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## Maintaining a Balance: Innovation in Power System Balancing Authorities

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# MAINTAINING A BALANCE: INNOVATION IN POWER SYSTEM BALANCING AUTHORITIES

Malcolm McLellan & Carol Opatrny\*

*Abstract:* The introduction of new power generation, including intermittent resources, into the North American electric grid is exposing the fact that the traditional approach to resource integration is not necessarily cost-effective. At the forefront of analysis is the electric balancing authority; the functional structure that is responsible for maintaining the continuous balance of the demand for and supply of electric power. Electric balancing authorities perform this function according to standards developed by the North American Electric Reliability Corporation and the Federal Energy Regulatory Commission. These services can significantly affect the cost of power. Rather than blindly purchasing balancing services from the local balancing authority, power generators and loads are proactively affecting their cost structure by purchasing balancing services from an adjacent balancing authority or forming a separate balancing authority and self-supplying services. These options do not undermine reliability and the cost controls enabled by competition ensure efficient resource integration.

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INTRODUCTION

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.<sup>1</sup> This monitoring is performed by Balancing Authorities pursuant to standards developed by the North American Electric Reliability Corporation (NERC)<sup>2</sup> and overseen by the Federal Energy Regulatory Commission (FERC) in the United States, and governmental authorities in Canada.<sup>3</sup> 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.<sup>4</sup>

As North America continues incorporating new generation

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1. North American Electric Reliability Corporation (NERC), *Understanding the Grid*, <http://www.nerc.com/page.php?cid=1|15> (last visited Apr. 27, 2011).

2. NERC (Apr. 27, 2011), <http://www.nerc.com/index.php> (“[NERC’s] mission is to ensure the reliability of the North American bulk power system. NERC is the electric reliability organization (ERO) certified by [FERC] to establish and enforce reliability standards for the bulk-power system.”).

3. Fed. Energy Regulatory Comm’n (FERC), *What FERC Does*, <http://www.ferc.gov/about/ferc-does.asp> (last visited May 10, 2011) (FERC is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. The Energy Policy Act of 2005 gave FERC additional responsibilities... [Protect] the reliability of the high voltage interstate transmission system through mandatory reliability standards.”).

4. 16 U.S.C. § 824(e) (2006); see also NERC, *About NERC: Company Overview*, <http://www.nerc.com/page.php?cid=1|7> (last visited Apr. 1, 2011).

technologies and inventing new ways of lowering the cost of serving load, old and new ideas are being applied in novel ways to balance the electric system. New approaches are teasing out new operational improvements, commercial opportunities and innovative solutions to existing inefficiencies without compromising reliability and compliance with NERC Reliability Standards.

The focus of the article is the Balancing Authority, which in plain English refers to the entity responsible for maintaining the energy load-resource balance within a specific geographic area,<sup>5</sup> and, in particular, the appropriateness, of presuming there is an appropriate size (measured in MWs), character and therefore, number of Balancing Authorities in North America. Instead, we focus on the reliability and operating standards that a Balancing Authority is obligated to meet, regardless of its size and character. Furthermore, this article does not attempt to choose sides in the debate of whether the number of Balancing Authorities in existence today should be reduced (referred to as Balancing Area consolidation), or even completely evaluate the debate. Rather, this article attempts to increase the understanding of the choices and frustrations of generators and load that find conflict between minimizing costs or maximizing competitiveness with a prescribed approach to integrating into the bulk electric system. Competition and choice require the ability to form separate Balancing Areas, consolidate Balancing Authorities or access services from adjacent Balancing Areas. The ability to choose a Balancing Authority structure changes the complexion of the industry, even if the choice is Balancing Authority consolidation.

Moreover, in the debate of Balancing Authority consolidation, it is important to recognize that the addition of

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5. NERC, *Reliability Standards for the Bulk Electric Systems of North America, BAL-005-0.1b* at 1 (Nov. 2009), [http://www.nerc.com/files/Reliability\\_Standards\\_Complete\\_Set\\_2010Jan25.pdf](http://www.nerc.com/files/Reliability_Standards_Complete_Set_2010Jan25.pdf); NERC, *Glossary of Terms Used in Reliability Standards* (February 12, 2008) [hereinafter *NERC Glossary of Terms Used in Reliability Standards*], available at [http://www.nerc.com/files/Glossary\\_12Feb08.pdf](http://www.nerc.com/files/Glossary_12Feb08.pdf) (a Balancing Authority is formally defined as “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.” Balancing Authority Area is formally defined as “The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.”).

new Balancing Authorities or facilitation of inter-Balancing Authority transactions arguably achieves the same results that some associate with consolidation, namely, greater transparency, greater access to market opportunities and greater efficiencies. Also, many equate Balancing Area consolidation with elimination or reduction of separate transmission rates (e.g. “rate pancakes”). These assumptions are not correct. Ownership and control of transmission systems along with their corresponding service rates are completely separate from the Balancing Area relationship; although every aspect of electric system operations is related. This article provides insight as to why the co-existence of choice in Balancing Authority structures facilitates competition and is consistent with a system of reliability.

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). These choices are 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 has brought about questions concerning their impact on reliability.<sup>6</sup> This article provides

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6. See Mizumori and Nickell, *Balancing Area Applications in the Western Interconnection* (Nov. 24, 2008) (unpublished) [hereinafter *WECC Paper*] (on file with Washington Journal of Environmental Law & Policy); NERC, SPECIAL REPORT: ACCOMMODATING HIGH LEVELS OF VARIABLE GENERATION 36 (April 2009) [hereinafter NERC SPECIAL REPORT], available at [http://www.nerc.com/files/IVGTF\\_Report\\_041609.pdf](http://www.nerc.com/files/IVGTF_Report_041609.pdf) (“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.”); see also *Integration of Variable Energy Resources*, Notice of Inquiry,

insight as to how structural innovation (driven by cost-minimization) in the use of Balancing Authorities is occurring within the electric system without negatively impacting system reliability.<sup>7</sup> The real world examples of how the use of Balancing Authorities is evolving today are not limited to the integration of intermitted resources. The article references Balancing Authorities that are composed of load-only, load and generation, and generation-only. As load and generation establish and evaluate Balancing Authority relationships, the business decision that best fit the circumstances reflects both quantifiable and qualitative considerations. These decision drivers may be relatively static, characteristic of a condition that is not expected to change, or relatively dynamic, characteristic of a potentially short-term condition. The set of considerations for each situation are unique; there is no one-size-fits all solution. This article therefore endeavors to add a depth to the understanding of Balancing Authorities, with a particular focus on the decision drivers of the entities that historically only purchased services from Balancing Authorities.

Part I of this article provides background describing NERC's role in terms of identifying, registering and overseeing all entities responsible for complying with Reliability Standards. Part II focuses specifically on the standards applicable to Balancing Authorities. Part III discusses and analyzes the assumptions behind balancing area consolidation, and Part IV addresses the issues arising during the certification of a number of the recently added Balancing Authorities and the

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130 FERC ¶ 61,053, ¶ 33 (Jan. 21, 2010) [hereinafter Notice of Inquiry], available at <http://elibrary.ferc.gov/IDMWS/nvcommon/NVViewer.asp?Doc=12249929:0>; Integration of Variable Energy Resources, 133 F.E.R.C. ¶ 61,149 (Nov. 18, 2010) [hereinafter Notice of Proposed Rulemaking] (Notice of Proposed Rulemaking (NOPR) on the Integration of Variable Energy Resources in response to comments received to the Notice of Inquiry. While FERC sought comments on Balancing Authority issues in the Notice of Inquiry, the NOPR did not address Balancing Authority issues.).

7. Given the universal applicability of the NERC standards to all Balancing Authorities, reliability is, by design, not negatively impacted by choice in the relationship an entity forms with a Balancing Authority. 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* (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](http://www.nerc.com/files/Confidential-Plum_Point_and_Osceola_CT_Report.pdf).

solutions implemented. Then Part V identifies and discusses the drivers behind the choice to either interconnect with an existing Balancing Authority Area: register as a Balancing Authority while managing to reliability standards or to 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. Part VI of this article concludes that it is only through vigilance that we ensure existing structures and traditional approaches do not become barriers to new market entrants and innovation.

## I. NERC'S ROLE – CERTIFICATION, REGISTRATION AND COMPLIANCE

To ensure that all consumers have a consistent, reliable source of power, various NERC-certified agencies constantly monitor the generation, interconnection, transmission, and metering of the North American electric grid.<sup>8</sup> 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 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

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8. See NERC, *Key Players: Regional Entities*, <http://www.nerc.com/page.php?cid=1|9|119> (last visited Mar. 22, 2011) (describing the eight regional reliability organizations working with NERC to improve the reliability of the Bulk Electric System); see also U.S. Energy Info. Admin., *North American Electric Reliability Corporation (NERC) Regions*, [http://www.eia.doe.gov/cneaf/electricity/chg\\_str\\_fuel/html/fig02.html](http://www.eia.doe.gov/cneaf/electricity/chg_str_fuel/html/fig02.html) (last visited Mar. 22, 2011); Western Electricity Coordinating Council, *About WECC*, <http://www.wecc.biz/About/Pages/default.aspx> (last visited Apr. 27, 2011) (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 and registered entities within their territory); NERC, *Compliance: Compliance Registry*, <http://www.nerc.com/page.php?cid=3|25> (last visited Apr. 27, 2011) (registration program). It is important to recognize that the various NERC regions and Balancing Authority areas ensure the reliability of the electric system, and are separate from electric power markets, transmission system boundaries, and the markets of the various Independent System Operators (*ISO*) and Regional Transmission Organizations (*RTOs*).

registry and certification program for the purpose of identifying those entities responsible for compliance with approved reliability standards.<sup>9</sup> As of January 26, 2011, NERC has registered 1,921 entities that are subject to the Reliability Standards associated with their applicable functions. Statistical data from NERC's compliance registry below provides a list of the functions by region and the current total number of organizations registered in each category.<sup>10</sup>

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9. NERC, *Rules of Procedure § 501* (Jan. 1, 2011), available at [http://www.nerc.com/files/NERC\\_Rules\\_of\\_Procedure\\_EFFECTIVE\\_20100205.pdf](http://www.nerc.com/files/NERC_Rules_of_Procedure_EFFECTIVE_20100205.pdf).

10. NERC, *Compliance Registry Matrix*, available at [http://www.nerc.com/files/NERC\\_Compliance\\_Registry\\_Matrix\\_Summary20110329.pdf](http://www.nerc.com/files/NERC_Compliance_Registry_Matrix_Summary20110329.pdf) (last visited April 11, 2011) (listing the eight regional entities: Electric Reliability Council of Texas, Florida Reliability Coordinating Council; Midwest Reliability Organization; Northeast Power Coordinating Council; Reliability First Corporation; SERC Reliability Corporation; Southwest Power Pool; and Western Electricity Coordinating Council.); see *NERC Glossary of Terms Used in Reliability Standards*, *supra* note 5 (The full names and explanations of the functions listed along the top of the matrix are found in the *NERC Glossary of Terms Used in Reliability Standards*. For example: BA means balancing authority, see *supra* note 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.").



## NERC Compliance Registry Matrix

Statistical Data  
Registration Status as of 3/29/2011

Region	# of Registered Entities	BA	DP	GO	GP	IA	LSE	PA	PSE	RC	RP	RSG	TO	TOP	TP	TSP	Total # of Functions
ERCOT	222	1	46	112	86	1	58	1	41	1	1	0	30	15	27	1	421
FRCC	72	10	27	31	31	10	19	13	28	0	15	1	24	16	13	8	246
MRO	124	20	54	45	45	5	57	6	74	3	34	2	39	20	23	13	440
NCEA	3	1	0	0	0	2	0	1	0	2	1	0	0	1	0	1	9
NPCC	298	6	61	136	132	6	62	6	91	5	6	2	34	14	17	14	592
RFC	363	13	82	146	145	3	54	3	163	2	15	1	37	16	13	3	696
SERC	246	32	79	97	89	28	78	20	87	8	31	7	49	27	30	16	678
SPP	130	16	47	54	52	2	50	1	64	1	24	1	38	18	20	5	393
WECC	463	33	173	208	203	1	147	29	148	1	54	3	83	51	44	34	1212
TOTALS:	1921	132	569	829	783	58	525	80	696	23	181	17	334	178	187	95	4687

While entities generally identify the function they perform, NERC may assign functional responsibilities where it believes a reliability gap would otherwise exist.<sup>11</sup> 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.<sup>12</sup> 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.<sup>13</sup>

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 (BA) or a Purchasing-Selling Entity (PSE). Deregulation and restructuring of United States electricity markets<sup>14</sup> and

11. New Harquahala Generating Co., LLC, 123 F.E.R.C. ¶ 61,173 (2008).

12. NERC, *Rules of Procedure*, §501(2) (Jan. 1, 2011), [http://www.nerc.com/files/NERC\\_Rules\\_of\\_Procedure\\_EFFECTIVE\\_20100205.pdf](http://www.nerc.com/files/NERC_Rules_of_Procedure_EFFECTIVE_20100205.pdf).

13. *Id.* at § 501(1.4).

14. See W.M. WARNICK, U.S. DEP'T OF ENERGY, A PRIMER ON ELECTRIC UTILITIES, DEREGULATION, AND RESTRUCTURING OF U.S. ELECTRICITY MARKETS (2002), available at <http://www1.eere.energy.gov/femp/pdfs/primer.pdf> (discussing the deregulation and restructuring of electricity markets in the United States); see also U.S. Energy Info. Admin., *Electric Power Industry Restructuring Fact Sheet*, [http://www.eia.doe.gov/cneaf/electricity/page/fact\\_sheets/restructuring.html](http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/restructuring.html) (last visited Mar. 24, 2011).

technological advancements, paired with industry experience has enabled these functions, or specific responsibilities, to be contracted to third-party organizations, or formally delegated to third-party organizations.<sup>15</sup>

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.<sup>16</sup>

## II. 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.<sup>17</sup> NERC and its regional entities monitor and

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15. 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.

16. FED. ENERGY REGULATORY COMM’N, STRATEGIC PLAN (FY 2009-14) § 1.1 (2009) (defining one key FERC goal to: “...enhance competition by allowing non-discriminatory market access to all supply-side and demand-side energy resources.”); *see also* FED. ENERGY REGULATORY COMM’N, STRATEGIC PLAN (FY 2009-14) § 1.2 (2009) (defining further FERC goals as to: “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, 72 Fed. Reg. 12266, Summary (Mar. 15, 2007) (to be codified at 18 C.F.R. pt. 35, 37) [hereinafter Order No. 890] (providing a historic overview of the development of wholesale electric competition); FERC Filing of Rates Schedules and Charges, 18 C.F.R. § 35.34 (1999) [hereinafter Order No. 2000] (enhance competition and increase efficiency of wholesale electric market operations and increase non-discriminatory access to the transmission grid); Pro Forma OATT, FERC Order No. 890-B, 123 F.E.R.C. ¶ 61,299 at 1 (2008) (“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.”).

17. 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 public comment, due process, openness,

enforce this comprehensive set of standards to ensure reliability of the electric system.<sup>18</sup>

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.”<sup>19</sup> In the Western Interconnection, this statement is illustrated by the graphic (below) depicting the location of each Balancing Area.<sup>20</sup> 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).<sup>21</sup> 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.<sup>22</sup> Other

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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 NERC for Approval of Reliability Standards*, FERC Docket No. RM06-16-000 (Apr. 4, 2006) [hereinafter *Petition of NERC for Approval of Reliability Standards*]; see *About NERC: Company Overview*, *supra* note 4.

18. See NERC, *Reliability Standards for the Bulk Electric System of N. Am., Standard BAL-001-0.1a et seq.* (2008) available at [http://www.nerc.com/files/Reliability\\_Standards\\_Complete\\_Set.pdf](http://www.nerc.com/files/Reliability_Standards_Complete_Set.pdf).

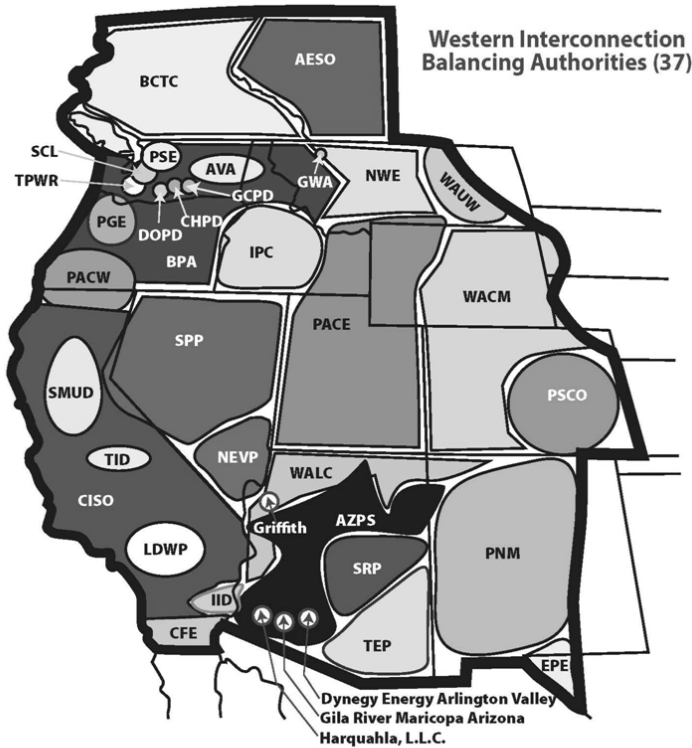
19. *Id.*

20. W. Elec. Coordinating Council, *Western Interconnection Balancing Authorities* (2009), available at <http://www.wecc.biz/library/WECC%20Documents/Publications/Balancing%20Authorities.pdf>; see also Altus Finance, *NERC Balancing Authorities*, <http://www.altusfinance.com/assets/pdf/AppA.pdf> (illustrating the location and relationships between all the NERC Balancing Authorities in North America, as of August 1, 2007). The authors observe that the illustration refers to BCTC as a Balancing Authority. However, BCTC has merged into BC Hydro. See BC Hydro, *BC Transmission Corporation, BC Hydro Become One* (July 5, 2010), [http://www.bchydro.com/news/press\\_centre/media\\_updates/BCTC\\_bchydro\\_integration.html](http://www.bchydro.com/news/press_centre/media_updates/BCTC_bchydro_integration.html). In addition, the illustration references 37 Balancing Authorities in the WECC. However, as of March 28, 2011 only 33 Balancing Authorities are registered in the WECC. See NERC, *NERC Compliance Registry Matrix* (Mar. 29, 2011), [http://www.nerc.com/files/NERC\\_Compliance\\_Registry\\_Matrix\\_Summary20110329.pdf](http://www.nerc.com/files/NERC_Compliance_Registry_Matrix_Summary20110329.pdf).

21. NERC Reliability Functional Model Technical Document, Version 5 at 8 (September 2009); see *NERC Glossary of Terms Used in Reliability Standards*, *supra* note 5 (defining ACE 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.”).

22. NERC Reliability Functional Model, Function Definitions and Functional Entities, Version 5 at 33 (September 2009) (as defined by NERC, an Interchange Transaction is “an agreement to transfer energy from a seller to a buyer that crosses

Balancing Authority requirements (provided in Table 1 below) 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.



- |   |  |   |
|---|--|---|
| Alberta Electric System Operator (AESO)               | Imperial Irrigation District (IID)               | Sacramento Municipal Utility District (SMUD)                            |
| Arizona Public Service Company (AZPS)                 | Los Angeles Department of Water and Power (LDWP) | Salt River Project (SRP)  |
| Avista Corporation (AVA)                              | NaturEner Power Watch (GWA)*                     | Seattle City Light (SCL)  |
| Bonneville Power Administration – Transmission (BPAT) | Nevada Power Company (NVP)                       | Sierra Pacific Power Company (SPP)                                      |
| British Columbia Transmission Corporation (BCTC)      | NorthWestern Energy (NWE)                        | Tacoma Power (TPWR)   |
| California Independent System Operator (CISO)         | PacifiCorp — East (PAC)                          | Tucson Electric Power Company (TEP)                                     |
| Comisión Federal de Electricidad (CFE)                | PacifiCorp — West (PACW)                         | Turlock Irrigation District (TID)                                       |
| Dynergy Energy Arlington Valley*                      | Portland General Electric Company (PGE)          | Western Area Power Administration, Colorado-Missouri Region (WACM)      |
| El Paso Electric Company (EPE)                        | Public Service Company of Colorado (PSCO)        | Western Area Power Administration, Lower Colorado Region (WALC)         |
| Gila River Maricopa Arizona*                          | Public Service Company of New Mexico (PNM)       | Western Area Power Administration, Upper Upper Great Plains West (WAUW) |
| Griffith Energy, LLC (Griffith)*                      | PUD No. 1 of Chelan County (CHPD)                |   |
| Harquahala LLC*                                       | PUD No. 1 of Douglas County (DOPD)               |   |
| Idaho Power Company (IPC)                             | PUD No. 2 of Grant County (GCPD)                 |   |
|   | Puget Sound Energy (PSE)                         |   |
- \*Generation-only, controls no load

Table 1: Balancing Authority Tasks <sup>23</sup>	
1. Review generation availability, planned dispatch, and capability against forecasted load and commitments.	

one or more Balancing Authority Area boundaries.”).

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

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

Registering 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 directly realized by generators or load-serving entities that do not become a Balancing Authority.<sup>24</sup> As long as a generator or load-serving entity considers the responsibilities and consequences of registering as a Balancing Authority,

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24. Generators and load-serving entities that purchase balancing services are charged by their Balancing Authority for the services provided in the Balancing Authority's rates. Those rates depend in part upon the number of entities purchasing services and the extent to which costs are recoverable in rates. For example, compliance penalties assessed against the Balancing Authority may not always be recoverable in rates. To the extent an entity becomes a Balancing Authority the entity is individually responsible for all compliance costs, including penalties.

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.<sup>25</sup>

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 place so that it can perform the Balancing Authority function in accordance with NERC’s Reliability Standards.<sup>26</sup> 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

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25. See *NERC Glossary of Terms Used in Reliability Standards*, *supra* note 5 (defining Host Balancing Authority as “A Balancing Authority that confirms and implements Interchange Transactions for a Purchasing Selling Entity that operates generation or serves customers directly within the Balancing Authority’s metered boundaries”).

26. NERC, *Rules of Procedure Section 501.2, 502 and Appendix 5* (March 21, 2008), [www.nerc.com/page.php?cid=2%7C20%7C285.pdf](http://www.nerc.com/page.php?cid=2%7C20%7C285.pdf) (last visited Apr. 1, 2011); see e.g. WECC, *Control Area Certification Procedures* (2002) [hereinafter *WECC Control Area Certification Procedures*], available at [http://www.wecc.biz/committees/Standing Committees/JGC/112003/Lists/Agendas/1/WECC\\_Control\\_Area\\_Certification\\_Procedure\\_Agenda\\_Item\\_VII.doc](http://www.wecc.biz/committees/Standing%20Committees/JGC/112003/Lists/Agendas/1/WECC_Control_Area_Certification_Procedure_Agenda_Item_VII.doc) (specifying a detailed process that WECC will conduct to ensure reliability before certification as a control area or Balancing Authority, including an extensive questionnaire and agreement to comply with all of the reliability standards adopted by NERC before being considered as a certified Balancing Authority); see also NERC, *NERC Balancing Authority Questionnaire* [hereinafter *NERC Balancing Authority Questionnaire*], [http://www.nerc.com/files/BA\\_Questionnaire\\_ORCS\\_012408.doc](http://www.nerc.com/files/BA_Questionnaire_ORCS_012408.doc) (last visited Apr. 1, 2011).

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.<sup>27</sup> 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.<sup>28</sup> Each Balancing Authority must comply with the BAL standards to maintain the reliability of the system. If a Balancing Authority fails to comply, then NERC and the regional entity, through its monitoring, compliance and enforcement processes can recommend sanctions and remedial action directives to FERC for enforcement.<sup>29</sup>

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

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27. Each NERC function is required to adhere to the reliability standards associated with that function. See NERC, *VRF Standards Applicability Matrix* (2009) [hereinafter *VRF Standards Applicability Matrix*], [http://www.nerc.com/docs/standards/rs/VRF\\_Standards\\_Applicability\\_Matrix\\_2009Oct21.xls](http://www.nerc.com/docs/standards/rs/VRF_Standards_Applicability_Matrix_2009Oct21.xls) (last visited Apr. 1, 2011) (maintaining a matrix allocating standards and functions).

28. See Petition of NERC for Approval of Reliability Standards, *supra* note 17; see also NERC *Glossary of Terms Used in Reliability Standards*, *supra* note 5 (defining Area control error (ACE) 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.").

29. NERC, *About Compliance*, <http://www.nerc.com/page.php?cid=3|249> (last visited Apr. 1, 2011).

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 unique; at the time GWA became certified, Montana law prohibited NWE from owning generation beyond what is necessary to serve its own load. NWE believed that Montana law precluded it from providing ancillary services until 2007 under its OATT for energy exported outside of its service area.<sup>30</sup> In other words, in Montana, until recently, merchant generation was not able to secure from NWE the ancillary services necessary to reliably operate.<sup>31</sup> As a result, other than relocating, the owner of the Glacier wind facility had the option 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. This would make them subject to NWE's Generation Imbalance charges and potentially expose

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30. *NorthWestern Corp. Amendment to Open Access Transmission Tariff*, filed in Docket No. ER09-1314-000 (June 16, 2009). It was not until the passage of H.B. 25 that NWE believed it could acquire generation to provide ancillary services. H.B. 25 provided, "a public utility that removed its generation assets from its rate base pursuant to this chapter prior to [the effective date of this act] may apply to the commission for approval of an electricity supply resource that is not yet procured." 2007 Mont. Laws Ch. 491, § 14 (May 14, 2007). This language allowed NWE to acquire additional generation to provide ancillary services. But, the law also states, "generation assets acquired by a public utility pursuant to this chapter: 1) must be used by the public utility to serve and benefit customers within the public utility's Montana service territory. . . ." 2007 Mont. Laws Ch. 491, § 19 (May 14, 2007). As a result, NWE continued to believe it could not acquire generation to serve ancillary services outside its service area. But, FERC ultimately concluded that this was not the case. For example, FERC stated, "we find that NWE's obligation to offer generator imbalance (i.e., energy) service under Schedule 9 of the pro forma Tariff would be undermined by a requirement that intermittent renewable generators in NWE's balancing authority supply or otherwise account for their own generator regulation (i.e., capacity) service. We therefore find that NWE has failed to demonstrate that its proposed Schedule 10 is consistent with or superior to the transmission provider's obligation to offer generator imbalance service under Schedule 9 of the pro forma Tariff." *Order Rejecting Proposed Tariff Revisions*, 129 F.E.R.C. ¶ 61,116 at P 24 (Nov. 10, 2009).

31. *NorthWestern Corp.*, 129 F.E.R.C. ¶ 61,116 (2009) (requiring NWE to offer ancillary services).



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 retain 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 business solution.<sup>32</sup> More 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.<sup>33</sup>

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.

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32. 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.

33. See, e.g., Non-conforming Long-term Service Agreement Between Avista Corporation and Northwestern Corporation--Energy Supply Function, FERC Docket No. ER09-143-000 (Oct. 29, 2008), available at <http://elibrary.ferc.gov/IDMWS/nvcommon/NVViewer.asp?Doc=11867671:0>; Bonneville Power Administration, FERC Docket No. ER08-1526-000 (Sept. 17, 2008); Powerex Corp, FERC Docket No. ER08-1528-000 (Sept. 17, 2008); Public Utility District No. 2 of Grant County, Washington, FERC Docket No. ER08-1529-000 (Nov. 14, 2008).

### III. THE ASSUMPTIONS BEHIND BALANCING AUTHORITY CONSOLIDATION

For over two decades, FERC has advocated independent, regionally operated transmission grids as being a necessary component to promote competitive electricity markets.<sup>34</sup> As a result, various industry groups, including NERC and some of the Regional Entities, advocate for the consolidation of Balancing Authorities. Some regions, such as the Western Interconnection, have not fully embraced the concept of consolidation. In fact, since Order 2000, efforts have been made to fully and thoroughly evaluate the merits of an independent grid operator, regional transmission organization, and independent system operator. However, in the Western Interconnection the concept has only taken hold in the state of California in the form of the California Independent System Operator.

One of the most cited reasons for consolidation of Balancing Authorities is to reduce the cost of regulatory compliance for the entity registered as the Balancing Authority.<sup>35</sup> As mentioned above, registration with NERC as a Balancing Authority requires compliance with additional Reliability Standards and strict performance standards, both of which impose additional costs on the entity registered as a Balancing Authority. While the entity into which the individual Balancing Authorities consolidate retains these compliance obligations and the associated costs, the obligations and costs become shared obligations and costs by all of the loads and generation associated with the consolidated entity.

In theory, consolidation creates opportunities for reducing costs through operational efficiencies and savings in labor expenses that result from consolidation. Realization of the operational efficiency savings requires certain conditions to exist.<sup>36</sup> If resource or load diversity exists (meaning that load excursions or resource ramps offset each other) within the consolidated Balancing Authority Area, the Balancing Authority's net demand for ancillary services should be less than that of the original individual Balancing Authorities. In

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34. Order No. 2000, *supra* note 16.

35. *WECC Paper*, *supra* note 6, at 6.

36. NERC SPECIAL REPORT, *supra* note 6, at 60.

real-time, this diversity should produce relative cost-savings, as the diversity reduces the Balancing Authority's need to call on energy from its reserved capacity. In the longer term, diversity should produce cost savings when there is sufficient planning certainty to enable some predictable reduction in the Balancing Authority's capacity requirements (recognizing that determining resource sufficiency is more of an art than a science with significant ramifications when reality fails to align with plans). Should shortages occur in real-time the Balancing Authority must cover the demand with market purchases of energy and capacity, demand increase or reduction, or curtailment of generation or load, each of which has a cost.

Intuitively, economies of scale created by consolidation of Balancing Authorities should produce labor and equipment savings. These types of savings are frequently cited as support for business mergers. In addition to labor savings, consolidation often enables savings resulting from a broader allocation of costs associated with hardware, software (e.g., SCADA, Energy Management Systems), metering (e.g., interchange points, points of interconnection, customer loads), reporting (e.g., reliability coordinators, NERC, FERC, etc.), staffing audits (e.g., certification and compliance audits, training, etc.). The details of these savings must be taken into consideration. It is important to recognize that some costs categories are directly assigned and so arguably, consolidation will not produce any savings for those categories. For example, some costs associated with Balancing Authorities are recoverable by contract from the entities that interconnect with the Balancing Authority. Moreover, Balancing Authority consolidation or formation of a new Balancing Authority is not necessarily synonymous with consolidation of transmission systems through the bundling of previously separate transmission services and rates or blending of the revenue requirements associated with various generating resources.

Historically, when the industry functioned as what is called a vertically integrated industry, a utility built a transmission system to supply power from its resources over distribution lines to its loads. That utility controlled its generation to the shape of its load. In response to: (1) FERC Order No. 888's unbundling of transmission from generation; and, (2) FERC Order No. 889's separating the functions of operating and selling transmission from the functions of selling power and

transmission, the balancing responsibility (operation of the Balancing Authority), has generally been considered a transmission function. The same personnel that manage transmission also manage the Balancing Authority responsibilities, thereby increasing the relationship between these functions. Along with the required separation of these functions, it is also required that every generator, transmission system and load be associated with a Balancing Authority. In Order No. 888, FERC encouraged the formation of Independent System Operators as a vehicle for selling transmission service. The result is a reduced incentive for transmission owners and operators to sell or use transmission assets in a manner improperly favoring internal marketing activities. FERC further evolved its policy when, in Order No. 2000, it encouraged the formation of Regional Transmission Organizations. In each case, FERC encouraged the establishment of entities independent of marketing functions, in both power and transmission functions. FERC further encouraged these entities to be broad in scope, thereby favoring consolidation of functions between and among multiple entities.

Among the topics of consolidation were the authority and responsibility to sell transmission services, the consolidation of transmission tariffs, the consolidation of transmission rates, and the consolidation of Balancing Authority responsibilities, with the principal objective of the effort being standardization of services and the elimination or reduction of separate transmission rates. In utility industry jargon, this is generally described as the evolution from a world with “pancaked” rates, terms and conditions to a world with “postage stamp” rates, terms and conditions. The underlying goal is to reduce the cost of transmission across multiple transmission systems. However, opening up access to relatively low cost resources and establishing a new market price equilibrium may benefit some but harm others. In other words, while transmission costs are just a small component of the cost of delivered power, they are the only component of power costs that FERC has jurisdiction to control. Further, access to low or lower cost power can be affected by transmission. In this debate, those entities facing relatively higher costs of power want access to lower costs of power, and those entities with lower costs of power want to minimize the access of others. This is why, in portions of North America, ISOs and RTOs were formed and

utilities merged. It is also why in some pockets of North America, with extremely low power costs, ISOs and RTOs did not form.

These seemingly separate and distinct historical events are important, as they explain the logic and misconceptions of Balancing Area consolidation. The goal remains unchanged: obtain access to the lowest cost of power. While Balancing Authority consolidation is separate and distinct from transmission consolidation, it is also motivated by cost-minimization principles, such as eliminating separate transmission rates in order to gain broad access to power supplies in order to lower overall power costs.

Balancing Areas can consolidate, in whole or in part, without consolidating transmission rates. Likewise, transmission operations and transmission rates can consolidate without Balancing Areas consolidating.<sup>37</sup>

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37. See, e.g., Order Granting RTO Status Subject to Fulfillment of Requirements, Southwest Power Pool, Inc., 106 F.E.R.C. ¶ 61,110 at 81 (Feb. 10, 2004) (finding that Southwest Power Pool (SPP) was not required to form a consolidated Balancing Area upon its establishment. The Commission stated, “[w]e will not, at this time, require SPP to have a single control area. We will, however, require SPP to study the feasibility of reducing its control areas and provide the Commission, within one year of the date of this order, the outcome of its study.”); Order Granting RTO Status and Accepting Supplemental Filings, Midwest Independent Transmission System Operator, Inc., 97 F.E.R.C. ¶ 61,326 at 19-20 (finding that Midwest ISO (MISO) was not required to form a consolidated balancing authority. In allowing separate control areas to remain, the Commission noted, “[w]hile local control area operators are responsible for certain control area functions, the Midwest ISO Agreement provides Midwest ISO with superseding authority to ensure short-term reliability.”). Cf. Order Provisionally Granting RTO Status, PJM Interconnection, LLC, 96 F.E.R.C. ¶ 61,061 at 15 (finding that Pennsylvania New Jersey Maryland ISO (PJM) was an existing control area at the time of its formation as an RTO and retained that status when it received Commission approval as an RTO. The Commission found that, “PJM... by virtue of its operation of a contiguous control area... already meets this RTO characteristic [requiring an RTO to have operational authority for all transmission under its control.]”); see also Order on RTO Compliance Filing, 96 F.E.R.C. ¶ 61,059 at 8 (finding that New York ISO (NYISO), with an RTO petition denied by the Commission, had a consolidated balancing authority. The Commission noted, “NYISO... encompasses a contiguous geographic area, as well as a highly interconnected portion of the grid, and also comprises an existing control area.”); Order Conditionally Accepting the California Independent System Operator’s Electric Tariff Filing to Reflect Market Redesign and Technology Upgrade, 116 F.E.R.C. ¶ 61,274 at 309 (finding that California ISO (CAISO) has a consolidated balancing authority. In accepting CAISO’s treatment of ancillary services, the Commission determined, “[w]e agree that the CAISO’s procured ancillary services support the use of the entire CAISO Control Area, and therefore we find that it is appropriate to allocate the costs associated with ancillary services procurement to all load in the CAISO Control Area.”); Order Granting RTO Status Subject to Fulfillment of

Consolidation decisions, whether it is based on transmission, Balancing Authority, or anything else, occur when it is economic to the parties, unless required to do so by act of law or regulation. Balancing Authority consolidation will occur when the Balancing Area Authority operators believe the overall benefits outweigh the costs, and new Balancing Area Authorities will cease being created when the benefits of becoming a Balancing Area Authority cease outweighing the costs. Factors affecting these decisions are outlined in Section 5 below. Outside these factors, the concepts of Balancing Area consolidation or creation are likely confused, intentionally or unintentionally, with the broader, and legally separate, goal of consolidating transmission rates in order to effect changes in power prices.

Whether consolidation or formation of Balancing Area Authorities benefit, hinder or are neutral to the integration of renewable generation depend upon the unique set of costs involved. Instead of arguing for or against consolidation, this article suggests that the focus should be on whether or not the parties have the tools available to manage their costs today and as they change over time. To the extent there are barriers to managing costs, those barriers should be understood and removed so that each entity can make rational business decisions.

#### IV. 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,

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Requirements and Establishing Hearing and Settlement Judge Procedures, ISO New England, Inc., 106 F.E.R.C. ¶ 61,280 at 5-6 (New England (NE-ISO) became a consolidated balancing authority when (New England Power Pool) NEPOOL contracted with NE-ISO to perform the ISO requirements of Order No. 888. In discussing the history of NE-ISO, the Commission noted, “[i]nitially, NEPOOL operated as a tight power pool, a single, unified regional network with coordinated operations covering the bulk power facilities subject to its control, including a centralized Control Center to provide central dispatch services. Following the issuance of our open-access mandate in Order No. 888, NEPOOL was required to revise its operational and organizational structure to satisfy the requirements for an Independent System Operator (ISO). To meet these requirements... NEPOOL, chose, instead, to contract with an independent entity, ISO-NE, to perform these functions.”).

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.

#### A. *Balancing Authority Reliability Standards*

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.<sup>38</sup> Once registered, it must operate in compliance with those standards. 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. Conversely, 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.<sup>39</sup>

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38. NERC, Rules of Procedure, §§ 501.2, 502, app. 5 (2008); see *WECC Control Area Certification Procedures*, *supra* note 26 (specifying a detailed process that WECC will conduct to ensure reliability before certification as a control area or Balancing Authority); see also *NERC Balancing Authority Questionnaire*, *supra* note 26; *VRF Standards Applicability Matrix*, *supra* note 27 (reviewing all compliance and standards applicability).

39. 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 (i.e., more entities are contributing to the support of the Single Largest Contingency) which in turn, increases

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

#### *B. 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. 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

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system efficiency and reduces the per-member cost of providing reserves.



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.<sup>40</sup>

### C. *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 Standard (DCS) compare ACE over different time periods to grade how reliably the BA is performing.<sup>41</sup>

The reliability concerns associated with integrating intermittent renewable resources, such as wind, center around

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40. NERC SPECIAL REPORT, *supra* note 6, at 3 ("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, *supra* note 17; Mandatory Reliability Standards for the Bulk Power System, 18 C.F.R. § 40.1–40.3 (2011).

41. *WECC Paper*, *supra* note 6, at 8; *see NERC Glossary of Terms Used in Reliability Standards*, *supra* note 5, at 5-6 (defining the Control Performance Standard as "[t]he reliability standard that sets the limits of a Balancing Authority's Area Control Error over a specified time period," and Disturbance Control Standard as "[t]he 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.").

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 ten-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.<sup>42</sup>

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  $L_{10}$ ) contrasted with the quantity (MWs) of control error that there would be allowed if Balancing Authority Areas were consolidated.<sup>43</sup> 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).<sup>44</sup> 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 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 not all generation located within a Balancing Authority Area

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42. *WECC Paper*, supra note 6, at 10.

43. *Id.* at 9; NERC SPECIAL REPORT, supra note 6, at 60-61.

44. 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.

was historically controlled by the Balancing Authority; the amount of generation capacity placed on AGC was tied to expected load and generation variability. Traditionally, of those few resources on AGC, only those owned/operated by the host Balancing Area were controlled.<sup>45</sup> In comparison, 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, 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.<sup>46</sup>

There is a further 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

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45. NERC SPECIAL REPORT, *supra* note 6, at 6.

46. 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.

obligation is based upon 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.<sup>47</sup>

#### *D. Balancing Authority Area Diversity*

The concept is that Balancing Authority Areas with large geographic scopes can secure diversity of load and generation. Diversity thereby offsets some of the system variability and uncertainty associated with wind ramps, topology, and resource location relative to load location.<sup>48</sup> These concepts are logical. However, it is important to recognize that not all efforts to consolidate Balancing Authorities have been successful.<sup>49</sup> Moreover, generation output and load diversity can be aggregated without Balancing Area consolidation.

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47. 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 shutdown 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. WECC, *Automatic Time Error Correction*, BAL-004-WECC-01, available at <http://www.wecc.biz/Standards/Approved%20Standards/BAL-004-WECC-1.pdf>.

48. *See supra* Part III.

49. In response to Order Nos. 888 and 2000, a number of regions throughout North America attempted to form independent system operators and regional transmission organizations, respectively. In some regions these efforts succeeded and others they did not. Balancing Authority consolidation (previously referred to as Control Area consolidation) was one of the many issues in those negotiations. Among those entities that formed, not all resulted in Balancing Authority consolidation. For example, the transmission owners that formed the Midwest System Operator and the Southwest Power Pool did not consolidate Balancing Authorities. In the Western Interconnection, there was a visceral rejection of the idea of consolidation. Utilities believed, and many still do today, that consolidation will lead to centralized planning and operations which will impact the current allocation of costs and benefits associated with the power and

Two 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 North America.<sup>50</sup> Other examples that are commercial in nature are enabled by the *pro forma* OATT's ancillary services schedules.<sup>51</sup> 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 or pseudo-ties, some are seriously considering certifying wind-based Balancing Authorities focused on the aggregation of 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.

### *E. Dynamic Scheduling/Pseudo-Ties Mechanisms*

Pseudo-ties and dynamic transfers are both standard methods that may be used to transfer resources or load to support variable generation resource requirements and variable load requirements between (and sometimes within) Balancing Authority Areas.<sup>52</sup> However, Transmission Providers have not provided this service on all paths, and FERC has not ensured this availability even though it is a

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transmission systems. In short, in the Western Interconnection, except for California, the general conclusion has been that the consequences of consolidation were believed to more likely to outweigh the proposed benefits of consolidation.

50. See ISO New England Inc., *System Operating Procedures, Manage Resource and Demand Balancing* (2011), [http://www.isone.com/rules\\_proceeds/operating/sysop/rt\\_mkts/sop\\_rtmkts\\_0170\\_0020.pdf](http://www.isone.com/rules_proceeds/operating/sysop/rt_mkts/sop_rtmkts_0170_0020.pdf); Northern Tier Transmission Group, *ADI Overview* (2008), available at [http://nttg.biz/site/index.php?option=com\\_content&task=blogsection&id=5&Itemid=26](http://nttg.biz/site/index.php?option=com_content&task=blogsection&id=5&Itemid=26); see also Notice of Proposed Rulemaking, *supra* note 6 (a recent FERC Notice of Proposed Rule Making indicates that ACE Diversity Interchange is a positive operational reform that may need to be implemented in order to accommodate the integration of variable energy resources like wind and solar).

51. Order No. 890, *supra* note 16, at 179; Pro Forma OATT, *supra* note 16, at 179.

52. NERC, DYNAMIC TRANSFER WHITE PAPER (2003), available at [http://www.nerc.com/docs/oc/is/Dynamic\\_Transfer\\_White\\_Paper\\_Draft\\_4.pdf](http://www.nerc.com/docs/oc/is/Dynamic_Transfer_White_Paper_Draft_4.pdf) (describing dynamic transfers).

necessary tool for the right to self-provide ancillary services contained in the *pro forma* OATT.<sup>53</sup>

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.<sup>54</sup> 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.

#### *F. 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.<sup>55</sup> The unique

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53. *WECC Paper*, *supra* note 6, at 9.

54. 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.

55. Notice of Proposed Rulemaking, *supra* note 6, at 31 (proposing to move away

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.<sup>56</sup> 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.<sup>57</sup> While these challenges are often associated with wind-

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from hourly transmission scheduling because “[it is] no longer just and reasonable and may be unduly discriminatory...”). FERC proposes to “provide transmission customers the option to schedule transmission service on an intra-hour basis, at intervals of 15 minutes.” FERC makes this proposal on the basis that “existing hourly transmission scheduling protocols expose transmission customers to excessive or unduly discriminatory generator imbalance charges and are insufficient to provide system operators with the flexibility to manage their system effectively and efficiently.” *Id.* The practical effect of the proposal though is to move from hourly to 15 minute scheduling for all scheduled resources, and dramatically increase the labor costs of managing 15 minute scheduling changes. The proposal quadruples the number of schedules that must be processed by all parties to an E-tag, and increases the risk of error. Every schedule must be submitted, check by all parties to an E-tag and implemented. This must be done for every schedule in now less than 15 minutes. While scheduling and check are automated processes, human involvement is critical. Schedulers maintain their qualifications through rigorous NERC certified training programs.

56. NERC SPECIAL REPORT, *supra* note 6, at 54-55; Notice of Proposed Rulemaking, *supra* note 6, at 48 (“[T]he Commission proposes to revise the *pro forma* [Large Generator Interconnection Agreement] to require interconnection customers whose generating facilities are [Variable Energy Resources] to provide certain meteorological and operational data to the public utility transmission providers with whom they are interconnected. Such data are necessary to enable a public utility transmission provider to develop and deploy state-of-the-art power production forecasting tools.”).

57. Bonneville Power Admin., *Integrating Wind Power and Other Renewable Resources into the Electric Grid 9* (2009), [http://www.bpa.gov/corporate/windpower/docs/Wind-WIT\\_generic\\_slide\\_set\\_Sep\\_2009\\_customer.pdf](http://www.bpa.gov/corporate/windpower/docs/Wind-WIT_generic_slide_set_Sep_2009_customer.pdf); *The Role of Grid-Scale Energy Storage in Meeting our Energy and Climate Goals: Hearing Before the Comm.*

fuelled 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 (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 complying with the Reliability Standards. As explained above, Balancing Authorities (including generation-only Balancing Authorities and wind-based Balancing Authorities) are responsible on an around-the-clock 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.

#### *G. 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

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*On Energy and Nat. Resources of the United States Senate*, 111th Cong. (2009) (statement of Elliot Mainzer, Exec. Vice Pres. Corp. Strategy, BPA), available at [http://www.bpa.gov/corporate/WindPower/docs/Mainzer\\_BPA\\_FinalTestimonyforSenat e121009.pdf](http://www.bpa.gov/corporate/WindPower/docs/Mainzer_BPA_FinalTestimonyforSenat e121009.pdf).



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).

## V. THE DECISION DRIVERS

As load and generation establish and evaluate Balancing Authority relationships, the business decision that best fits the circumstances reflects both quantifiable and qualitative considerations. These decision drivers may be relatively static, characteristic of a condition that is not expected to change, or relatively dynamic, 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.<sup>58</sup> 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 and there is no

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58. See e.g., Puget Sound Energy, Inc., FERC Letter Order, Docket Nos. ER10-623-00, ER 10-624-000, ER10-625-000 (Mar. 3, 2010) (FERC approved Parties' intra-hour scheduling permit).

one-size-fits all solution. Below are 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, who is responsible for (1) balancing loads and resources, (2) the technology, maintenance, operation and monitoring required to satisfy NERC's Reliability Standards, and (3) on-going certification.<sup>59</sup> 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, the existing Balancing Authority directly absorbs these costs with either direct allocation to tariff charges or indirectly allocated as overhead costs to all of the Balancing Authority's customers. These costs and any operational requirements, such as imposed curtailments, re-dispatch or directed reduction of generating output, are likely to change over time.

In addition, there is the benefit of access to the diversity afforded by the host Balancing Authority Area's combined portfolio of loads and generation. As NERC explains, through planning efforts, a Balancing Authority considers the many and varied conditions that may be experienced and how best to cost-effectively balance, given the particular character of loads and the generation portfolio, including new variable generation.<sup>60</sup> These resources may be helpful in terms of

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59. See *NERC Glossary of Terms Used in Reliability Standards*, *supra* note 5 (the host Balancing Authority Area is responsible for balancing loads and resources, is responsible for the technology, maintenance, operation and monitoring required to satisfy NERC's Reliability Standards, and is responsible for on-going certification).

60. NERC SPECIAL REPORT, *supra* note 6, at 47 ("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

allowing the netting of load and output as well as making available an adequate supply of cost-effective ancillary services. However, it is important to understand who benefits from such netting, the host Balancing Authority or the interconnected load or generator.

The interconnecting entity is not necessarily the financial beneficiary of such netting. The interconnecting entity is responsible for purchasing ancillary services from the host Balancing Authority. Netting of load or generation demands benefits the host Balancing Authority by capturing diversity, whether by reducing the demand for energy or reducing the volatility of intermittent output. The demand reduction results in less real-time use of energy, but whether the interconnecting load or generator receives any benefit from the netting depends on when and how the load or generation are metered. If the load or generation is directly metered (as is usually the case), then any netting occurring within the host Balancing Authority's system will not necessarily be credited back to the interconnected party.<sup>61</sup> The load or generator will be charged for the ancillary services it consumes, regardless of the value of the netted impact. For example, while netting may reduce the host Balancing Authority's capacity requirements, that benefit will not be assigned to the customer. The reason being that unless netting can be predicted with reasonable certainty the host Balancing Authority cannot count on it; the host Balancing Authority has the supplier of last resort responsibility and as a result, must have adequate resources to supply demand under most conditions. Therefore, the cost of the reserved capacity plus the cost of the energy consumed are some of the costs that are charged to load or generation purchasing ancillary services from the host Balancing Authority.

Thus, in this option the interconnected entity has no direct control over the costs of the ancillary services it purchases from the host Balancing Authority Area. Said another way, the interconnected entity must purchase needed services at whatever price is set by the host Balancing Authority Area's

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are available to meet bulk power system reliability requirements under contingency conditions.”).

61. Whether there is any crediting may be an issue addressed in rate-making proceedings.

rate-making proceedings, or in accordance with whatever methods of operation. In this situation there is little incentive or benefit for the host Balancing Authority to innovate cost reducing tools or strategies. The host Balancing Authority needs to be sure that it has the energy, capacity and operational tools to satisfy its planned demand. While a particular interconnected load may be willing to tolerate some risk of non-performance to reduce costs, the host Balancing Authority's risk tolerance for failure to performance may be slim to none. In either case, the interconnected load and generation are in a must purchase situation at whatever price is ultimately established by or for the host Balancing Authority.

*Option 2: Registering as a Balancing Authority*

In contrast to option 1, above, most of the benefits associated with becoming a generation-only Balancing Authority revolve around the operational control afforded by access to otherwise unavailable opportunities. Said in another way, an entity that has access to resources that can be used to provide ancillary services at a lower cost than are available from a host Balancing Authority is financially better off becoming its own Balancing Authority as long its resources plus overhead costs are expected to be lower than those of the host Balancing Authority over time. 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,<sup>62</sup> but instead, takes on the responsibility of managing inadvertent energy according to the NERC Reliability Standards.<sup>63</sup> 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.<sup>64</sup> A separate Balancing Authority may also be able to participate in operational processes that support reliability that it would

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

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

64. *WECC Paper, supra* note 6, at 6 - 7.

not be otherwise able to access, e.g., participation in reserve sharing programs, system-wide restoration testing and training, ACE Diversity Interchange programs,<sup>65</sup> etc. However, a separate Balancing Authority requires specific communications and control systems and trained operators on duty twenty-four hours a day, seven days a week, and 365 days a year. The functions can be performed directly or through a vendor. Assuming equally trained and experienced employees, the lower cost option will likely prevail.

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.<sup>66</sup> Specifically, reliability is increased with additional Balancing Authorities because there are more trained operators monitoring the system and higher resolution data is available to Reliability Coordinators.

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.<sup>67</sup>

The process by which wind or generation-only Balancing Authority obtains the resources necessary to provide Balancing Area services under this option 2 is illustrated by the Glacier wind facility. Within the GWA Balancing Area, the operational challenge is to balance its scheduled output with actual generation. To support its efforts, the Balancing Authority purchases generation that it uses for regulation and other products necessary to meet Balancing Authority standards and participate in various regional programs, e.g., the Northwest

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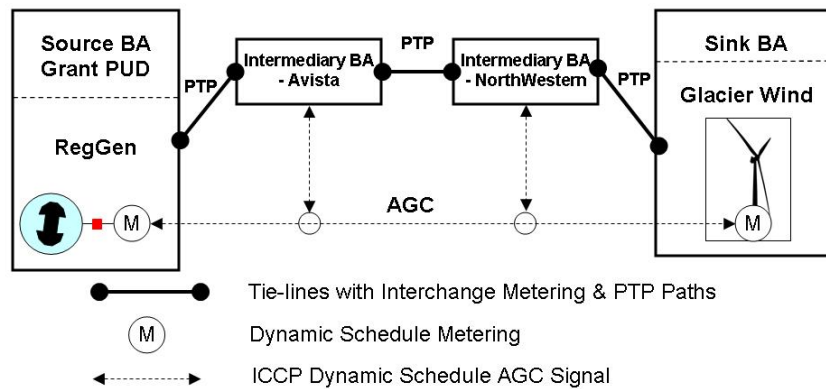
65. *Id.* at 10.

66. 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).

67. *WECC Paper, supra* note 6, at 6.

Power Pool’s reserve sharing program. In terms of regulation, GWA must enter into power purchase agreements with various suppliers in order to acquire the capacity and energy that it uses for regulation, and obtain the necessary transmission services to secure resources.<sup>68</sup> One of GWA’s regulation suppliers is Public Utility District No. 2 of Grant County,

## Glacier Wind Topology



Ref: NERC Dynamic Transfer Whitepaper, App. F, pg 9

Washington (Grant PUD).<sup>69</sup>

The illustration above shows that GWA is able to balance its schedules and actual generation by purchasing generation from Grant PUD, and purchasing transmission services from Grant PUD to GWA over both Avista Corporation (Avista) and NorthWestern Energy’s (NorthWestern) transmission systems. Over this path, Avista and NorthWestern allow Grant PUD to transmit and GWA to receive varying amounts of energy pursuant to dynamic scheduling protocols using automatic generation controls. The energy that is transmitted is metered at Grant PUD and at GWA. Pursuant to dynamic scheduling protocols the capacity reservation is pre-scheduled and the actual energy consumed is reconciled after the hour with the four balancing areas involved in the transaction: Grant PUD,

68. Response to Request for Additional Information, FERC Docket No. ER09-1329-000 at 2 (Sept. 2009).

69. *Id.*

Avista, NorthWestern, and GWA. This transaction is repeated with each supplier of resources, every hour of each day.

*Option 3: Interconnect and Implement Dynamic Scheduling or Market Allowances*

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.<sup>70</sup>

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).<sup>71</sup>

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

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70. For example, in the WECC, which is composed of 33 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.

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

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 that in turn, produce efficiencies and monetize 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.

How a wind or generation only balancing area self-supplies regulation services under this option 3 is illustrated by the Bonneville Power Administration's (Bonneville) pilot with Iberdrola Renewables (Iberdrola), as graphically depicted below. Iberdrola has 1,100 MW of wind turbine capacity within Bonneville's Balancing Area,<sup>72</sup> owns thermal generation and has contracted for additional hydroelectric and thermal generation that it uses to self-provide generation imbalance services.<sup>73</sup> As a result of this arrangement, while Iberdrola remains within the Bonneville Balancing Authority Area, Bonneville's supply obligation is reduced by "roughly 300 MW."<sup>74</sup>

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72. Bonneville Power Administration, *Fact Sheet 2* (2010) available at [http://www.bpa.gov/corporate/pubs/fact\\_sheets/10fs/WIT\\_Factsheet\\_-\\_October\\_2010-2.pdf](http://www.bpa.gov/corporate/pubs/fact_sheets/10fs/WIT_Factsheet_-_October_2010-2.pdf).

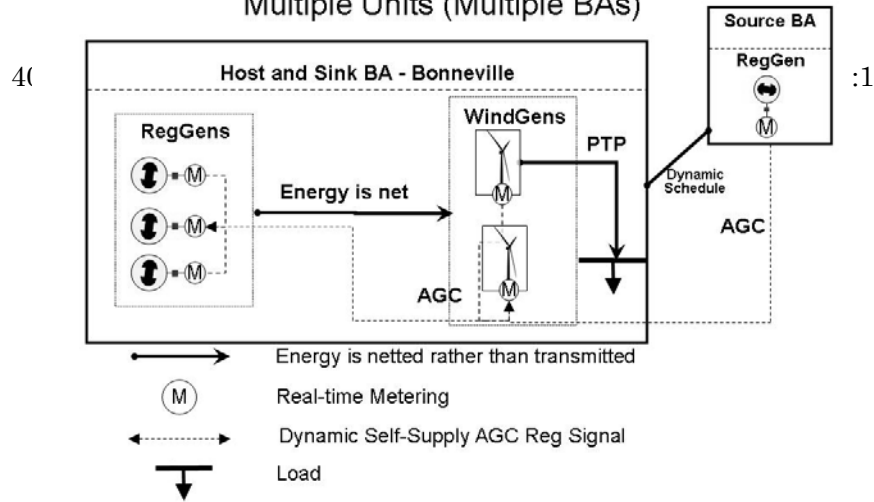
73. *Id.* at 2-3.

74. *Id.* at 3.



# Iberdrola BPA Pilot Topology

## Multiple Units (Multiple BAs)



In this situation, Iberdrola continues to purchase regulation and load-following reserves from Bonneville (the instantaneous and up to 10-minute regulation) while self-providing imbalance regulation (up to 60-minute) by using a combination of tools, e.g., netting its wind fleet, using intra-hour schedules and contracting for additional generation (incremental generation and decremented generation) on static contract and automatic generation control. This is done with owned wind fleet, owned thermal resources and contracted for thermal and hydroelectric resources located both inside and adjacent to the BPA Balancing Authority, using a combination of firm transmission paths and awarded Dynamic Transfer Capability.<sup>75</sup> This arrangement allows Iberdrola to better manage its costs and reduces the regulation services that Bonneville must set aside for Iberdrola as its host Balancing Authority.

## VI. CONCLUSION

As North America continues incorporating new generation technologies and inventing new ways of lower the cost of serving load, 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

75. BPA TRANSMISSIONS SERV., BONNEVILLE POWER ADMIN., GENERATION IMBALANCE SELF SUPPLY PILOT PROJECT OVERVIEW 2 (2009), available at [http://transmission.bpa.gov/wind/gen\\_imbalance/gi\\_self-supply\\_pilot\\_overview\\_122310.pdf](http://transmission.bpa.gov/wind/gen_imbalance/gi_self-supply_pilot_overview_122310.pdf); Iberdrola Renewables, *Comments on Proposed DTC Study Pilot Change*, (August 3, 2010), available at [http://transmission.bpa.gov/wind/dynamic\\_transfer/ibr\\_dtc\\_comment.pdf](http://transmission.bpa.gov/wind/dynamic_transfer/ibr_dtc_comment.pdf).

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.