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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EC-2013-0377 et al.

DIRECT TESTIMONY

OF

EDWARD A. HOLT

ON

BEHALF OF

RENEW MISSOURI ET AL.

May, 2013

TABLE OF CONTENTS

Contents

DIRECT TESTIMONY

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I. Introduction

Q. Please state your name and business address.

A. My name is Edward A. Holt. My business address is 28 Headland Road, Harpswell, Maine.

Q. By whom and in what capacity are you employed?

A. I am employed by Ed Holt & Associates, Inc. as president and consultant.

Q. Please describe your educational background and employment experience.

A. I graduated from the University of New Hampshire in 1968 with a Bachelor of Science degree in Music Theory. I graduated from the University of Washington in 1974 with a Master of Urban Planning degree. From 1982 to 1994, I worked for Seattle City Light, a municipal utility, in various capacities, including manager of planning and program development and manager of commercial/industrial energy management programs. During this time I also contributed to the utility's integrated resource plans. I was employed by the Regulatory Assistance Project for two years, 1994-1996, during which time I provided seminars and research to state utility regulators on energy efficiency and renewable energy in integrated resource planning. In 1996 I began my consulting practice, in which I have focused on renewable energy policy and markets.

In my 17 years of consulting experience, I have conducted research and analysis for a variety of clients. For the Lawrence Berkeley National Laboratory, for example, I have co-authored reports focusing on renewable energy policy:

- E. Holt, R. Wiser and G. Barbose. *How a Federal Renewable Electricity Standard Will Affect State Renewables Portfolio Standards*. (unpublished).
- R. Wiser, E. Holt and G. Barbose. *Supporting Solar Power in Renewables Portfolio Standards: Experience from the United States*. LBNL-3984E. Lawrence Berkeley National Laboratory, October 2010.
- R. Wiser and G. Barbose, *Renewable Portfolio Standards in the United States: A Status Report with Data through 2007*. (Contributing author). LBNL-154E. Lawrence Berkeley National Laboratory, April 2008.
- E. Holt and R. Wiser, *The Treatment of Renewable Energy Certificates, Emissions Allowances, and Green Power Programs in State Renewables Portfolio Standards.* LBNL-62574. Lawrence Berkeley National Laboratory, April 2007.
- E. Holt, R. Wiser and M. Bolinger, *Who Owns Renewable Energy Certificates? An Exploration of Policy Options and Practice*. LBNL-59965. Lawrence Berkeley National Laboratory, April 2006.

Other renewable energy policy reports have been prepared for the Clean Energy States Alliance and the Electric Power Research Institute:

- E. Holt, *Increasing Coordination and Uniformity among State Renewable Portfolio Standards*. Prepared for Clean Energy States Alliance and the Northeast/Mid-Atlantic RPS Collaborative, 2008. http://www.cleanenergystates.org/Publications/CESA_Holt-RPS_Policy_Report_Dec2008.pdf
- C. Elefant and E. Holt, *The Commerce Clause and Implications for State Renewable Portfolio Standard Programs*. Prepared for Clean Energy States Alliance, 2011.

- Kearns & West and E. Holt, *Renewable Energy Requirement Status and Compliance Strategies: 2004.* (EPRI 1008374) Palo Alto, California: Electric Power Research Institute, 2004.

I have written additional reports relating to voluntary green power markets and about the use of renewable energy certificates for the National Renewable Energy Laboratory:

- E. Holt, J. Sumner and L. Bird. *The Role of Renewable Energy Certificates in Developing New Renewable Energy Projects*. Golden, Colo: National Renewable Energy Laboratory, 2011.
- L. Bird, E. Holt, J. Sumner and C. Kreycik, *Forecasting the Size of the Voluntary Green Power Market*. Golden, Colo: National Renewable Energy Laboratory, 2010.
- L. Bird, E. Holt and G. Carroll. *Implications of Carbon Regulation for Green Power Markets*. Golden, Colo: National Renewable Energy Laboratory, 2007.
- E. Holt and L. Bird. *Emerging Markets for Renewable Energy Certificates: Opportunities and Challenges*. Golden, Colo: National Renewable Energy Laboratory, 2004.
- R. Wiser, M, Bolinger, E. Holt and B. Swezey. *National Green Power Market Assessment*. Golden, Colo: National Renewable Energy Laboratory, 2001.

I also have been a long-time consultant to the U.S. Environmental Protection Agency on its national recognition program (Green Power Partnership) for large customers that buy renewable electricity. I have supported EPA as it considers program standards and policies regarding renewable energy certificates and greenhouse gas accounting. Most of my EPA work is unpublished but it does include the following publication:

- W. Golove, R. Brown and E. Holt, *Guide to Purchasing Green Power: Renewable Electricity, Renewable Energy Certificates and On-Site Renewable Generation*. Published by US DOE, US EPA, WRI and CRS. September 2004.

I have provided consulting services to state regulators, including the Public Utilities Commission of Ohio on aspects of its alternative energy portfolio standard and the Arkansas Public Service Commission on the design of a renewable portfolio standard.

I have been involved in the development of a number of certificate tracking systems, including PJM Generation Attribute Tracking System, the Midwest Renewable Energy Tracking System, the Western Renewable Energy Generation Information System, and currently for the New York State Energy Research and Development Authority. I have also consulted with a few utilities on the design and operation of voluntary renewable energy programs, including Santee Cooper, and for more than ten years, Tennessee Valley Authority.

II. Purpose and Summary of Testimony

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my testimony is to demonstrate that utility compliance with Missouri's Renewable Energy Standard (RES) to date is flawed and that Union Electric Company d/b/a Ameren Missouri ("Ameren") and The Empire District Electric Company ("Empire") are in fact non-compliant based on their 2011 compliance reports.

Q. In what ways are the utility compliance efforts deficient?

A. Utility 2011 compliance efforts are deficient in three ways:

(1) Compliance reporting is incorrectly based on the assumed eligibility of individual hydro turbine units, each with a nameplate rating of less than 10 MW, instead of eligibility based on the nameplate rating of a hydro generating facility at one location.

(2) Compliance reporting is incorrectly based on the use of retroactive renewable energy credits (RECs) issued for generation that occurred prior to when compliance with the RES began.

(3) Compliance reporting is incorrectly based on imported RECs without the delivery of associated energy from the eligible generating facilities, providing no economic or environmental benefits to the state of Missouri as RES policies generally intend.

III. Hydropower Nameplate Rating and Capacity Limits

Q. What is the Missouri RPS eligibility for hydropower?

A. Missouri statute states that eligible resources include "hydropower (not including pumped storage) that does not require a new diversion or impoundment of water and that has a nameplate rating of ten megawatts or less…" § 393.1025(5), RSMo. The rule adopted by the Commission that governs the eligibility of hydro resources adds the word "generator" and uses the word "rating" in its plural form: "Hydropower (not including pumped storage) that does not require a new diversion or impoundment of water and that has generator nameplate ratings of 10 megawatts or less;" 4 CSR 240-20.100(1)(K)(8).

Q. What do the obligated utilities claim in their 2011 RES Compliance Reports?

A. Ameren's Compliance Report for 2011 states, "Ameren Missouri is the owner and operator of the Keokuk Hydro-electric Generation Station located on the Mississippi River in Keokuk, Iowa. The station consists of 15 separate generators. The individual nameplate ratings range from 7.2 to 8.8 MWs." Empire states in its 2011 Annual RES Compliance Report, "68,786 RECs were retired from Empire's Ozark Beach Hydroelectric Project, a certified renewable energy facility. Ozark Beach consists of 4 generators with individual nameplate ratings of 4 MW each."

Q. What is nameplate rating?

A. In terms of its literal meaning, it is the maximum rated output of a generating unit at a power plant under specific operating conditions that are designated by the manufacturer. In the context of a power plant, however, nameplate rating is the sum of the maximum output of all the generating units at the facility's location. Nameplate rating is commonly expressed in kilowatts or megawatts. Nameplate rating is also referred to as nameplate capacity. The two terms "nameplate rating" and "nameplate capacity" are used interchangeably. Both are used in Missouri and Federal law to refer to a utility's aggregate generating capacity in various contexts." § 393.1025(5), § 393.1050 RSMo.

Q. What does nameplate rating apply to?

A. Although the physical nameplate is attached to each generating unit, in practice "nameplate rating" is almost universally applied to the facility, power plant or group of generating units at one location. For example, the Federal Energy Regulatory Commission (FERC), in its instructions for Form 1, Electric Utility Annual Report, directs utilities to report the total installed hydroelectric capacity, which it identifies as generator nameplate ratings in MW. (FERC FINANCIAL REPORT, FERC FORM No. 1: Annual Report of Major Electric Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report, at http://www.ferc.gov/docs-filing/forms/form-1/form-1.pdf.) For large hydro, which it defines as "hydro plants of 10,000 Kw or more of installed capacity (name plate ratings)," FERC Form 1 requests "Total installed cap" and "Gen name plate Rating in MW" together on the same line, indicating that the terms "installed capacity" and "name plate rating" are synonymous (p. 117 of the pdf file cited, numbered p. 406, line 5).

The U.S. Energy Information Administration (EIA) offers another example. In its description of the Annual Electric Generator Report, EIA states, "Form EIA-860 is completed by all existing

plants and proposed (10-year plans) plants that: 1) have a total generator nameplate capacity (sum for generators at a single site) of 1 megawatt (1,000 kW) or greater; and 2) where the generator(s), or the facility in which the generator(s) resides, is connected to the local or regional electric power grid and has the ability to draw power from the grid or deliver power to the grid." (Emphasis added; http://www.eia.gov/survey/#eia-860).

The Missouri Department of Natural Resources offers another example. DNR's rules for Certification of Renewable Energy frequently and repeatedly refer to certification of a "renewable energy generation facility," which it defines as "the facility where electrical energy was generated by an eligible renewable energy resource." 10 CSR 140-8.010(1)(F).

Q. Is there other evidence that the size of a hydro resource, as commonly expressed by its capacity, includes all generating units at a facility, and is not determined by the size of its individual turbine generators?

A. One of the most common and widely known utility laws is the federal Public Utility Regulatory Policies Act of 1978 (PURPA). According to the FERC website, PURPA was implemented to encourage, in part, the expeditious development of hydroelectric potential at existing small dams (http://www.ferc.gov/industries/electric/gen-info/qual-fac/what-is.asp). PURPA accomplishes this goal by creating two classes of generating facilities eligible to receive special rate and regulatory treatment. "Generating facilities in this group are known as qualifying facilities (QFs), and fall into two categories: qualifying small power production facilities and qualifying cogeneration facilities. A **small power production facility** is a generating facility of 80 MW or less whose primary energy source is renewable (hydro, wind or solar), biomass, waste, or geothermal resources." (Emphasis in original) With respect to eligibility of small power production facilities, PURPA regulations state:

"§ 292.204 Criteria for qualifying small power production facilities.

(a) *Size of the facility* —(1) *Maximum size.* Except as provided in paragraph (a)(4) of this section, the power production capacity of a facility for which qualification is sought, together with the power production capacity of any other small power production facilities that use the same energy resource, are owned by the same person(s) or its affiliates, and are located at the same site, may not exceed 80 megawatts.

(2) *Method of calculation.* (i) For purposes of this paragraph, facilities are considered to be located at the same site as the facility for which qualification is sought if they are located within one mile of the facility for which qualification is sought and, for hydroelectric facilities, if they use water from the same impoundment for power generation.

(ii) For purposes of making the determination in clause (i), the distance between facilities shall be measured from the electrical generating equipment of a facility." (18 CFR 292.204; emphasis added)

There are two important points from these federal rules. First, reference to facilities is typical. Individual generating units are not the focus. Second, the federal regulation is quite explicit that the size of a facility is determined by the aggregate capacity of all power production capacity that uses the same energy resource, are owned by the same person, and are located at the same site. Specifically in the case of hydro facilities, the total facility size is based on whether they use water from the same impoundment for power generation. Under federal regulation and FERC rules, Ameren and Empire would have to count the combined power capacity of all generating units associated with the Keokuk and Ozark Beach dams.

Q. Does the RES statute shed any further light on its intention?

A. Yes. The statute requires that DNR certify electricity generated from renewable resources used to fulfill the RES requirements. The statute refers to the generating facility, not individual generating units, when stating: "Certification criteria for renewable energy generation shall be determined by factors that include fuel type, technology, and the environmental impacts of the generating facility." § 393.1030.4, RSMo (emphasis added). The statute goes on to say, "Renewable energy facilities shall not cause undue adverse air, water, or land use impacts, including impacts associated with the gathering of generation feedstocks." Based on my experience with other state renewable portfolio standards, the use of the phrase "renewable energy facility" strongly suggests that the entire set of generating units at any one facility or location was intended.

A separate Missouri statute refers to utilities that have achieved a certain level of eligible renewables, as measured by a percentage of nameplate capacity. It applies to "any electrical corporation…which…achieves an amount of eligible renewable technology nameplate capacity equal to or greater than fifteen percent of such corporation's total owned fossil-fired generating capacity…" § 393.1050 RSMo (emphasis added). Here "nameplate capacity" clearly refers to "aggregate" or "total" nameplate ratings, even though neither of those words is used.

Q. Do the Commission rules shed any further light on whether it intended individual generating units or whole generating facilities with regard to eligibility based on nameplate rating?

A. As mentioned, the Commission rules refer to hydropower facilities that have "generator nameplate ratings" of ten (10) MW or less. 4 CSR 240-20.100(1)(K)(8). The plural "ratings" makes the Commission's rule consistent with my interpretation that a certified facility's multiple generating units are to be taken together as a single resource.

Moreover, "generator" may refer to the owner of a renewable energy generating facility. The word "generator" is used often to refer to the owner of a generating facility, and in fact the Commission rules make numerous references to "customer-generators" and "customer-generator facilities." These terms refer to customer-owned net-metered renewable energy resources in which the entire installation is the facility; in this context the individual solar panels, for example, are not treated as separate generators.

Q. Is there any other evidence as to the intent of the statute and its treatment of hydropower according to its nameplate rating?

A. Yes. No other renewable energy resource was similarly limited according to its size, as measured by nameplate rating or capacity, suggesting strongly that the drafters of the language intended to limit eligibility to exclude large hydropower above 10 MW. This is consistent with a number of other state RES statutes and rules. Where a state limits hydro resources by size (using nameplate rating or capacity as the measure of size), it is the overall size of the facility that matters, not the size of the individual components.

Q. Do utilities generally quote their hydropower nameplate ratings for individual generating units or for the facility as a whole?

A. Almost always, utilities quote the facility's aggregate nameplate rating or capacity. For example, on its website, Ameren provides a corporate fact sheet. (See http://www.ameren.com/AboutAmeren/Documents/AmerenCorporateFactSheet.pdf) Under "Regulated Operations, Ameren Missouri Facilities," the Fact Sheet shows a list of Hydroelectric Facilities, including the following: "Keokuk Energy Center, Keokuk, Iowa, Capacity: 140 MW." The Osage Energy Center, another of Ameren's hydroelectric resources with multiple generating units, is also described by its facility capacity of 240 MW, not by the

capacity of each of its turbine-generators. This is all the more striking because the same Fact Sheet lists the utility's gas-fired combustion turbines by naming individual generating units, or groups of units, as Joppa 1-3 (110 MW) and Joppa 4-5 (74 MW) yet listing their capacity based on the facility total. This Fact Sheet shows that Ameren normally considers the nameplate rating or capacity of the entire facility as the relevant fact.

In making its RES Compliance Report for 2011, Ameren included as Exhibit 2 an affidavit of the Executive Vice-President of Pioneer Prairie Wind Farm, which states, "Pioneer Prairie Wind Farm I LLC is located in Mitchell County, Iowa. The facility's nameplate capacity is 300.3 MW, of which 102.3 MW is sold to Buyer." (p. 36) Again, it is not the nameplate of each turbine-generator that is relevant, it is the nameplate rating or capacity of the entire facility that is considered significant. Regarding this wind facility, Ameren itself states, "In June, 2009 Ameren Missouri and Pioneer Prairie Wind Farm I LLC entered into a 15 year power purchase agreement. Ameren Missouri is purchasing 102.3 MWs of nameplate generation from the Pioneer Prairie Wind Farm consisting of 62 turbines, located in north east Iowa." (Ameren Missouri, RES Compliance Report 2012, p. 6.) In this instance, Ameren refers to the nameplate of this total facility, and does not claim that each turbine's nameplate rating is important.

Empire provides information about its generating resources on its website. In its brief history of the company, Empire states, "Today, Ozark Beach Hydroelectric Plant supplies Empire with 16 megawatts of power and the Taney County area with a beautiful recreational area." https://www.empiredistrict.com/About/History.aspx. Also, in its Fast Facts webpage, Empire lists its power plants, including Ozark Beach with a "Power Plant Rating" of 16 MW. https://www.empiredistrict.com/About/FastFacts.aspx

In Attachment 2 to its 2012 RES compliance report, Empire also uses "nameplate capacity" repeatedly to refer to aggregate capacity: "In other words, if Empire has a renewable energy nameplate capacity of greater than 15% of its total owned fossil-fired generating capacity by January 20, 2009, Empire does not have to meet the solar requirement… Empire's renewable energy nameplate capacity as of January 1, 2009 is 255 Megawatts (MW). This number is derived from the 150 MW of capacity related to the Elk River Windfarm…and the 105 MW Meridian Way Wind Farm…" (Empire 2012 RES Compliance Report, p. 11.)

Q. How do Ameren and Empire treat Keokuk and Ozark Beach, respectively, in their reports to FERC?

A. In its official reports to the Federal Energy Regulatory Commission (FERC), Ameren Missouri, as Union Electric Company, also quotes the nameplate rating of Keokuk based on the entire facility. FERC Form 1, Electric Utility Annual Report for the year 2012, filed by Union Electric Company, requires reporting of hydroelectric plant statistics (Large Plants). Large Plants are defined by FERC Form 1 as "hydro plants of 10,000 kW of more of installed capacity (nameplate ratings)." It is clear from this instruction (also shown below) that FERC views "nameplate rating" and "installed capacity" as synonymous. It is also clear that by using the plural "nameplate ratings," (just as the Commission RES rules do), FERC means to treat the aggregate of the individual turbine nameplate ratings at the plant.

HYDROELECTRIC GENERATING PLANT STATISTICS (Large Plants) Large plants are hydro plants of 10,000 Kw or more of installed capacity (name plate ratings)	
Column C Plant Name: Total installed cap (Gen name plate Rating in MW)	Keokuk 127.20

In its FERC Form 1 report, Ameren acknowledges that Keokuk exceeds the maximum size eligible for the Missouri RES. If Ameren truly considered the generating units as separate resources, it would have reported them individually and not as a single large unit.

By virtue of reporting Keokuk as a large plant with a nameplate rating in excess of 10,000 kW, Ameren is acknowledging that Keokuk exceeds the maximum size eligible for the Missouri RES. Similarly, Empire filed FERC Form 1 for the year 2012, in which it reports Ozark Beach as a large hydro plant with nameplate ratings of 16 MW.

HYDROELECTRIC GENERATING PLANT STATISTICS (Large Plants) Large plants are hydro plants of 10,000 Kw or more of installed capacity (name plate ratings)	
Column C Plant Name:	Ozark Beach
Total installed cap (Gen name plate Rating in MW)	16

Ozark Beach, as acknowledged by Empire in its FERC Form 1 report, is likewise a large hydro plant with nameplate ratings in excess of 10,000 kW and therefore is ineligible for the Missouri RES.

Q. What does the REC tracking system intend with respect to nameplate ratings or capacity?

A. Each North American Renewables Registry (NAR) Certificate contains a number of data fields. These data fields are enumerated in Section 7.4 of the NAR Operating Rules. One of these data fields is Nameplate Capacity, and the comment column for that data field notes, "Nameplate Capacity of facility." (emphasis added).

Q. How do Ameren and Empire treat Keokuk and Ozark Beach, respectively, in their registration with the REC tracking system?

A. The NAR requires that a Generating Asset must first be registered with NAR prior to being issued certificates. NAR defines a Generating Asset as "One or more Generating Units that have

been accepted by the NAR Administrator for listing in the Registry." (NAR Operating Rules p. v.) On its website, NAR publishes a publicly available report listing all registered Assets within the NAR system, including the following:

Account Holder Company	NAR ID	State	Asset	Facility Ownership Type	Multi-Fuel Indicator	Fuel/Project Type	Commenced Operation Date	Nameplate Capacity
AmerenUE	GEN160	IA	Keokuk-Keokuk	Investor-Owned Utility	No	Hydroelectric Water-Dam/Impoundment	1/1/1913	134
Empire District Electric Company	GEN99	MO	Ozark Beach-Ozark Beach Hydro	Investor-Owned Utility	No	Hydroelectric Water-Dam/Impoundment	1/1/1930	16

https://narenewables2.apx.com/myModule/rpt/myrpt.asp?r=111

In registering Keokuk with NAR, Ameren treated Keokuk as a single Generating Asset with a Nameplate Capacity of 134 MW. Ameren did not register each of the Keokuk turbines separately as different Generating Assets. Similarly, Empire treated Ozark Beach as a single Generating Asset with a Nameplate Capacity of 16 MW. Empire did not register each of the Ozark Beach turbines separately as different Generating Assets.

Ameren's Annual Compliance Report for 2011 shows a listing of Keokuk RECs used for compliance (Exhibit 1 p. 13). All Keokuk RECs display the same generator number (NAR ID: GEN160). The Asset is Keokuk—not generator 1, generator 2, etc. The Keokuk RECs are all based on generation occurring in 2009, 2010 and 2011. Empire's 2011 RES Compliance Report shows a listing of Empire RECs used for compliance (listed in Attachment 1 of the Report). All Ozark Beach RECs display the same generator number (NAR ID: GEN99). All generating units are treated as one in terms of registration and nameplate rating.

Q: How have other states addressed hydropower eligibility?

Many states have limited the eligibility of hydroelectric power to comply with their renewable energy requirements. These states have used several approaches, including limits on facility

capacity, prohibitions against new dams or water impoundments, restricting eligibility to new low-impact hydro facilities, establishing separate classes or tiers each with its own percentage requirement, and limiting hydro eligibility in one class but accepting it in a different class. The reasons for these limitations on eligibility often include the following: (1) to minimize the broad environmental impacts arising from flooding land and wildlife habitat; (2) to encourage investment in new projects for their economic benefits; and (3) to recognize that older, existing facilities have had time to recover their capital investment costs and are no longer in need of any financial or regulatory incentive. These limitations are evident in the summary table below.

State	Hydropower Eligibility
CA	Facility employing one or more hydroelectric turbine generators, the sum capacity of which does not exceed 30 MW, with an exception for eligible efficiency improvements made after January 1, 2008.
CO	Existing hydro with nameplate rating of 30 MW or less; new hydro with nameplate rating of 10 MW or less.
CT	Class I: Certain newer run-of-the-river hydropower facilities not exceeding 5 MW in generating capacity. Class II: Certain older run-of-the-river hydropower facilities also not exceeding 5 MW in generating capacity.
DC	Ineligible for Tier 1 but eligible for Tier 2.
DE	Facilities with a maximum design capacity of 30 MW or less from all generating units combined.
IL	May not involve the construction of new dams or significant expansion of existing dams.
KS	Existing hydropower; new hydro that has a nameplate rating of 10 MW or less. The capacity determination for a multiunit resource may be made through tests for a representative sample of at least 10 % of the units.
MD	Small power plant of less than 30 MW capacity and in operation as of January 1, 2004.
MA	Class I: Certain new facilities, or certain incremental new energy from increased capacity or efficiency improvements at existing facilities.
ME	Class I: New facilities less than 100 MW capacity that have come on-line after September 1, 2005. Class II: Older facilities less than 100 MW capacity. Nameplate capacity means the capacity rating of a generation facility as specified by the manufacturer.
MI	Run of river resources. Facilities that require new dam construction are *not* considered an eligible resource, although repairs, replacements, and upgrades of existing dams may be counted towards compliance.
MN	Facilities less than 100 MW capacity.
MT	Existing projects with nameplate rating of 10 MW or less; new projects up to 15 MW nameplate capacity installed at an existing reservoir or on an existing irrigation system that did not have hydroelectric generation as of April 16, 2009.
NC	Facilities with a generating capacity up to 10 MW
NH	Class I – Incremental new production from a hydro facility regardless of gross nameplate capacity. Class IV - Existing Small Hydroelectric. Facilities with gross nameplate capacity up to 5 MW, provided the generator began operation before January 1, 2006, and meets certain environmental protection criteria.

NJ	Class II: Facilities that have a maximum design capacity of 30 MW or less from all generating units combined.
NM	Facilities brought in service after July 1, 2007.
NV	Facilities with generating capacity not more than 30 MW, and no new or increased appropriation or diversion of water for its creation.
NY	In-state run-of-river facilities of 5 MW or less that were built prior to January 1, 2003, and demonstrate a need for financial support.
OH	Facility must meet a series of requirements regarding its environmental impact.
OR	Facility must have commenced operation on or after January 1, 1995, except that the incremental output from efficiency improvements to facilities that began operation before that date may qualify; also 50 average MW of utility-owned, pre-1995, low-impact hydro can be used for compliance, and 40 average MW of non-utility owned, pre-1995, low-impact hydro can be used for compliance.
PA	Tier I: New and existing low-impact hydro facilities. Tier II: Large-scale hydro.
RI	Facilities employing one or more hydroelectric turbine generators and with an aggregate capacity not exceeding 30 MW.
TX	Facilities installed after September 1999.
WA	Incremental output resulting from efficiency improvements completed after March 31, 1999 to projects owned by a utility subject to the RPS and located in the Pacific Northwest; or to generation in irrigation pipes and canals located in the Pacific Northwest, where the additional generation in either case does not result in new water diversions or impoundments.
WI	Small hydro facilities with a capacity of less than 60 MW; large hydro facilities with a capacity of 60 MW or more.

Source: Database of State Incentives for Renewables & Efficiency; supplemented by Ed Holt & Associates, Inc.

Missouri law is broadly consistent with the restrictions adopted by other states, namely that hydropower "does not require a new diversion or impoundment of water and that has a nameplate rating of ten megawatts or less…" Interpreting the phrase "nameplate rating" as applying to each turbine unit within a hydro generating facility, however, would contradict the common intent of limiting the size and environmental impact of such facilities. Such an interpretation also frustrates the basic intent of renewable portfolio standards to stimulate the local economy by encouraging the development of new renewable resources. Finally, this interpretation would provide an irrational regulatory incentive for hydro plants that have existed for nearly a century and that have had more than enough time to recover their capital expenditures.

Q. Is there any other reason why state policy would limit the size of hydroelectric facilities eligible for state RES programs designed to encourage renewable energy resources?

A. No. Limitations on the size of hydro facilities are based on avoiding greater environmental impacts and on encouraging the development of renewable technologies not yet established.

Q. What do you conclude about the use of hydropower for compliance with the RES?

A. Based on the plain language of the RES statute that limits hydropower resources to no more than 10 MW nameplate rating, I believe that hydropower eligibility is intended to be, and should be, based on the nameplate ratings of the hydropower facility and not the nameplate rating of the individual turbine units within the facility. My conclusion is consistent with FERC's interpretation and requirements for reporting large hydropower greater than 10 MW. It is also consistent with the PURPA definition of Qualified Small Power Production Facilities. Finally, it is consistent with how Ameren has reported Keokuk as having a nameplate rating or capacity of 127 to 140 MW, and how Empire has reported Ozark Beach as having a nameplate rating or capacity of 16 MW. I conclude that the Keokuk and Ozark Beach hydropower facilities should not be eligible for RES compliance. Ameren and Empire are attempting to have it both ways by claiming that Keokuk's and Ozark Beach's individual turbine-generators are eligible for the RES, while at the same time reporting the facilities as in excess of 10 MW nameplate rating (on fact sheets and websites, in FERC reporting, and in registration with NAR). In so doing, the utilities are frustrating the obvious intent of the RES to limit the size of eligible hydropower. The result of reliance on Keokuk and Ozark Beach for compliance is a drastic reduction in the construction of new renewable generation, the very thing that the RES statute was designed to encourage.

IV. REC Eligibility from Generation Pre-dating RES Effective Date

Q. What does the Missouri RES statute say about renewable energy credit (REC) eligibility?

A. Missouri statute states, "An unused credit may exist for up to three years from the date of its creation." § 393.1030.2, RSMo.

Q. Is this unusual?

A. No. A number of state renewable energy requirements provide for REC life extension beyond the year of its creation, a practice often referred to as REC banking. Conversely, in so extending the life of a REC beyond a year, many states also limit the life of a REC.

Q. What is the purpose of REC banking?

A. The purpose of such REC rollover or REC banking provisions is to allow a utility that has more than it needs for a given compliance year to carry forward any extra RECs not needed for compliance. These provisions are not intended to make RECs eligible retroactively, especially when such RECs were created before a compliance requirement was in effect. Limits on the duration of REC banking are often imposed to prevent REC hoarding, or to inhibit such oversupply of RECs that the RES has no effect on the development of new renewable resources.

Q. What do the Commission rules say about REC life extension?

A. The Commission rules state, "An REC expires three (3) years from the date the electricity associated with that REC was generated." (4 CSR 240-20.100(1)(J). It appears that the rules have the same effect as the statute, though different phrasing is used.

Q. How have Missouri utilities chosen to interpret this rule?

A. Missouri utilities have interpreted the 3-year REC rollover rule to mean that they can use RECs from energy generated up to three years prior to the first year of compliance. Ameren states, "In addition, the RES rules allow for the banking of RECs for up to a three year time period. This has allowed the use of eligible RECs generated from January 1, 2008 to the current time period in meeting the RES requirements for calendar year 2011." (Ameren RES

Compliance Report for 2011, p. 5). Exhibit 1 of Ameren's RES Compliance Report for 2011 shows that the company claimed 949,909 Keokuk RECs generated in 2009 and 930,246 Keokuk RECs generated in 2010, as well as 910,448 Keokuk RECs generated in 2011.

In its RES compliance Report for 2011, Empire states:

> In addition, the Ozark Beach Hydroelectric Project, owned by EDE has produced renewable hydropower for many years. The RES rules allow for the banking of RECs for up to a three year time period. This has allowed the use of eligible Ozark Beach RECs generated in 2008 and 2009 in meeting the 2011 RES requirements. (Empire District Electric Company, 2011 Annual Renewable Energy Standard Compliance Report, p. 3.)

Later, Empire's Report goes on to state:

> During 2011, 63,000 vintage 2008 RECs from hydroelectric generation at Ozark Beach were retired to fulfill the Missouri compliance obligation. In January of 2012, 5,786 additional vintage 2008 and 2009 RECs from hydroelectric generation at Ozark Beach were retired to complete the RES obligation for 2011. RECs generated from the windfarms were not used to fulfill Missouri compliance obligations. (Empire District Electric Company, 2011 Annual Renewable Energy Standard Compliance Report, pp. 5-6.)

Q. Is the utility application of the statute's banking provision justified?

A. No. REC banking is for carrying forward RECs that have gone unused for compliance purposes, and the compliance requirement did not begin until 2011. A utility may <u>own</u> RECs prior to compliance but they cannot <u>use</u> them, for purposes of compliance, until the initial year of

RES compliance. In other words, pre-2011 RECs are not "unused" within the meaning of the statute, which is focused only on compliance.

Q. What do other states do?

A. Unless there is an express provision for creating eligible RECs prior to the initial year of compliance, state RES practice is to start with the first year of compliance. This is why state RES statutes often allow a few years between enactment and implementation of the policy, so the obligated utilities have time to get new facilities built or line up sources of supply. If the utilities could rely on pre-existing RECs that may have been created, there would presumably be no need to delay the first year of implementation.

If a state wants to allow such early banking of RECs prior to compliance, they may do so by explicitly enabling the practice through statutory language.[1]

Q. Doesn't the RES allow existing renewable resources to be used for compliance?

A. Yes it does, but that does not make RECs generated prior to the RES eligible. It is only the pre-existing renewable energy generating facility that is eligible.

Q. What do you conclude about RECs that pre-date the initial compliance year of the RES?

A. Missouri's REC rollover or REC banking provision is intended for carrying forward RECs that were generated in the initial compliance year and that are surplus to compliance. The statutory language stating that "An unused credit may exist for up to three years from the date of its creation" does not make retroactive or pre-existing RECs eligible. Ameren and Empire are incorrectly interpreting the statute and improperly complying with retroactive RECs. Should Ameren and Empire's interpretations be accepted, utilities would be able to cash in RECs stored up from multiple years during which there was nothing on which to use them. Essentially, this

[1] See for example Md. Code, Com. Law § 7-709.

would result in the construction and installation of far less renewable generation than the RES statute envisioned.

V. RECs Unassociated with Power Delivered to Missouri

Q. What does the RES statute say about compliance using RECs?

A. The Missouri RES statute reads, in relevant part, "The portfolio requirements shall apply to all power sold to Missouri consumers whether such power is self-generated or purchased from another source in or outside of this state. A utility may comply with the standard in whole or in part by purchasing RECs." § 393.1030.1 RSMo.

Q. What actions have Missouri utilities taken with respect to these provisions of law?

A. Ameren Missouri states that its 2011 compliance is based on "renewable energy credits (RECs) and/or actual energy that includes the REC from all forms of qualified renewable generation sources…There is a separate component, the "solar" RES that requires compliance which can only be met with solar RECs or actual energy that includes the REC from solar generation resources." (Ameren Missouri, RES Compliance Report 2011, p. 4.) Ameren goes on to say, "In late 2010, Ameren Missouri purchased 12,606 solar RECs from various third party brokers. During CY 2011, an additional 17,400 solar RECs (includes 4,000 S-RECs to be delivered by 12/31/12) were purchased from various third party brokers. These SRECs are associated with qualified solar facilities and registered with the Western Renewable Energy Generation Information System (WREGIS)." (p.8.)

Other Missouri investor-owned utilities also claimed compliance with SRECs purchased from similar third party brokers. (See 2011 RES Compliance Reports of Kansas City Power & Light and KCPL-Greater Missouri Operations.) Empire did not claim any RECs acquired from another party for compliance in 2011 or 2012; it relied only on RECs from its owned resources.

Although Ameren recognizes in its compliance report that the RES allows compliance with RECs ("RECs…or actual energy that includes the RECs"), it appears that they have imported SRECs from the western states without any associated delivery of energy from the otherwise eligible facilities. This is what Ameren means when it says it purchased SRECs from various third-party brokers (presumably REC brokers) associated with qualified solar facilities and registered with WREGIS.

Q. Is the utilities' reliance on imported RECs without the delivery of the associated energy justified?

A. No. Utilities' compliance using imported RECs without the delivery of associated energy is based on the assumption that "RECs" means imported RECs without an associated energy delivery when the statute says, "A utility may comply with the standard in whole or in part by purchasing RECs." In claiming imported RECs for compliance without the delivery of associated energy, the utilities are making a distinction that I believe is unsupported by my plain reading of the RES statute. The RES statute does not make a distinction for RECs without associated energy; it clearly states that "The portfolio requirements shall apply to all power sold to Missouri consumers…" § 393.1030.1, RSMo. (Emphasis added) The sentence immediately following it ("A utility may comply with the standard in whole or in part by purchasing RECs") I take to mean simply that a utility can acquire the RECs either by owning the eligible renewable energy resource ("self-generated"), or by purchasing them from a generating facility ("power…purchased from another source in or outside of this state"). § 393.1030.1, RSMo.

Q. What is the problem with using imported RECs unassociated with power delivered to Missouri?

A. For the Missouri RES compliance market, there is no problem with trading RECs if the electricity generation that gave rise to the RECs was generated in or delivered to Missouri. But if the RECs are imported from outside Missouri and are unaccompanied by the delivery of energy, the electricity generated by these remote facilities does not displace conventional fossil fuel electricity generation in Missouri. Therefore, these imported RECs do not provide the local environmental, security or economic benefits that most RES laws are intended to provide. The public benefits expected to accrue to Missouri ratepayers are absent if such RECs are eligible for compliance under the RES.

Q. How do states encourage local benefits through their renewable energy requirements?

A. Almost all states with an RES in place try to ensure that benefits accrue to the state adopting the RES by designating what renewable energy facilities are eligible for compliance. For example, a few states require eligible facilities to be located in-state or within the service area of utilities serving the state, or a minimum portion of compliance to come from in-state facilities.[2] Several require eligible facilities to be located in the electric grid region of which they are a part. Many others do not restrict the physical location of eligible facilities but do require that electricity from the facilities be delivered to the utility, the state or the electric grid region. I interpret Missouri as falling into this latter group. Missouri statutory language places absolutely no restriction on the location of generation sources, but simply requires a showing of energy delivery from eligible facilities to the state.

[2] Despite the U.S. Constitution's Commerce Clause prohibition against states erecting barriers to interstate trade, most states have concluded that there is a reasonable nexus between their public policy objectives of environmental improvement, security, local grid reliability, electricity price stability, etc., on the one hand, and the means to ensure that these benefits are created for their state, especially through the energy delivery requirements. As long as the goal of the restriction is not economic protectionism, such limits may be allowed. (See C. Elefant and E. Holt, *The Commerce Clause and Implications for State Renewable Portfolio Standard Programs*. Prepared for Clean Energy States Alliance, 2011.)

A few states allow imported RECs without delivery of energy but limit the degree of compliance that can be achieved in this way. Two states provide credit multipliers, although this is not mutually exclusive with other methods for encouraging local benefits. These policies are summarized in the table below.

It should be noted that the table below applies only to the main tier of each state's RES. For distributed resources such as small solar or customer-sited resources, almost all states require that the distributed resource be located in the state or interconnected with a utility serving load in the state.

	Geographic Eligibility and Delivery Requirements	**States**	**Notes**
1	In-state generation requirement	HI, IA, MI	IA and MI also allow location in broader utility service area
2	In-state generation requirement for a portion of compliance	CA, NC, OH	CA: by 2017, min. 75% in-state, max. 10% imported RECs without energy within WECC; remainder energy scheduled and delivered to CA. NC: max. 25% imported RECs without accompanying energy, remainder must be in-state or delivered to utility. OH: min. 50% in-state, remainder deliverable from adjacent states
3	In-region generation requirement	DC, IL, MD, MN, OR, PA, WV	MD and WV: within PJM; DC: within PJM or a state adjacent to PJM; PA: within PJM or within MISO for a small portion of the state served by MISO; MN: RECs originating within M-RETS; IL: in-state or adjoining states unless insufficient cost-effective resources; OR: within WECC for imported RECs, US portion of WECC and delivered to utility for renewable electricity
	Electricity delivery required to state or to utility		
4	Direct transmission inter-tie between generators and state	NV, TX	NV allows limited sharing of transmission inter-tie with other generators; TX disallows such sharing
5	Broader delivery requirements to state or to utility	AZ, KS, MT, NM, NY, WI	KS: in Kansas or serves ratepayers in the state; NY: strict hourly scheduling of energy to state; WI: out-of-state facilities must be owned by or under contract to utility
	Electricity delivery required to broader region		
6	Generators anywhere outside region must deliver electricity to region	DE, ME, NJ, WA	
7	Generators in limited areas outside region must deliver electricity to region	CT, MA, NH, RI	All: renewable facilities must be located in control areas adjacent to state's ISO.
8	In-state generation encouragement	CO	Credit multiplier for in-state projects

Source: R. Wiser and G. Barbose, *Renewables Portfolio Standards in the United States: A Status Report with Data through 2007*. Lawrence Berkeley National Laboratory, 2008. Revised and updated by Ed Holt & Associates, Inc. 2013.

Q. What do you conclude about the use of imported RECs unassociated with power delivered to Missouri for RES compliance in Missouri?

A. States enact renewable energy requirements in order to foster local economic development opportunities, environmental improvement, price stability, and other in-state benefits. In addition, states pay close attention to geographic criteria for eligible renewable energy resources as a way to ensure those local benefits. As such, it is highly unusual for a state to place no restrictions on the use of imported RECs for compliance without also requiring delivery of energy from the eligible generating facilities. To allow imported RECs without limitation undermines the basic functions of an RES policy of fostering local economic benefits. Based on my plain reading of the Missouri RES law and my knowledge of other state renewable portfolio standards, I conclude that the Missouri RES requires that power be delivered to Missouri along with the REC. If I were to place Missouri in the table above having not reviewed utility compliance reports and having no knowledge of this case, I would place it in the row numbered 5.

Q. Does this conclude your direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

EARTH ISLAND INSTITUTE d/b/a RENEW MISSOURI, et al.	)	
	)	
COMPLAINANTS	)	
	)	
v.	)	**Case No. EC-2013-0377 et al.**
	)	
UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI, et al.	)	
	)	
RESPONDENT	)	

AFFIDAVIT OF EDWARD A. HOLT

STATE OF MAINE
COUNTY OF CUMBERLAND

Edward A. Holt, being first duly sworn on his oath, states:

1. My name is Edward A. Holt. I work in the Town of Harpswell, Maine, and I am employed by Ed Holt & Associates, Inc. as president and consultant.
2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Renew Missouri, et al., which has been prepared in written form for introduction into evidence in the above-referenced docket.
3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Edward A. Holt

Subscribed and sworn to me this 22 day of May, 2013

Notary Public

My commission expires: Edythe L. Dunham Notary Public, Maine My Commission Expires September 16, 2019