equipment or to the system as a whole. For equipment, frequency response is, "The ability of a system or elements of the system to react or respond to a change in system frequency." For the system, frequency response is, "The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz)." **Time error correction** is defined as "An offset to the Interconnection's scheduled frequency to return the Interconnection's Time Error to a predetermined value." *NERC Glossary of Terms Used in Reliability Standards.*

Authority must comply with the BAL standards to maintain the reliability of the system. If a Balancing Authority fails to comply, then NERC and/or the regional entity, through its monitoring, compliance and enforcement processes can recommend sanctions and remedial action directives to FERC for enforcement.[28]

One of the newest NERC-certified Balancing Authorities is NaturEner Power Watch, LLC (GWA). GWA has been a relatively high profile example of a newly certified Balancing Authority and has garnered significant interest in the composition and implications of establishing new Balancing Authorities. The GWA Balancing Authority consists of the Glacier wind facility, which is currently the largest wind farm in the state of Montana with a nameplate capacity of 210 MW. In addition, GWA is the first, wind-based generator in the United States to register as a Balancing Authority; it is directly interconnected with the NorthWestern Energy Balancing Authority (NWE) that is also located in the State of Montana. GWA's situation is somewhat unique because existing Montana law prohibits NWE from owning generation beyond what is necessary to serve its own load. In other words, in Montana, until recently, merchant generation was not able to secure from NWE the ancillary services necessary to reliably operate.[29] As a result, other than relocating, the owner of the Glacier wind facility had to either establish its own Balancing Authority or operate as an independent power producer in NWE's Balancing Authority. Operating as an independent power producer within NWE would have required GWA to secure the necessary ancillary services from other Balancing Authorities subjecting itself to NWE's Generation Imbalance charges and potentially, exposing NWE to Control Performance Standard (CPS) violations. While becoming its own Balancing Authority required GWA to procure other power and transmission services in order to assemble its own mix of balancing resources, doing so allowed NWE to maintain precious resources required to balance its own native load and avoid exposure to control performance violations.

GWA's experience is an example of the challenges that drive innovative solutions to cost-effectively integrate resources while enhancing reliability. There are other examples where load-serving entities and generators have decided that registering as a Balancing Authority was the right solution for its business.[30] More

---

28 NERC, *About Compliance*, http://www.nerc.com/page.php?cid=3|249.

29 On November 10, 2009, FERC issued an Order requiring NorthWestern to offer ancillary services. *NorthWestern Corp.*, 129 FERC ¶ 61,116 (2009).

30 In the WECC, there are currently five generation-only Balancing Authorities including: Gila River, Arlington Valley, Harquahala, Griffith and NaturEner Power Watch, LLC, (GWA). Examples of new "load-only" Balancing Areas include: City of Conway, Arkansas and City of Ruston, Louisiana. An example of a new "load and generation" Balancing Authority is North Little Rock, Arkansas.

often than not, generation and load have decided that the best solution for their businesses is to assimilate into or remain part of an existing, "host" Balancing Authority and to exclusively access that Balancing Authority's services. Yet in other cases, generation and load have chosen to either access services from other Balancing Authorities or to dynamically move their load or generation to other Balancing Authorities, adjacent or beyond.[31]

In any given situation, the best solution takes into account the respective costs and benefits of the various options. These considerations are often unique to each situation due to the different geographic, regional and state policies and commercial conditions involved. Importantly, there is no universal solution. In fact, the existence of alternative solutions provides healthy diversity and competition since having multiple solutions gives a generator or load entity the opportunity to select the most cost-effective and efficient approach to meet its reliability requirements.

Section 3: Concerns and Solutions Associated with Additional Balancing Authorities

Due to the variable nature of many of the recently integrated intermittent renewable resources, the task of satisfying reliability requirements and ensuring a constant source of power has had to overcome new complexities. Yet, innovation has overcome skeptics that have feared the use of proven practices in non-traditional ways to help businesses move forward and grow while maintaining reliability. The subsections that follow discuss issues that arose during the certification of a number of the recently added Balancing Authorities.

Balancing Authority Reliability Standards: As discussed above, to qualify as a Balancing Authority, a business must first prove that it has the processes, procedures and tools in place to perform the function in accordance with NERC's Reliability Standards.[32] Once registered, it must operate in compliance with those standards.

---

31 Examples include: Northwestern Energy's ancillary services agreements with Avista Corp (FERC Docket No. ER09-143-000); Bonneville Power Administration (FERC Docket No. ER08-1526-000); Powerex Corp (FERC Docket No. ER08-1528-000); and Public Utility District No. 2 of Grant County, Washington (FERC Docket No. ER08-1529-000).

32 NERC Rules of Procedure Section 501.2, 502 and Appendix 5 (March 21, 2008); *See* WECC Control Area Certification Procedures. These procedures specify a detailed process that WECC will conduct to ensure reliability before certification as a control area or Balancing Authority. As part of this process, a potential Balancing Authority must fill out an extensive questionnaire and agree to comply with all of the reliability standards adopted by NERC before being considered as a certified Balancing Authority. *See* NERC Balancing Authority Questionnaire, *available at* http://www.nerc.com/files/BA_Questionnaire_ORCS_012408.doc; The matrix of standards applicable

Every Balancing Authority, regardless of its resource composition, adheres to exactly the same standards—no more and no less. By way of comparison, a generation owner (GO) that becomes certified and registered as a Balancing Authority is obligated to comply with all of the BAL standards in addition to the generator owner reliability standards. Whereas the same generation owner that does not become a Balancing Authority is only required to comply with the generation owner reliability standards. In the context of a generation operator (GOP), the generator operator is only required to adhere to the BAL-005-0.1b, requirements R1 and R1.1. These comparisons are significant as a generator owner or generator operator that becomes certified as a Balancing Authority assumes significantly more responsibility for ensuring overall reliability of the grid.

For example, a generation-only Balancing Authority maintains a real-time (every four seconds) operational data exchange with the interconnected Transmission Operators, interconnected Balancing Authorities, the regional Reliability Coordinator, and, where applicable, Reserve Sharing Groups.[33] The Balancing Authority also provides daily data to Reliability Coordinators and adjacent Balancing Authorities and Transmission Operators including hourly net scheduled interchange, available reserves by hour, and unit availability (while a generator owner that does not become a Balancing Authority provides limited information used primarily by its transmission owner (TO) for planning purposes). Finally, becoming a Balancing Authority makes business sense in that the generator owner may be able to better monetize its assets by selling and purchasing other types of energy products that are more dynamic than traditional hourly-block schedules. This means that Balancing Authorities foster competition (and reduce energy prices) by engaging in transactions that may not be facilitated when operating only as a generator owner within a host Balancing Authority.

Once a new Balancing Authority is engaged, the incumbent Transmission Provider is free to utilize elsewhere the regulating resources it once would have used to manage that same generator as an independent power producer. This means that more resources are available to the incumbent Balancing Authority for integrating

---

to each function is found at:
http://www.nerc.com/docs/standards/rs/VRF_Standards_Applicability_Matrix_2009Oct21.xls.

33 It is noteworthy that while the amount of a Contingency Reserve Obligation is not typically affected by the number of members in a Reserve Sharing Group (i.e., the Single Largest Contingency does not change), the addition of members in a Reserve Sharing Group directly reduces each member's respective contribution (e.g., more entities are contributing to the support of the Single Largest Contingency) which in turn, increases system efficiency and reduces the per-member cost of providing reserves.

renewables. This also means that the new Balancing Authority is free to secure and coordinate other balancing capabilities to manage its own requirements.

Balancing Authority Resource Composition: A Balancing Authority must operate in compliance with NERC's Reliability Standards regardless of the composition, size or number of resources within the Balancing Authority Area. The resources that make up a Balancing Authority Area may include loads and generating resources, loads only, or generating resources only. As discussed above, the process by which a Balancing Authority is certified occurs when the audit team verifies that the applicant has the tools, processes, and procedures in place to operate the resources in a manner that satisfies the requirements. The composition of the resources within a Balancing Authority Area are not addressed by the Reliability Standards; and correctly so. The composition of resources within a Balancing Authority Area is not a measure of reliability but rather defines the particular system that must be managed in accordance with NERC's reliability standards. Said another way, a Balancing Authority must operate according to NERC's Reliability Standards regardless of the composition, size or number of resources that constitute the Balancing Authority Area. In this sense, all Balancing Authorities are equal, and adherence to these standards effectively defines what it means to operate in a "reliable" manner. There is not a prescription of the resources that must be included within (or excluded from) a particular Balancing Authority Area.[34]

Real-Time Regulation: In a technical sense, reliability is equated with a balanced system and is achieved by managing the Balancing Authority Area's Area Control Error (ACE).

> ACE is the measurement of the degree to which a BA is balancing its generation to its obligations (load, interchange, and frequency). Specifically, ACE is the difference between the BA's net actual and scheduled energy interchange, while taking into account system frequency. Control Performance Standard (CPS) and Disturbance Control

[34] See *Accommodating High Levels of Variable Generation*, Section 1.1, page 3, North American Electric Reliability Corporation (April 2009) ("Reliable power system operation requires ongoing balancing of supply and demand in accordance with established operating criteria such as maintaining system voltages and frequency within acceptable limits. System Operators provide for the minute-to-minute reliable operation of the power system by continuously matching the supply of electricity with the demand while also ensuring the availability of sufficient supply capacity in future hours. Operators are fully trained and certified and have long standing business practices, procedures, control software and hardware to manage the reliability of the bulk power system."). *See also*, Petition of NERC for Approval of Reliability Standards, FERC Docket No. RM06-16-000 (April 4, 2006), available at http://www.nerc.com/docs/docs/ferc/FirstPetitionReliabilityStandards-04042006.pdf; and FERC Mandatory Reliability Standards for the Bulk-Power System, 118 FERC ¶ 61,218 (2007).

> Standard (DCS) compare ACE over different time periods to grade how reliably the BA is performing.[35]

The reliability concerns associated with integrating intermittent renewable resources, such as wind, center around the ability of the Balancing Authority to comply with a specific BAL standard, CPS2.

> CPS2 measures how well a BA limits its ACE deviation over a short period of time. The calculation is based on the average of the BA's ACE for each 10 minute period in a month . . . . In the case of CPS2, the maximum ACE deviation is bounded by a value called L_{10}, which is a derived number based on a frequency error target and the BA size relative to the interconnection.[36]

Taking the time to work through the math associated with the CPS2 calculation demonstrates that the addition of Balancing Authority Areas allows more ACE variation within an Interconnection in terms of the quantity (MWs) of control error allowed (as measured by L_{10}) than there would be allowed if Balancing Authority Areas were consolidated.[37] However, concluding that more Balancing Authorities are therefore problematic misses the practical point that each Balancing Authority must in fact control its generation to satisfy its CPS2 obligations. This is the defined reliability obligation.

Balancing Areas customarily manage CPS2 through the use of Automatic Generation Control (AGC).[38] AGC is the "heart and soul" of all regulation and balancing energy products. AGC enables most ancillary products; it makes within-hour capacity accessible and as a result, frees inefficiencies associated with hourly-block

---

35 *WECC Paper* at 4. The **Control Performance Standard** is defined as "The reliability standard that sets the limits of a Balancing Authority's Area Control Error over a specified time period." The **Disturbance Control Standard** is defined as "The reliability standard that sets the time limit following a Disturbance within which a Balancing Authority must return its Area Control Error to within a specified range." *NERC Glossary of Terms Used in Reliability Standards*.

36 *WECC Paper* at 10.

37 *Id.* at 4; *NERC Special Report* at 60-61, paragraph 4.3.

38 The effective use of AGC requires Automatic Generation Control equipment, circuitry and skilled personnel to enable real-time communications; Remote Terminal Units; Inter-control Center Communication Protocols; Energy Management Systems; SCADA modeling; after-the-fact check outs and settlement; real-time operations; ongoing training; reporting; and, contractual agreements to effect these arrangements.

services. AGC is used by each Balancing Authority to track the moment-by-moment production of energy and compare it to the scheduled output. In the event of a discrepancy outside the CPS boundaries, the Balancing Authority uses AGC to change generation output to stay within the boundaries allowed and therefore, provides the Balancing Authority with a tool to instantaneously direct control of resource output.

To place this into context, it is important to recognize that historically not all generation located within a Balancing Authority Area could be controlled by the Balancing Authority; only some resources were placed on AGC. Traditionally, of those few resources on AGC only those owned/operated by the host Control Area were controlled.[39] In comparison, as discussed above, GWA and other recently formed Balancing Authority Areas use AGC to directly control generation, thereby providing the Balancing Authority with the ability to effect real-time changes in all generation under its control. If that same generating facility was operated within a host Balancing Area as an independent power producer, nothing requires that facility to operate with AGC in service; manual intervention between the generating facility operator and the Balancing Authority would typically be required to effect a change in generator output. Furthermore, for a number of legitimate reasons, that generator may never change its output thus using precious regulating resources that could otherwise be used to regulate for new loads or new variable generating resources such as wind and solar. Therefore, recently added Balancing Authorities increase the system's overall ability to integrate renewable resources, stabilize frequency and effect a change in actual flows in comparison to either a traditional, existing Balancing Authority or a consolidated Balancing Authority that relies on latent market dynamics to drive generation output.[40]

There is another counter-argument to the concern about additional Balancing Authority Areas allowing more ACE variation. The addition of new Balancing Authorities results in a greater contribution of frequency bias. Frequency bias is a condition that improves operational efficiencies by minimizing interconnection and frequency error. A generator, registering as a Balancing Authority commits to a frequency bias obligation in proportion to its output and often, in proportion to its peak capacity (regardless of output). In contrast, an independent power producer operating within a host Balancing Authority does not change that Balancing Authority's frequency bias because a traditional Balancing Authority's obligation is based upon

---

39 *NERC Special Report* at 6.

40 ISO/RTO markets are an arguably adequate method of deploying vital balancing and ancillary energy products but are not as responsive as generation controlled directly by AGC. AGC is directly employed to meet reliability standards without any market filters encumbering controls.

peak load. Therefore, additional Balancing Authorities result in a net increase in entities and volume of capacity available to control interconnection frequency. Here again, the addition of a Balancing Authority may bring about change, however, that change occurs within the context of satisfying all reliability standards and arguably provides system improvements.[41]

Balancing Authority Area Diversity: The concept is that Balancing Authority Areas with large geographic scopes can secure diversity of load and/or generation. Diversity thereby offsets some of the system variability and uncertainty associated with wind ramps, topology, and resource location relative to load location. These concepts are logical. However, it is important to recognize that not all efforts to consolidate Balancing Authorities have been successful. Moreover, generation output and/or load diversity can be aggregated without Balancing Area consolidation.

A couple of examples of inter-Balancing Authority Area reliability tools produced by agreement rather than by consolidation are reserve sharing programs and ACE Diversity Interchange programs, both of which are in operation in various parts of the United States.[42] Other examples that are commercial in nature are enabled by the *pro forma* OATT's ancillary services schedules.[43] The commercial transactions require transmission service and dynamic scheduling services to enable AGC to cross Balancing Authority Area boundaries. In some regions, pseudo-ties are also used for moving generation within and between or among Balancing Authority Areas (discussed below). Through the use of dynamic scheduling and/or pseudo-ties, some are seriously considering certifying wind-based Balancing Authorities focused on the aggregation of

---

41 Another concern recently raised about adding new Balancing Areas involves the accumulation of inadvertent interchange. Inadvertent interchange, "the difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange," occurs for various reasons but, must be managed. During project commissioning, start-up and shut-down periods, accumulations that are not consistent with steady-state operations may occur. However, concerns about inadvertent accumulations that have not resulted in violations of NERC and regional reliability standards seem misplaced. Here again, NERC and regional reliability standards should be the yardstick of comparison as they and they alone are used for determining compliance and adequate operations. NERC requires each Balancing Authority to calculate and record hourly Inadvertent Interchange. In the Western Interconnection, the WECC Automatic Time Error Correction (ATEC) requires Balancing Authorities to take action in the event of large accumulations of primary inadvertent as such could indicate an invalid implementation of ATEC, accounting errors, lose control or, metering errors. BAL-004-WECC-01 and BAL-006-1.

42 See *System Operating Procedures – Manage Resource and Demand Balancing*, *SOP-RTMKTS.0170.0020*, New England ISO (Feb. 24, 2009), *available at* http://www.iso-ne.com/rules_proceds/operating/sysop/rt_mkts/sop_rtmkts_0170_0020.pdf; *ADI Overview*, NTTG (Jan. 23, 2008), *available at* http://nttg.biz/site/index.php?option=com_content&task=blogsection&id=5&Itemid=26.

43 *Pro Forma OATT*, FERC Order No. 890-B, Appendix B (section 3) at p. 179, 123 FERC ¶ 61,299 (2008).

wind generation located in a number of adjacent Balancing Authority Areas for the specific purpose of isolating, managing and operating intermittent renewable generation using dedicated AGC.

Dynamic Scheduling/Pseudo-Ties Mechanisms: Pseudo-ties and dynamic transfers are both standard methods that may be used to transfer resources and/or load to support variable generation resource requirements and variable load requirements between (and sometimes within) Balancing Authority Areas.[44] However, Transmission Providers have not provided this service on all paths, and FERC has not ensured this availability even though it is a necessary tool for the right to self-provide ancillary services contained in the *pro forma* OATT.[45]

Transmission must be secured for dynamic transfers, whether between generator (source) and load (sink) or generation (source) to supplement generation schedules (sink). A transmission profile reflected in an electronic tag (E-tag) is required for dynamic transfers so that the maximum and estimated usage can be captured. This electronic tag is approved by all interconnected transmission service providers and Balancing Authorities involved in the transaction. "Fail-safes" are generally inherent in the manner in which the dynamic transfer is modeled in the respective Energy Management Systems (EMS) of the affected Balancing Authorities so the dynamic transfer will only flow up to the amount of transmission specified in the electronic tag (E-tag) approved by the affected parties. Subject to these limitations, energy is scheduled and ultimately produced according to the real-time demand requirements between the source Balancing Authority and sink Balancing Authority. The dynamic transfer amount requested by the receiving system is transmitted to the responding Balancing Authority every four seconds as demand changes and after-the-fact reconciliation of actual flows are performed in accordance with NERC requirements.[46] The direct interaction between the EMSs of the affected Balancing Authorities is more efficient and reliable than independent power producers that do not have EMS and are not required to meet Balancing Authority communication and control standards.

---

44 A white paper describing dynamic transfers is available on the NERC site at: www.nerc.com/docs/oc/is/Dynamic_Transfer_White_Paper_Draft_4.pdf - 2003-05-14.

45 *Supra*, footnote 43.

46 In addition, the necessary transmission rights must be in place, metering and communications must be established, and NERC-certified operations staff must have oversight of the transfers.

Forecasting/Scheduling/Dynamic Balancing Resources*:* Electricity is traditionally managed in hourly blocks of time. The *pro forma* OATT and reliability standards penalize the failure to operate within these blocks. Hourly blocks can pose commercial, operational and reliability problems for intermittent renewable resources and the Balancing Authority Areas to which they are interconnected. The unique challenges associated with forecasting and scheduling output for intermittent renewable generating resources requires better forecasts, more flexible scheduling practices (for both power and transmission services), and infrastructure that supports dynamic balancing resources.[47] Forecasting and scheduling practices are used to manage a resource in pre-schedule by the generator owner, the transmission customer (or agent) and the Balancing Area. In real time, dynamic balancing resources are used to supplement the production of an intermittent renewable resource to minimize control error and reshape the energy by the transmission customer and the Balancing Authority.

These dynamic balancing resources are known as "fast-energy" and can be provided by both generating resources as well as demand-response arrangements. However, depending upon the real-time loads, fast-energy may or may not be available from the host Balancing Authority Area or these resources may be limited due to inadequate supply or transmission constraints within a host Balancing Authority Area.[48] While these challenges are often associated with wind-fueled generation, hydroelectric generation can also be difficult to dispatch especially when the project is a run-of-river resource with limited storage. Nevertheless, intermittent renewable resources must acquire this fast-energy and integrate it with plant output. This is accomplished through the use of AGC, discussed above, and dynamic transfers or pseudo-ties (discussed above) to minimize imbalances and enhance the value of the energy. Obtaining this fast-energy can be accomplished with or without forming a separate Balancing Authority to the extent the affected Balancing Authority is willing to facilitate these arrangements.

While the *pro forma* OATT manages these issues from the perspective of the transmission customer, a Balancing Authority manages these issues in the context of

---

47 *NERC Special Report* at 54.

48 Bonneville Power Administration, Presentation: "Integrating Wind Power and Other Renewable Resources into the Electric Grid," September 2009 at slide 9, *available at* http://www.bpa.gov/corporate/WindPower/docs/Wind-WIT_generic_slide_set_Sep_2009_customer.pdf; Statement of Elliot Mainzer, Executive Vice President Corporate Strategy, Bonneville Power Administration Before the Committee on Energy and Natural Resources, United States Senate (Dec. 10, 2009), *available at* http://www.bpa.gov/corporate/WindPower/docs/Mainzer_BPA_FinalTestimonyforSenate121009.pdf.

complying with the Reliability Standards. As explained above, Balancing Authorities (including generation-only Balancing Authorities and wind-based Balancing Authorities) are responsible on a 24 X 7 basis for balancing generation output and contributing to frequency corrections. The dynamic balancing resources described above are implemented in real time (every four seconds) based on system measurements and captured in the Balancing Authority's EMS. This keeps the system resources measured and controlled within NERC requirements.

Communications, Data Access and Transparency: As indicated above, establishment of new Balancing Authorities increases the visibility of the resources within the Balancing Authority Area, the granularity of information, and allows for increased generation control. By way of example, the newly established Balancing Authorities in the Western Electricity Coordinating Council (WECC) share with the Reliability Coordinators local frequency, CPS and ACE data every four seconds. Similar data is exchanged with the interconnected Balancing Authorities. This type of transparency is not typically provided by independent power producers located in the host Balancing Authority Area. In the Western Interconnection, the Balancing Authority provides data files through enhanced interface data exchanges (EIDE) to the Reliability Coordinators each day which includes four days of net scheduled interchange by hour, available reserves by hour, and unit availability as part of the system study process. The Balancing Authority participates in the WECC auto-time error correction process to minimize inadvertent balances and reports agreed-to inadvertent balances monthly to NERC. In addition, the Balancing Authority provides data to support planning efforts through the WECC Loads and Resources data collection efforts. Finally, the Balancing Authority is subject to annual self-certification processes and the three year on-site compliance audit to prove compliance with Reliability Standards (the GOP function is not required to have on-site audits nor required to undergo audits with the same frequency as a Balancing Authority).

Section 4: The Decision Drivers

As load and generation establish and/or evaluate Balancing Authority relationships, the business decision that best fits the circumstances reflects both quantifiable and qualitative considerations. These considerations, the decision drivers, may be relatively static, i.e., characteristic of a condition that is not expected to change or, relatively dynamic, that is to say, characteristic of a potentially short-term condition. The potential for change in state is in and of itself an important consideration. More obvious considerations are the cost of services, including ancillary services, that the host Balancing Authority offers, contrasted with other Balancing Authorities or self-supply options. The flexibility of services is also important; for example, some Balancing

Authorities process only hourly transactions and only a few process intra-hour transactions.[49] Finally, there is a risk profile to consider which includes the "shelf-life" of the applicable drivers—federal and state legislation and policies, tariff provisions, rates, business practices, operational directives as well as the industry composition and trends associated with the marketplaces being considered. Therefore, the set of considerations for each situation are unique; there is no one-size-fits all solution. Below, we highlight some of the option-specific drivers that favor one approach over another.

Option 1: Interconnecting within an Existing Balancing Area

Interconnecting with an existing Balancing Authority Area may be the best option for some. First, the Balancing Authority Area responsibilities remain with the host Balancing Authority and, as a result, this option relieves an individual (load-serving entity or generator) from the costs of paying for the technology, maintenance, operation, and monitoring required to meet NERC's Reliability Standards. Instead, under this approach, these costs are directly absorbed by the existing Balancing Authority and either directly allocated to tariff charges or indirectly allocated as overhead costs to all of the Balancing Authority's customers.

In addition, as cited by NERC, there is the benefit of access to the diversity afforded by the host Balancing Authority Area's combined portfolio of loads and generation.[50] These resources may be helpful in terms of allowing the netting of load and output as well as making available an adequate supply of cost-effective ancillary services.

Option 2: Registering as a Balancing Authority

Most of the benefits associated with becoming a generation-only Balancing Authority primarily revolve around operational control afforded by access to otherwise

---

49 *E.g.*, Letter Order, FERC Docket Nos. ER10-623-00, ER10-624-000, and ER10-625-000 (March 3, 2010).

50 *NERC Special Report* at 47 ("**3.6 Flexibility in the Resource Portfolio.** From a planning perspective, the question is 'how does one ensure that adequate generation reserve, demand side resources or transmission transfer capability to neighboring regions (i.e. Interconnection capability) is available to serve demand and maintain reliability during the expected range of operating conditions (including severe variable ramping conditions) in a balancing area?' If the underlying fuel is available, new variable generation technologies can readily contribute to the power system ancillary services and ramping needs. Upward ramping and regulation needs, beyond the maximum generation afforded by availability of the primary fuel (wind or sun), are important planning considerations. Unless renewable resources in the balancing authority are designed to provide inertial response, the planner must ensure other sources of inertia are available to meet bulk power system reliability requirements under contingency conditions.").

unavailable opportunities. For example, a separate Balancing Authority is not subject to various Ancillary Service charges that it would have paid had it remained part of an already existing Balancing Authority. One example is not being subject to Generation Imbalance charges,[51] but instead, takes on the responsibility of managing inadvertent energy according to the NERC Reliability Standards.[52] A Balancing Authority can exercise comparably more control over the resources and costs to supply interconnected operations services, including regulation and balancing, supported by transmission.[53] A separate Balancing Authority may also be able to participate in operational processes that support reliability that it would not be otherwise able to access, e.g., participation in reserve sharing programs, system-wide restoration testing and training, ACE Diversity Interchange programs,[54] etc. Finally, these Balancing Authorities provide additional operational transparency by having to transmit redundant, real-time data to adjacent Balancing Authorities, Reliability Coordinators with oversight by NERC-certified system operations, thus making operation conditions known, thereby allowing transparent monitoring of system reliability parameters.[55]

Likewise, a load-serving Balancing Authority can more directly respond to reliability concerns by knowing when to self-supply or make other arrangements for reliability-related services. In addition, because of the increased autonomy, load-serving entities avoid mismatched penalty schemes whereby a host Balancing Authority charges a premium for over or under-scheduling but pays the actual replacement costs, thus insulating its customer base but also, overcharging it.[56]

---

51 When embedded in the host Balancing Area, the generator receives is compensated and/or penalized for over or under generation based upon the transmission provider's tariff.

52 Inadvertent energy is used by all Balancing Authorities to manage scheduling error.

53 *WECC Paper* at 6.

54 *Id.* at 10.

55 By way of example, GWA maintains real-time (4-second) operational data exchange (CPS and ACE) with interconnected transmission providers, the Reliability Coordinator and the Northwest Power Pool (the entity that operates the NWPP Reserve Sharing Program).

56 *WECC Paper* at 6.

Option 3: <u>Interconnect and Implement Dynamic Scheduling or Market Allowances</u>

A third option, which can provide a unique and attractive alternative, is for the generator or load-serving entity to remain within an existing Balancing Authority Area but self-supply services or engage "buy-through" services from other Balancing Authority Areas or from independent power producers within the host Balancing Authority Area or from other adjacent Balancing Authorities.[57]

Going forward, with the significant interest in developing and integrating intermittent renewable resources as well as the recognized efficiencies and opportunities that are held captive by hourly-block wholesale markets, there are significant commercial opportunities associated with self-supply between and among entities located in different Balancing Authority Areas. For example, there is significant interest in securing, regulating and balancing reserves from multiple suppliers as well as servicing these needs in multiple Balancing Authorities. These arrangements will require transmission and intra-hour power and transmission services and therefore will require either market allowances or dynamic transfers (instantaneous, four-second system measurement and resource output correction).[58]

The major benefit of self-supply arrangements is that they enable additional balancing opportunities that are characteristic of registration as a Balancing Authority without having to bear the costs to operate as such. Some recognized examples include Supplemental or Overlap Regulation and self-supply of balancing resources (both supply-side and demand-side). These transactions require transmission to be secured on a bilateral basis (using Dynamic Schedules), pooled basis, or some sort of set-aside capacity reservation that is operated similarly to some sort of organized dispatch. These examples lead to more accurate monitoring of loads and generation which in turn, produces efficiencies and monetizes assets that would otherwise be wasted. Finally, these types of arrangements satisfy regional Reliability Coordinators because overseeing a system with fewer Balancing Authorities is simpler from their perspective. As such, for some generators or load-serving entities, this option presents a particularly attractive alternative to full registration as a Balancing Authority.

---

57 For example, in the WECC, which is composed of 36 Balancing Authority Areas, some industry participants are interested in implementing many of these operational tools that mimic an organized market without the overhead involved in creating the attendant organizational structure. This option has already been implemented in various ways, e.g., dynamic scheduling resource output remote to load, the ACE Diversity Interchange (ADI) tool, and is being tested with some pilot efforts, e.g., intra-hour scheduling, Dynamic Scheduling Services, etc.

58 Dynamic energy products that are scheduled, tagged and accounted for using scheduled and integrated values.

Section 5: Conclusion

As North America continues incorporating new generation technologies, the reliability functions associated with balancing the respective electric systems should also progress. To accomplish this, FERC, NERC, and the regions must continue encouraging market innovation by: (1) removing barriers that may impede the implementation of new concepts; and (2) ensuring that *existing* structures and *existing* ways of doing business do not act as a barrier to new entries and ideas. By doing so, new approaches will bring about operational improvements, commercial opportunities and innovative solutions to existing inefficiencies and new challenges without compromising reliability and compliance with NERC Reliability Standards. Removing these barriers to entry will pave the way for considering all of the options discussed herein. Indeed, the additional local control and transparency of data that would result from enabling all of these options will certainly not degrade but rather improve system reliability and thus should be welcomed along with the integration of new, intermittent renewable generation.