University of Richmond Law Review

Volume 42 | Issue 3 Article 8

1-1-2008

My Two Cents Per Kilowatt-Hour: Virginia's Renewable Energy Portfolio Standard

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MY TWO CENTS PER KILOWATT-HOUR: VIRGINIA'S RENEWABLE ENERGY PORTFOLIO STANDARD

Electricity deregulation is a classic story of good intentions gone awry. Virginia's experience has been no different. Fortunately, Virginia's lawmakers had the foresight to avoid the troubles—such as price spikes and rolling blackouts—that have plagued deregulated states like California and Maryland.[1] In April 2007, Virginia reversed course on its electricity restructuring plan, ending the Commonwealth's experiment with a competitive retail electric energy market.[2]

The restructuring plan, enacted in 1999, contemplated a ten-year period, beginning in 2001, in which Virginia's electric energy market would be open to competition.[3] During that period, the State Corporation Commission ("Commission") would continue to regulate the Commonwealth's electric utility monopolies and electricity rates would be capped at preset levels.[4] This ten-year period of open markets and price stability was intended to entice new energy suppliers to enter Virginia's energy market to compete with the traditional electric utilities. Evidencing the plan's ambitious intentions, it permitted the Commission to lift the capped rates as early as 2004 for regions of the state where a fully competitive energy market had developed.[5] However, the capped rates were too low[6] and by late 2006—with the 2010 date

1. *See, e.g.*, Terence O'Hara & Amit R. Paley, *Electricity Deregulation: High Cost, Unmet Promises*, WASH. POST, Mar. 12, 2006, at A1; Richard Allen Greene, *California Blackout: Why It Happened*, BBC NEWS ONLINE, Jan. 18, 2001, http://news.bbc.co.uk/2/low/americas/1123665.stm.

2. *See* Act of Apr. 4, 2007, ch. 933, 2007 Va. Acts 1044, 1049 (codified at VA. CODE ANN. tit. 56 2007 (2007)). However, customers with over five megawatts of demand may still choose their energy supplier. VA. CODE ANN. § 56-577(A)(3) (2007).

3. *See* VA. CODE ANN. § 56-577, -582.

4. *See id.* § 56-582.

5. *Id.* § 56-582(C).

6. *See* IRENE E. LEECH, VA. CITIZENS CONSUMER COUNCIL, STATUS OF ELECTRIC RESTRUCTURING IN VIRGINIA: 2006 ASSESSMENT OF THE VIRGINIA CITIZENS CONSUMER COUNCIL ¶ 1 (2006), *available at* http://www.scc.virginia.gov/division/eaf/comments/facil06/

looming when capped rates were to be lifted and Virginia's energy market was to be fully competitive—*no* new energy companies were actively competing in the market.[7]

The prospect of an unregulated monopolized energy market spurred the legislature into action, prompting the restructuring legislation that is the subject of this comment. Under the amendments to Virginia's Electric Utility Restructuring Act, the Commonwealth's electric power utilities will be *re*-regulated in a hybridized manner similar to traditional cost-of-service regulation.[8] Accordingly, retail electric energy rates will once again be determined by rate cases in which the Commission determines how much utilities may charge Virginia electricity consumers.[9]

Critics of the bill argue that it heavily favors the interests of Richmond-headquartered Dominion Resources,[10] one of the nation's largest energy companies and the electricity provider for 80% of Virginians.[11] It is unsurprising that the changes are gen-

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vccc_may06.doc (submitted to the Division of Economics and Finance, Virginia State Corporation Commission) ("Until Virginia's average price for electricity increases sufficiently above the average in PJM [regional energy market], no competitor will find it economically possible to enter our market, especially since significant marketing and customer care dollars will have to be spent to gain notice above the incumbent utilities."). *Cf.* 2B PHILLIP E. AREEDA ET AL., ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION ¶ 421d (3d ed., 2007) (noting that a monopolist's supracompetitive rates are a highly effective, albeit permissible, barrier to market entry).

7. *See* KENNETH ROSE & KARL MEEUSEN, 2006 PERFORMANCE REVIEW OF ELECTRIC POWER MARKETS pt. 2, at 3 (2006), *available at* http://www.scc.virginia.gov/caseinfo/reports/2006_part2.pdf (conducted for Virginia State Corporation Commission). One competitive service provider had enrolled 1339 customers in Dominion Virginia Power's service territory. However, the provider was no longer accepting new customers. *Id.* Ten other competitive providers and energy aggregators were registered to compete with Dominion, but none had any registered customers. *Id.* One service provider had registered in Delmarva Power and Light's territory, but it had only one retail customer. *Id.*

8. *See* Dominion, Electric Reregulation in Virginia, http://www.dom.com/about/companies/vapower/rereg.jsp (last visited Nov. 22, 2007).

9. See VA. CODE ANN. § 56-585.1.

10. *See, e.g.*, Scott Miller, Op-Ed., *Gov. Kaine, Don't Short-Circuit Electric Customers*, VIRGINIAN-PILOT (Norfolk, Va.), Mar. 1, 2007, at 19 *available at* http://epilot2.hamptonroads.com/Repository/ml.asp?Ref=VmlyZ2luaWFuUGlsb3QvMjAwNy8wMy8wMSNBcjAxOTAx; Virginia Interfaith Center for Public Policy, Urge House and Senate Members to Oppose Dominion's Plan for Re-regulation (Feb. 14, 2007), http://ga4.org/interfaithcenter/alert-description.tcl?alert_id=7268839; Mike Tidwell, Chesapeake Climate Action Network, Memo to Dominion Virginia Power: The Earth is Warming, (Feb. 1, 2007) http://www.chesapeakeclimate.org/news/news_detail.cfm?id=259 *But see* Tom Farrell, Op-Ed., *Electricity Re-Regulation: New Model Provides Direction Virginia Requires*, RICH. TIMES-DISPATCH, Feb. 4, 2007, at F3 (arguing for the re-regulation plan; written by CEO and president of Dominion Resources).

11. Greg Edwards, *Kaine Alters Re-Regulation Bill*, RICH. TIMES-DISPATCH, Mar. 28, 2007, at B9. Dominion Resources serves Virginia retail electric energy customers through

erous to Dominion given that the energy company initially proposed the regulatory scheme, which was passed by Virginia's General Assembly with few amendments.[12] Assessing the final version of the bill, a coalition of environmental groups announced, "Consumers and the environment still lose."[13]

When considering new energy legislation, the General Assembly has a duty to protect Virginia's consumers and its environment. It is the official energy policy of the Commonwealth to "[ensure] the availability of reliable energy at costs that are reasonable"[14] and to "promote the use of, renewable energy sources."[15] One way these objectives can be pursued concurrently is through the implementation of a renewable energy portfolio standard ("RPS"). An RPS—which will be described in greater detail below—obligates a state's energy providers to supply a percentage of a state's electrical energy from renewable energy sources, such as wind and solar power. In January 2007, the General Assembly rejected a proposal for a mandatory RPS applicable to state utilities[16]—the approach taken by twenty-one other states.[17] Instead, the legislature enacted the RPS that Dominion wrote into the reregulation bill—a voluntary program with lucrative incentives for utilities.[18]

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its subsidiary, Virginia Electric and Power Company. Throughout this comment, the entities will be referred to collectively as "Dominion."

12. *See id.* It seems appropriate to point out that in 2006, Dominion was one of the largest contributors to Virginia politicians with $526,169. This amount is second only to Gov. Kaine's Inaugural Committee, and more than twice the amount given by the next non-party-affiliated donor, a Philip Morris entity, Altria. Virginia Public Access Project, Top Donors 2006, http://vpap.org/topdonors.cfm?Year=2006&CandFilter=A (last visited Nov. 22, 2007); *see also* Virginia Public Access Project, Dominion Donor Profile, http://vpap.org/donors/results_level2.cfm?key=ORH000201250&Year=2006&CandFilter=A (last visited Nov. 22, 2007) (showing that most of Dominion's 2006 donations went to members of Virginia's General Assembly). For a detailed account of Dominion's role in passing the re-regulation bill, see Michael D. Shear, *Virginia Is Redrafting Electricity Regulation*, WASH. POST, Feb. 5, 2007, at B1.

13. *Edwards*, *supra* note 11.

14. VA. CODE ANN. § 67-101(1) (2007).

15. *Id.* § 67-102(A)(1).

16. S.B. 1275, 2007 Gen. Assem., Reg. Sess. (Va. 2007).

17. *See* ENERGY INFO. ADMIN., RENEWABLE ENERGY TRENDS IN CONSUMPTION AND ELECTRICITY, 2005, tbl. 28, at 42 (2007), http://www.eia.doe.gov/cneaf/solar.renewables/Page/trends/table28.pdf.

18. *See* VA. CODE ANN. § 56-585.2 (2007); Greg Edwards, *Re-Regulation Plan is Opposed*, RICH. TIMES-DISPATCH, Mar. 23, 2007, at B11; Dominion, Electric Reregulation in Virginia, http://www.dom.com/about/companies/vapower/rereg.jsp (last visited Nov. 22, 2007). Only three other states have implemented voluntary RPSs: Hawaii, Illinois, and Vermont. ENERGY INFO. ADMIN., *supra* note 17.

The purpose of this comment is to highlight the problems with the RPS provision of Virginia's electricity re-regulation statute and to propose a better alternative. Section I addresses reasons why it is beneficial to include renewable energy sources in the state's mix of electric energy supply—the goal of any RPS. Section II looks at three renewable energy sources that are particularly suited to development in Virginia. These energy sources—wind, landfill gas, and solar—could be developed much more rapidly if a well-designed RPS were implemented. Virginia's current RPS is analyzed in Section III. In its place, a new RPS will be proposed, one that is tailored to the goals of the Commonwealth. Finally, an appendix follows the main text, which includes the text of Virginia's current RPS along with proposed statutory amendments that would implement the proposals discussed in Section III.

I. THE QUESTION: WHY RENEWABLE?

Coal, nuclear, and natural gas are the most utilized sources of electric power in the United States.[19] They are relatively inexpensive and reliable technologies. They do, however, have negative aspects: coal produces large amounts of greenhouse gases and other air pollutants; there is no consensus regarding what to do about the long-term storage of spent nuclear fuel; and natural gas is prone to massive price spikes. There are advantages to having a diversified mix of energy sources, and renewable energy sources have unique benefits. In particular, there are environmental and economic advantages to encouraging renewable energy growth.

Countless sources detail the environmental benefits of replacing traditional fossil fuel energy sources with renewable energy sources. These benefits are well-known, and it is unnecessary to delve into them here. What is worth noting, however, is that changes in Virginia's energy usage can have a significant effect on the environment. If Virginia were a country, it would rank thirty-third in the world in total carbon dioxide emissions per year.[20] Alarmingly, Virginia may be moving up this ignominious

19. *See* ENERGY INFO. ADMIN. ELECTRIC POWER ANNUAL 2006, tbl. 1.1, at 16 (2007), http://www.eia.doe.gov/cneaf/electricity/epa/epat1p1.html.

20. *See* World Resources Institute, Climate Analysis Indicators Tool (CAIT), Version 4.0 (2007), http://cait.wri.org (based on 2003 emissions) (Virginia's emissions are 124.6

list; over the past decade the Commonwealth's carbon dioxide emissions have increased at nearly twice the national average.[21] Along with the state's increasing urban sprawl, increased emissions from coal-fired power plants have been the primary driver of Virginia's carbon dioxide boom.[22]

Every megawatt of power generated from a renewable source replaces a megawatt from traditional power sources, such as coal or natural gas. Replacing one megawatt-hour ("MWh") of coal with energy from a non-air-polluting source prevents the emission of over a ton of carbon dioxide.[23] To put this in context, Virginia generated approximately 35.5 million MWhs of electricity from coal in 2005.[24] If Virginia had replaced a modest 5% of its electrical generation from coal-fired power plants with renewable sources, a staggering 1.85 million tons of carbon dioxide would not have been released into the air that year.[25]

In addition to the well-known environmental benefits of renewable energy, there are lesser-known economic benefits. Natural gas, petroleum, and coal are tradable commodities. The prices of these fossil fuels can vary wildly. For instance, over the past twelve years, wholesale natural gas prices have been as low as $1 per million British thermal units ("BTUs")[26] and as high as $20

$MtCO_2$, which places it in thirty-third place); World Resources Institute, Climate Analysis Indicators Tool (CAIT US), Version 2.0 (2007), http://cait.wri.org (based on 2003 emissions).

21. David A. Fahrenthold, *Increased Greenhouse Emissions Decried*, WASH. POST, Apr. 13, 2007, at B1.

22. *Id.*

23. *See* Roland Nelles, *Germany Plans Boom in Coal-Fired Power Plants—Despite High Emissions*, SPIEGEL ONLINE (Germany), Mar. 21, 2007, http://www.spiegel.de/international/germany/0,1518,472786,00.html. The article notes that one kilowatt hour ("kWh") of coal-produced energy results in 949 grams ("g") of carbon dioxide ("CO_2") being emitted into the atmosphere. 1 kWh = 0.001 MWh and 949 g = 2.092 lbs. Thus, if 1 kWh of energy creates 949 g of CO_2, then 1 MWh of energy produces 2092 lbs of CO_2. This figure represents an average. Factors such as the type of coal burned and the pollution control technologies employed by the generator can significantly affect the amount of CO_2 released into the air. *See infra* note 139.

24. ENERGY INFO. ADMIN. STATE ELECTRICITY PROFILES 2005, tbl. 5, at 233 (2007), http://www.eia.doe.gov/cneaf/electricity/st_profiles/sep2005.pdf.

25. 5% of 35.5 million MWh is 1,775,000 MWh. 1,775,000 MWh x 2092 lbs CO_2/MWh= 3,713,300,000 lbs CO_2. 3,713,300,000 lbs CO_2 ÷ 2000 lbs/ton = 1,856,650 tons CO_2. This calculation uses an average for the amount of CO_2 produced per MWh of coal-generated power. The actual amount of CO_2 produced depends on a number of factors. *See infra* note 139.

26. A BTU is "the quantity of heat required to raise the temperature of one avoirdupois pound of water one degree Fahrenheit at or near 39.2°F." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 279 (2002).

per million BTUs.[27] These price fluctuations have been driven in large part by unforeseen natural disasters, such as Hurricanes Katrina and Rita, which caused spikes in oil and natural gas prices.[28]

An advantage of most renewable energy sources, such as wind and solar, is that they have no fuel source that must be purchased—although the sun and wind may be intermittent at times, they never go up in price. The primary determinant of the cost for energy from renewable power sources is the capital cost invested in the generation facilities, such as the wind turbines or solar arrays. Thus, the price of energy produced from renewable sources is generally stable and predictable.

The predictability of renewable energy prices makes them ideal for hedging against fuel cost fluctuations in a diversified energy supply market. Including renewable power in the supply mix serves to dampen fuel price shocks that may be passed through to retail customers if the supply mix over-relies on any one fuel source. For instance, if the price of natural gas spiked, a customer who relied solely on natural gas-generated power in an unregulated market would see her electricity bills soar. A customer in the same market who purchased half of her energy from renewable energy sources would only see her bill increase by half as much as the first customer.

Austin Energy's GreenChoice program offers an example of the ability of renewable energy to hedge against fuel cost increases.[29] In Texas's deregulated energy market, customers have various options for their electrical power. Taking advantage of the predictability of renewable energy prices, the GreenChoice program allows retail energy customers to enter into ten-year fixed-price contracts to purchase renewable power.[30] In 2005, natural gas

27. *Volatility in the Natural Gas Market: The Impact of High Natural Gas Prices on American Consumers: Hearing Before the Permanent Subcomm. on Investigations of the S. Committee on Homeland Security and Governmental Affairs*, 109th Cong. 98 (2006) (statement of Jim Wells, Director, Natural Resources and Environment, U.S. Government Accountability Office), *available at* http://www.gao.gov/new.items/d06420t.pdf.

28. *See* FED. ENERGY REGULATORY COMM'N, HIGH NATURAL GAS PRICES: THE BASICS 2 (2006), *available at* http://ferc.gov/legal/staff-reports/high-gas-prices.pdf.

29. *See generally* Austin Energy, GreenChoice http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Choice/index.htm (last visited Nov. 23, 2007).

30. LORI BIRD & BLAIR SWEZEY, NAT'L RENEWABLE ENERGY LAB., GREEN POWER MARKETING IN THE UNITED STATES: A STATUS REPORT 20 (9th ed. 2006), *available at* http://www.eere.energy.gov/greenpower/resources/pdfs/40904.pdf.

prices spiked nationwide, causing significant electricity bill increases for many people.[31] GreenChoice customers, who are supplied by 100% renewable energy, were insulated from the increased gas prices. They actually paid *less* for their electricity in 2005 than customers supplied by traditional energy sources.[32]

Despite the many advantages of a diversified energy fuel mix, efforts to encourage renewable energy are not without critics. Some argue that plans to encourage renewable energy production are little more than subsidies to an uncompetitive industry.[33] In many respects, these critics are correct, but they miss the point. Given enough time, renewable energy production will eventually achieve cost parity with traditional forms of energy such as nuclear and fossil fuels. Considering that fossil fuel and nuclear energy production rely on fuels with finite supply, there will be a point in the future where supply will be exhausted. As supplies dwindle, prices will rise accordingly. Renewable fuels, by definition, rely on power sources that are virtually infinite in their availability. For this reason, the fuel costs for renewable technologies are nearly always zero. Consequently, as fossil fuel prices rise and the price of renewable generation technologies fall, an inversion must occur at some point in the future where renewable energy production costs less than fossil fuel or nuclear production on a consistent basis.[34]

The rationale for subsidizing "uncompetitive" renewable energy technologies is two-fold. First, proponents of renewable energy point out that there are significant costs of fossil fuel and nuclear energy production that are not internalized by the power-generating entities.[35] These costs are manifested in other forms,

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31. *See* FED. ENERGY REGULATORY COMM'N, *supra* note 28, at 2.

32. News Release, U.S. Dep't of Energy, A Consumer's Guide to Energy Efficiency and Renewable Energy, Austin Energy Maintains U.S. Lead in Green Power Sales, (Apr. 11, 2007) http://www.eere.energy.gov/consumer/news_detail.cfm/news_id=10704; *see also* Daniel Mottola, *Get It While It's Green*, AUSTIN CHRON., Jan. 13, 2006, at 18.

33. *See, e.g.*, ROBERT L. BRADLEY JR., RENEWABLE ENERGY: NOT CHEAP, NOT "GREEN" (Cato Institute Policy Analysis No. 280, 1997), *available at* http://www.cato.org/pubs/pas/pa-280.html.

34. Take the example of "peak oil," the idea that conventional oil production will reach a peak in the very near future. As energy demands continue to increase and oil production plateaus, oil prices will rise sharply. Proponents of this theory predict that crude oil may reach $200 per barrel or higher in the foreseeable future. Deepak Gopinath, *Peak Oil Forecasters Win Converts on Wall Street to $200 Crude*, ENERGY BULLETIN, Aug. 31, 2006, http://www.energybulletin.net/19890.html (originally published by BLOOMBERG).

35. *See* Am. Wind Energy Ass'n, The Renewables Portfolio Standard: How It Works

such as health care expenses associated with increased incidents of asthma caused by nitrogen oxide pollution from burning fossil fuels.[36] Unfortunately, these costs are rarely considered when comparing the costs of fossil fuel use with the cost of renewable energy.[37] By forcing energy producers to invest in cleaner technologies, these costs would be internalized by the energy industry. Ultimately, the costs of cleaner energy production will be borne by consumers, but short-term increases in energy bills are preferable to the pernicious effects of pollution and global warming on human health and the economy.[38]

Second, renewable energy incentives or subsidies are temporary. As discussed above, renewable energy sources will eventually reach cost parity with fossil fuels. Incentives and subsidies will serve to reduce the amount of time before renewable energy is directly competitive with fossil fuel- and nuclear-generated power. In this respect, renewable energy incentives are more appropriately characterized as investments than subsidies.

II. THE SOLUTION: VIABLE SOURCES OF RENEWABLE ENERGY IN VIRGINIA

Not every source of renewable energy is right for Virginia. Two sources, wind and landfill gas, are prime candidates for development as utility-scale sources of renewable energy. A third source, solar, is ideally suited for small-scale distributed generation at Virginia homes and businesses.

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and Why It's Needed (Oct. 1997), http://www.awea.org/policy/rpsbrief.html. [hereinafter Am. Wind, Renewables Portfolio Standard].

36. *See* RENEWABLE ENERGY RESEARCH LAB., WIND POWER: CAPACITY FACTOR, INTERMITTENCY, AND WHAT HAPPENS WHEN THE WIND DOESN'T BLOW? 4, *available at* http://www.ceere.org/rerl/about_wind/RERL_Fact_Sheet_2a_Capacity_Factor.pdf; *see also* Rudy Perkins, Note, *Electricity Deregulation, Environmental Externalities and the Limitations of Price*, 39 B.C. L. REV. 993, 1015–17 (1998) (discussing global warming-related environmental externalities of electric power generation).

37. *See* Richard L. Ottinger & Rebecca Williams, *Renewable Energy Sources for Development*, 32 ENVTL. L. 331, 346 (2002).

38. *See id.*; *see also infra* notes 136–40 and accompanying text (analyzing the costs associated with utilizing an RPS to encourage renewable energy growth).

A. *Wind Power*

Wind power is often considered a virtual synonym for renewable energy.[39] With the exception of hydroelectric power, wind power is the most common form of renewable energy in the world.[40] It is also the fastest growing source of renewable energy.[41] As of 2007, 11,603 megawatts of wind energy were online in the United States—enough to power three million average homes.[42] Although wind energy accounts for less than 1% of electric energy currently produced in the United States,[43] it is rapidly on the rise; power from wind generators accounts for 11.8% of the nation's electrical capacity currently under construction and 24% of power production in the planning stages.[44]

Economically, wind technology has not developed to the point where wind power generators can directly compete with traditional power sources on a wide scale. The unsubsidized generation costs for a utility-scale wind power producer generally range from 4 to 6 cents per kilowatt-hour ("kWh").[45] This price is further subsidized by a federal tax credit of 1.5 cents per kWh for the first ten years of a wind farm's operation.[46] Many states, includ-

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39. *Cf.* J.G. DELENE ET AL., OAK RIDGE NAT'L LAB., AN ASSESSMENT OF THE ECONOMICS OF FUTURE ELECTRIC POWER GENERATION OPTIONS AND THE IMPLICATIONS FOR FUSION 3 (1999), *available at* http://www.osti.gov/bridge/servlets/purl/14035-c6X7h1/webviewable/14035.pdf (using wind generators as a "surrogate for renewable energy" in a study of the cost of electricity from various sources).

40. *See* Scott Sklar, The Stella Group, Ltd., *UNEP Presentation—Renewable Energy Resource Assessment* (Apr. 2004), http://www.thestellagroupltd.com/unep.htm.

41. *See* Va. Dep't of Mines, Minerals & Energy, Wind Power, http://www.dmme.virginia.gov/DE/Alternative_Fuels/windpower.shtml (last visited Nov. 23, 2007).

42. AM. WIND ENERGY ASS'N, WIND ENERGY BASICS 1 (2007), http://www.awea.org/newsroom/pdf/Wind_Energy_Basics.pdf.

43. U.S. DEP'T OF ENERGY, WIND POWER TODAY 2 (2006), *available at* http://www.nrel.gov/docs/fy06osti/39479.pdf.

44. AM. PUB. POWER ASS'N, A LOOK AT AMERICA'S NEW GENERATING CAPICITY: THE FUELS THAT WILL POWER IT, AND THE REGIONS WHERE IT WILL BE LOCATED 2–3 (2007), *available at* http://www.appanet.org/files/PDFs/New%20plants%20analysis%20final%20307.pdf. At 42.4%, natural gas generators account for the largest share of generating capacity currently under construction. Coal plants come in second at 31.1%. Wind power is third. *Id.* at 2.

45. JOE MCGARVEY ET AL., NAT'L REGULATORY RESEARCH INST., WHAT GENERATION MIX SUITS YOUR STATE? TOOLS FOR COMPARING FOURTEEN TECHNOLOGIES ACROSS NINE CRITERIA 44 (2007), *available at* http://www.nrri.ohio-state.edu/dspace/bitstream/2068/1045/3/07-03.pdf. Small-scale distributed wind power and offshore wind power are significantly more expensive at present. *See* U.S. DEP'T OF ENERGY, *supra* note 43.

46. *See* 26 U.S.C. § 45(a) (2000 & Supp. IV 2004). The tax credit is annually adjusted for inflation and subject to a phase-out provision. *Id.* § 45(b). The tax credit may not be

ing Virginia, offer additional subsidies.[47] Despite subsidization, however, wind power remains more expensive than traditional baseload generators. For instance, the average generation cost of electricity from nuclear plants is 1.7 cents per kWh.[48] However, the cost of wind power has been falling rapidly; twenty-five years ago the average cost for wind power was 80 cents per kWh.[49] The U.S. Department of Energy predicts that the average price for utility-scale onshore wind production will fall to 3.6 cents per kWh within five years.[50]

The prospects for wind energy in Virginia are promising, but there are circumstances that limit its potential. Due to the intermittent nature of wind power—electricity cannot be produced when the wind stops blowing—it cannot fully replace baseload generators, such as nuclear plants, that produce a relatively constant supply of energy. Optimistic estimates project that 5% to 10% of Virginia's total electrical power supply could be derived from wind power within the next twenty years.[51]

Few areas of Virginia are suitable for large-scale wind production. The Department of Energy divides locations into one of seven "wind power classes" based on the average wind speed at that location at a height where most wind turbines operate.[52] The vast majority of Virginia is classified as power class one, "poor," meaning that the average wind speed is too low to support wind turbines.[53] There are, however, areas in western Virginia along the Blue Ridge and Allegheny Mountains ranges where average speeds produce "excellent," "outstanding," and "superb" read-

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available if the electricity is sold to utilities under certain contractual arrangements. *See id.* § 45(e)(7).

47. *See, e.g.*, VA. CODE ANN. §§ 67-900 to -903 (2007) (providing a 0.0085 cents per kWh subsidy for renewable energy).

48. NUCLEAR ENERGY INST., NUCLEAR ENERGY 2006: A SOLID BUSINESS PLATFORM FOR FUTURE GROWTH 8 (2006), *available at* http://www.nei.org/filefolder/wall_street_briefing_2-2-06.pdf.

49. Jeremy Twitchell, *Life Not a Breeze for Wind Farms*, DESERET MORNING NEWS (Salt Lake City), Sept. 17, 2006, *available at* http://deseretnews.com/article/content/mobile/0,5223,645201776,00.html..

50. U.S. DEP'T OF ENERGY, *supra* note 43.

51. *See With Good Reason: Edgeless Cities* (Vfh Radio broadcast May 13, 2006) (interview of Professor Jonathan J. Miles, James Madison University), *available at* http://www.withgoodreasonradio.org/archives/2006/may06wgr.html.

52. U.S. Dep't of Energy, Wind Energy Resource Potential, http://www.eere.energy.gov/windandhydro/wind_potential.html (last visited Nov. 23, 2007).

53. *Id.*

ings.[54] A few mountain crests along the north-central part of the state and ridge crests along the West Virginia and North Carolina borders have been identified as having the wind resources suitable for utility-scale power production.[55] However, the areas where the highest wind classes are found are geographically small and isolated from major population centers.[56] Such remoteness increases costs as new access roads and high-voltage power lines must be constructed.[57] As wind infrastructure prices fall, these areas may become increasingly attractive sites for wind power development.

Although wind power may not be viable on a large scale within many areas of Virginia, a number of locations are well-suited for distributed wind technology systems. Distributed wind technology deals with small-scale wind production primarily in rural areas.[58] A single small wind turbine is often sufficient to provide most of the power needed for an individual home, farm, or small business in an area with at least class three winds.[59] At a cost of 10 to 15 cents per kWh in a class three area,[60] the price of small-scale wind generation is still relatively high. These prices largely reflect the initial $15,000 to $50,000 investment needed to install a small-scale (three- to ten-kilowatt) wind turbine.[61] However, the Department of Energy is investing resources to bring these costs down in the near future.[62] Despite the high costs, a number of

54. *Id.* (wind power class map of United States); U.S. Dep't of Energy, Virginia Wind Resource Map, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wind_maps/va_50m.pdf [hereinafter Detailed Virginia Wind Map] (last visited Nov. 23, 2007) (detailed wind power class map of Virginia).

55. U.S. Dep't of Energy, Virginia Wind Resource Map Description, http://www.eere.energy.gov/windandhydro/windpoweringamerica/maps_template.asp?Stateab=va (last visited Nov. 23, 2007).

56. *See* Detailed Virginia Wind Map, *supra* note 54; *see also* U.S. Dep't of Energy, Advantages and Disadvantages of Wind Energy, http://www.eere.energy.gov/windandhydro/wind_ad.html (last visited Nov. 23, 2007) (noting that geographical remoteness is a common disadvantage of wind energy).

57. *See* OSMAN SEZGEN ET AL., BERKELEY NAT'L LAB., WIND GENERATION IN THE FUTURE COMPETITIVE CALIFORNIA POWER MARKET 20 (1998), *available at* http://www.osti.gov/bridge/servlets/purl/6467-RHiYDo/webviewable/.

58. U.S. Dep't of Energy, Distributed Wind Energy Technology, http://www.eere.energy.gov/windandhydro/wind_dist_tech.html (last visited Nov. 23, 2007).

59. *See id.*

60. *Id.*

61. *See* U.S. DEP'T OF ENERGY, SMALL WIND ELECTRIC SYSTEMS: A VIRGINIA CONSUMER'S GUIDE 7 (2007), http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_va.pdf.

62. *See* U.S. Dep't of Energy, Wind & Hydropower Technologies Program, http://www.

distributed wind systems are currently operating within the state.[63]

The coastal waters of Virginia are also potential future locations of large-scale wind power generation. Commercially viable class four winds can be found throughout most of the lower Chesapeake Bay.[64] Even more promising, substantial regions of class five, "excellent," winds are located in the Atlantic Ocean within several miles of Virginia Beach and along the Eastern Shore's Chesapeake shoreline.[65]

Utility-scale wind power soon may become a reality in Virginia. The state's first proposed large wind power facility has recently obtained conditional approval by the Commission[66] and survived a legal challenge in the Virginia state courts.[67] The proposed facility would be located in a rural mountainous area of Highland County, Virginia.[68] Power would be generated by twenty wind turbines, each with a capacity of two megawatts.[69] The applicants have asserted that the facility would be financially viable due to electricity sales and renewable energy credits.[70] If the Highland wind farm is successful, it will undoubtedly encourage other entrants into Virginia's wind power market.

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eere.energy.gov/windandhydro/wind_research_test.html (last visited Nov. 23, 2007).

63. *See* Virginia Energy Patterns and Trends, Renewables, http://www.energy.vt.edu/vept/renewables/renewplants.asp (last visited Nov. 23, 2007) (listing sites); *VSWIP Installations*, IN THE BREEZE (Va. Wind Energy Collaborative, Harrisonburg, Va.), Winter 2006–07 (describing recently completed and proposed small wind projects), *available at* http://vwec.cisat.jmu.edu/documents/VWEC_newsletter_Ed.2.4.pdf.

64. Detailed Virginia Wind Map, *supra* note 54.

65. *Id.*

66. Application of Highland New Wind Development, LLC, Commonwealth of Virginia State Corp. Comm'n, 2007 Va. PUC LEXIS 126, at *1, Report of Hearing Examiner (Mar. 1, 2007).

67. Miller v. Highland County, 274 Va. 355 (2007). Opponents of the wind farm are primarily concerned with the aesthetic effects of the turbines on the rural landscape, including noise created by the blades and interference with views of the mountains. Adam Hochberg, *Wind Farms Draw Mixed Response in Appalachia*, NPR, Mar. 27, 2006, http://www.npr.org/templates/story/story.php?storyId=5300507.

68. Highland New Wind Development, LLC, 2007 Va. PUC LEXIS 126, at *11.

69. *Id.*

70. *Id.* at *14. Renewable energy credits will be discussed further in Part IV.

B. *Landfill Gas-Powered Generation*

One of the most promising sources of renewable energy production in Virginia is landfill gas ("LFG"). LFG generation produces energy from a fuel source that is not in short supply in Virginia: trash. Virginia is second only to Pennsylvania as the leading trash importing state.[71] In 2005, 24.5 million tons of waste were sent to disposal facilities in the Commonwealth.[72] Of that amount, 7 million tons of waste were imported from a total of twenty-eight states, the District of Columbia, and Canada.[73] The majority of the waste disposed of in Virginia last year, 16.3 million tons, was deposited in landfills.[74] At this rate of landfill disposal, Virginia's existing available landfill capacity of 291.7 million tons will be exhausted around the year 2025.[75] In other words, Virginia will have quite a few full landfills in the near future.[76]

As parts of a landfill are filled to their capacity, they typically are capped with a lining of rubber and dirt.[77] In short time, nature takes its course and the trash begins to decompose.[78] The decomposing waste produces carbon dioxide and methane in roughly equal amounts.[79] The gas collects underneath the landfill cap and must be periodically vented into the air.[80] Because the

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71. Ray McAllister, *Landfills: Everyone Wants Them . . . But Somewhere Else*, RICH. TIMES DISPATCH, Oct. 10, 2006, at B1.

72. VA. DEP'T OF ENVTL. QUALITY, SOLID WASTE MANAGED IN VIRGINIA DURING CALENDAR YEAR 2005, at 2–3 (2006), http://www.deq.state.va.us/waste/pdf/swreport2005.pdf.

73. *Id.* at 7 tbl.2.

74. *See id.* at 6 tbl. 1.

75. *See id.* at 8 tbl. 3.

76. For instance, the Atlantic Waste Disposal Inc. Landfill in Waverly, Virginia is the second largest landfill by remaining capacity in the United States. It takes in nearly 5,000 tons of trash a day. Waste News, Largest Landfills, http://www.wastenews.com/rankings/showlf2004.html?line=1 (last visited Nov. 23, 2007). Although the Atlantic Waste Disposal site has an estimated forty years of usefulness remaining at current rates, *see* VA. DEP'T OF ENVTL. QUALITY, *supra* note 72, at 28–29, there are thirty-two municipal solid waste landfills in Virginia that have ten or fewer years of usefulness remaining.

77. *See* Sarah Hartough, *Mount Trashmore: Virginia Beach Transforms a Trash Heap into a Family Playground*, BALT. SUN, May 26, 2005 (discussing the closing of Mount Trashmore, a large landfill in Virginia Beach, Virginia).

78. U.S. Envtl. Prot. Agency, Landfill Methane Outreach Program, Basic Information, http://www.epa.gov/lmop/overview.htm.

79. *Id.*

80. *See id.*; *see also* Hartough, *supra* note 77 (describing how Virginia Beach's Mount Trashmore's seven vent pipes sound like "steam engines" when they periodically open to

decomposing garbage has an unpleasant odor and often contains high levels of volatile organic compounds,[81] it is often burned off into the atmosphere, producing large blue flames.[82]

The amount of methane gas produced by landfills is far from insignificant; municipal solid waste landfills are the greatest source of human-related methane in the United States.[83] Rather than venting or flaring the LFG, it can be fed into diesel generators to make electricity.[84] Since the LFG provides a constant source of fuel, LFG generators can operate twenty-four hours a day to provide baseload power.[85]

There are currently sixteen landfill gas operations in Virginia, and the Environmental Protection Agency estimates that an additional thirteen landfills in the Commonwealth are viable candidates.[86] For example, a proposed LFG facility in King and Queen County would produce four times the electricity needs of the county, using gas that is currently being burned off into the air.[87]

LFG generation is environmentally and economically sound. Methane is a greenhouse gas with twenty-one times the heat-trapping capacity of carbon dioxide, so burning methane is more environmentally beneficial than venting it.[88] An average three-megawatt LFG facility results in a net reduction in carbon dioxide equivalents of 143,000 tons a year by destroying the methane and displacing electricity from fossil fuels.[89] This reduction is the equivalent of removing 25,000 vehicles from the roads, planting

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release built-up LFG).

81. A municipal solid waste landfill is considered a "significant" source of air pollution under the Clean Air Act if it has the potential to emit more than fifty tons of non-methane organic compounds per year. 40 C.F.R. § 51.166(b)(23)(i) (2006).

82. *See* Lawrence Latane, III, *Landfill Seen as Power Source: Firm Says Methane at King and Queen Site Is Wasted Resource*, RICH. TIMES-DISPATCH, July 24, 2006, at B1.

83. U.S. Envtl. Prot. Agency, Methane, Sources and Emissions, http://www.epa.gov/methane/sources.html. Other significant sources of human-related methane include natural gas and petroleum production, livestock digestion, and coal mining. *Id.*

84. *See* Latane, *supra* note 82.

85. AM. PUB. POWER ASS'N, PUBLIC POWER: GENERATING GREENER COMMUNITIES 23 (2005), *available at* http://www.appanet.org/files/PDFs/GenGreenComm.pdf.

86. U.S. ENVTL. PROT. AGENCY, LANDFILL METHANE OUTREACH PROGRAM, ENERGY PROJECTS AND CANDIDATE LANDFILLS, http://www.epa.gov/lmop/proj/index.htm (last visited Nov. 23, 2007).

87. *See* Latane, *supra* note 82.

88. *See* AM. PUB. POWER ASS'N, *supra* note 85.

89. OFFICE OF AIR AND RADIATION, U.S. ENVTL. PROT. AGENCY, FREQUENTLY ASKED QUESTIONS ABOUT LANDFILL GAS AND HOW IT AFFECTS PUBLIC HEALTH, SAFETY, AND THE ENVIRONMENT 3–4 (2006), http://www.epa.gov/lmop/docs/faqs_about_LFG.pdf.

36,000 acres of trees, or avoiding the combustion of 305,000 barrels of petroleum.[90] Burning LFG also destroys certain dangerous non-methane organic compounds found in LFG, such as benzene and vinyl chloride,[91] which can pose significant health hazards.[92] With a generation cost of $45.67 per MWh (or, 4.6 cents per kWh), LFG is on par with the cost of wind power and is generally cheaper than other forms of renewable energy, such as solar or geothermal power.[93]

C. *Solar Power*

Photovoltaic ("PV") solar systems convert sunlight, Earth's most abundant energy source, into electricity.[94] Despite having sunlight as a fuel source, solar electricity production has lagged behind many other forms of renewable energy. There are currently only 411 megawatts of solar power generation capacity in the United States, compared to 8680 megawatts of wind generation capacity.[95] This is due in large part to the prohibitively high cost of generating solar power, which currently ranges from 18 to 23 cents per kWh.[96] To put this figure in context, the generation cost of solar power is two to three times the average *retail* price of residential electricity in Virginia.[97] On a per-kilowatt basis, solar power requires the greatest initial investment of any commer-

90. *Id.* at 4.

91. *Id.* at 1.

92. *See* AM. PUB. POWER ASS'N, *supra* note 85.

93. Jennifer Weeks, *Landfills Expand Energy Output*, Bio (Cycle, Aug. 2005, at 98, *available at* http://www.jgpress.com/archives/_free/000507.html. By comparison, the generation costs (per MWh) for wind, geothermal, and solar energy are $48.45, $54.34 and $140.71, respectively. *Id.*

94. GEORGE STERZINGER & MATT SVRCEK, RENEWABLE ENERGY POLICY PROJECT, SOLAR PV DEVELOPMENT: LOCATION OF ECONOMIC ACTIVITY 3 (2005), *available at* http://crest.org/articles/static/1/binaries/SolarLocator.pdf; Va. Dep't of Envtl. Quality, Solar Power, http://www.deq.virginia.gov/p2/vise/solar.html (last visited Nov. 23, 2007).

95. MCGARVEY ET AL., *supra* note 45, at 137 (showing 2005 data).

96. Martin LaMonica, *Getting the Right Price for Solar*, CNET NEWS, Apr. 3, 2007, http://www.news.com/getting-the-price-right-for-solar/2100-11392_3-6173019.html.

97. *See* Energy Info. Admin., Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html (last visited Nov. 23, 2007) (noting that the average residential retail rate in Virginia for 2006 was 8.3 cents per kWh).

cially available power source.[98] For this reason, solar power is typically employed as a small-scale distributed power source.[99]

One advantage of PV systems is that they generate the most energy during times when it is typically in highest demand: sunny summer days when air conditioners are humming.[100] Thus, solar energy can function as a peak power source that hedges against electricity price spikes during periods of high demand.[101] Even under less than ideal conditions, such as on overcast days, a PV system will continue to generate power at a substantial percentage of its maximum capacity.[102] Likewise, PV systems need not be located in desert-like areas to be effective; all regions of Virginia receive sufficient solar radiation for electricity generation.[103]

Notwithstanding the high costs of PV solar power, it does have a place in Virginia's electricity generation mix.[104] The environmental benefits of solar power make it attractive to many environmentally conscious consumers. A one-kilowatt PV system at a residential home would offset over 100 tons of carbon dioxide emissions per year,[105] and the Department of Energy declares that "PV has virtually no environmental impact."[106] PV systems are also very useful in rural locations that do not have ready access to an electrical grid.[107] In some instances, it costs less to in-

98. *See* MCGARVEY ET AL., *supra* note 45, at 18–19.

99. *But see* PAUL DENHOLM & ROBERT M. MARGOLIS, NAT'L RENEWABLE ENERGY LAB., VERY LARGE-SCALE DEPLOYMENT OF GRID-CONNECTED SOLAR PHOTOVOLTAICS IN THE UNITED STATES: CHALLENGES AND OPPORTUNITIES 5 (2006) (projecting that solar power may eventually be able to provide 20–30% of electricity supply in certain regions).

100. U.S. Dep't of Energy, Why PV Is Important to You, http://www.eere.energy.gov/solar/to_you.html (last visited Nov. 23, 2007).

101. *Id.*

102. *See* Solar Power is Hot!, LIGHTING FUTURES (Lighting Research Ctr., Troy, NY), 1998, http://www.lrc.rpi.edu/programs/futures/lf-photovoltaic/index.asp. On a "bright overcast" day, a PV system still generates 50–70% of its maximum output. *Id.*

103. *See* U.S. Dep't of Energy, Alternative Energy Resources in Virginia, http://www.eere.energy.gov/states/alternatives/resources_va.cfm (last visited Nov. 23, 2007).

104. For example, see James Madison University's (Harrisonburg, Virginia) CISAT Solar Electric Plant, which was constructed to "educate the public and students on the functionality and use of alternative energy systems." Virginia Wind Energy Collaborative, CISAT Solar Electric Plant, http://vwec.cisat.jmu.edu/documents/student_documents/Hybrid_Plant_poster.pdf.

105. *See* U.S. Dep't of Energy, *supra* note 100.

106. *Id.*

107. *See* U.S. DEP'T OF ENERGY, GET YOUR POWER FROM THE SUN 5 (2003), *available at* http://www.eere.energy.gov/solar/pdfs/35297.pdf.

stall a PV system than to construct the transmission lines to connect a remote site to the power grid.[108]

Besides PV, two other solar technologies available in Virginia are promising for their ability to reduce electricity consumption: solar water heaters and passive solar. Solar water heaters typically use a flat-panel solar collection device installed in the roof of a home or building to collect radiation from the sun that is used to heat water.[109] Given that electric water heaters typically account for 25% of a residence's energy costs, solar water heaters can significantly reduce the amount of electricity a home or building consumes.[110]

Passive solar refers to building methods and materials that take advantage of solar radiation to heat a building without mechanical heating devices.[111] An example of passive solar heating technology would be a room with large south-facing windows that receive direct sunlight. The windows would operate in much the same way as a greenhouse, allowing sunlight to enter but trapping the energy as heat. A brick wall adjacent to the windows would be warmed by the sunlight during the day for heat distribution during the night.[112] Such systems can greatly reduce a building's heating-related electricity consumption.

A number of federal and state incentives to encourage solar power exist. The federal government offers a 30% tax credit, up to a total of $2000, to offset the cost of purchasing a solar power system.[113] This credit can be used twice: once for the cost of an electricity-producing solar device and again for the cost of a solar water heater.[114]

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108. *Id.*

109. U.S. DEP'T OF ENERGY, HEAT YOUR WATER WITH THE SUN 2–5 (2003), *available at* http://www.nrel.gov/docs/fy04osti/34279.pdf.

110. *Id.* at 10.

111. *See* U.S. Dep't of Energy, A Consumer's Guide, Passive Solar Home Design, http://ww.eere.energy.gov/consumer/your_home/designing_remodeling/index.cfm/mytopic=10250 (last visited Nov. 23, 2007).

112. *See* U.S. Dep't of Energy, A Consumer's Guide, Five Elements of Passive Solar Home Design, http://www.eere.energy.gov/consumer/your_home/designing_remodeling/index.cfm/mytopic=10270 (last visited Nov. 23, 2007). During the summer months, the heat-collecting windows can be shaded by awnings or blinds. *Id.*

113. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1335, 119 Stat. 594, 1033 (2005) (as amended by Gulf Opportunity Zone Act of 2005, sec. 402, § 1335, 119 Stat. 2577, 2612 (2005)) (to be codified at 26 U.S.C. § 25D(a) & (b)).

114. *Id.* The credit is also applicable to investments in fuel cells. *Id.* (to be codified at

Virginia also offers solar power tax incentives. Local jurisdictions are authorized to exempt "solar energy equipment facilities or devices" from local property taxes.[115] Twenty-one counties and cities currently offer the tax exemptions.[116] The Virginia Solar Easements Act also provides for the creation of solar easements to prevent adjacent property owners from erecting structures or taking other actions that prevent sunlight from reaching the owner's solar collection equipment.[117] Additionally, in order to encourage PV manufacturing in the state, the General Assembly created the Solar Photovoltaic Manufacturing Incentive Grant Program.[118] The program allows manufacturers of PV equipment to receive a grant of up to 75 cents per watt of rated solar capacity for panels sold.[119]

III. THE MEANS: A BETTER VIRGINIA RENEWABLE PORTFOLIO STANDARD

An RPS is a market-based approach to encourage renewable energy development.[120] To implement an RPS, a government entity, typically at the state level, sets a target percentage of energy that must come from renewable sources.[121] The target can be either mandatory or attached to an incentive. The RPS can be applicable to either in-state generators, who must produce a certain amount of energy from renewable sources, or to in-state retail suppliers, who must supply a percentage of renewable energy to

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26 U.S.C. § 25D(a)).

115. VA. CODE ANN. § 58.1-3661(A) (2004).

116. *See* Database of State Incentives for Renewables & Efficiency, Local Option Property Tax Exemption for Solar (Virginia), http://www.dsireusa.org/library/includes/incentive2.cfm?incentive_Code=VA01F&state=VA&CurrentPageID=1&RE=1&EE=1 (last visited Nov. 23, 2007). The jurisdictions offering the tax incentive are Albemarle, Alexandria, Charlottesville, Chesterfield, Dinwiddie, Fairfax, Falls Church, Hampton, Hanover, Henrico, Isle of Wight, King and Queen, Loudon, Lynchburg, Prince William, Pulaski, Richlands, Roanoke, Spotsylvania, Warren, and Wise. *Id.*

117. VA. CODE ANN. §§ 55-352 to -354 (2007).

118. VA. CODE ANN. § 45.1-392 (2002).

119. *Id.*; *see also* Va. Dep't of Mines, Minerals & Energy, Solar, http://www.dmme.virginia.gov/de/alternative_fuels/solar.shtml (last visited Nov. 23, 2007). For an analysis of the economic potential of the PV industry, see STERZINGER & SVRCEK, *supra* note 94.

120. Kirsten H. Engel & Scott R. Saleska, *Subglobal Regulation of the Global Commons: The Case of Climate Change*, 32 ECOLOGY L.Q. 183, 218 (2005).

121. Joseph P. Tomain, *Smart Energy Path: How Willie Nelson Saved the Planet*, 36 CUMB. L. REV. 417, 449 (2006).

retail customers.[122] The renewable energy target percentage is usually set at a low level initially—at or below the current level of renewable production in the state—and then increased incrementally over time.[123] Under mandatory systems, failing to achieve RPS targets generally results in fines; while under voluntary systems the state provides tax or subsidy incentives for compliance.

One variation on the RPS concept involves a trading system in renewable energy credits, which functions similarly to the Clean Air Act's sulfur dioxide emissions trading program.[124] Under this system, a credit is issued to generators of renewable energy for each kWh or MWh of energy generated.[125] The credit can be bundled with the electricity sold or it can be sold as a separate commodity.[126] At the end of the year, each electricity retailer would have to hold a number of credits representing the RPS target percentage of its electricity sales for the year.[127] For example, under a 10% RPS, if Big Energy sold 100 MWh of electricity that year, it would have to hold 10 renewable energy credits. Failure to acquire enough credits would result in a fine.[128]

Under a cap and trade system, renewable energy credits would effectively function as a per-kWh subsidy for renewable generators in order to attract entrants into the market. To hedge against price spikes due to scarcity of the credits (that would likely be passed on to consumers), a cap would be set on the credit price and the supervising government agency would be empowered to issue "proxy" credits if supply was incapable of meeting demand.[129] As more participants enter the market, the price of the credits should decrease until the point where the market is fully developed and renewable generators are fully competitive with

122. *See* Edan Rotenberg, *Energy Efficiency in Regulated and Deregulated Markets*, 24 UCLA J. ENVTL. L. & POL'Y 259, 300 (2006).

123. Engel & Saleska, *supra* note 120, at 218–19.

124. Am. Wind Energy Ass'n, The Mechanics of a Renewables Portfolio Standard Applied at the State Level (Nov. 1997), http://www.awea.org/policy/rpsmechste.html [hereinafter Am. Wind., Mechanics of RPS].

125. *Id.*

126. *Id.*

127. *Id.*

128. *Id.*

129. *Id.*

fossil fuel and nuclear generators.[130] Thus, the program is self-sunsetting.[131]

One of the attractions of the RPS approach is the use of the market to regulate behavior and set prices. Most RPSs require no government subsidies and relatively little regulatory oversight.[132] Generally, the role of the administering government agency is limited to issuing credits and monitoring compliance.[133] Important decisions, such as what types of renewable energy to pursue, are left to the market.[134] Thus, the market determines the most cost-effective manner to comply with the standards.[135]

In practice, RPS programs do not significantly increase the price of electricity for end-users.[136] After studying eight state RPS programs, the Department of Energy determined that, on average, RPS programs added five dollars *a year* to residential customers' electricity bills.[137] Further, any price increases associated with purchasing energy from renewable suppliers should be offset by reduced environmental costs associated with pollution. For instance, producing 2000 kWh of wind power instead of producing power from a coal-fired plant means one ton of coal is not burned.[138] Combusting one ton of bituminous coal produces as much as 38 pounds of sulfur dioxide, 33 pounds of nitrogen oxide, and 4931 pounds of carbon dioxide, much of which is released into the environment.[139] An RPS forces the energy industry to internalize environmental costs that would otherwise be borne by seg-

130. *See* Ottinger & Williams, *supra* note 37, at 350.

131. Am. Wind, Mechanics of RPS, *supra* note 124.

132. *See* Joel B. Eisen, *The Environmental Responsibility of the Regionalizing Electric Utility Industry*, 15 DUKE ENVTL. L. & POL'Y F. 295, 308 (2005).

133. Am. Wind, Renewables Portfolio Standard, *supra* note 35.

134. Steven Ferrey, *Power Future*, 15 DUKE ENVTL. L. & POL'Y F. 261, 285 (2005).

135. *Id.*

136. U.S. Dep't of Energy, Nat'l Renewable Energy Lab., Renewables Portfolio Standard Overview (Feb. 2005), http://www.nrel.gov/docs/fy05osti/37627.pdf.

137. *Id.* Under some circumstances, RPS studies predict a net *decrease* in residential energy costs. *Id.*

138. Energy Info. Admin., Coal Demand, http://www.eia.doe.gov/neic/infosheets/coaldemand.html (last visited Nov. 23, 2007).

139. NAT'L RENEWABLE ENERGY LAB., POWER TECHNOLOGIES ENERGY DATA BOOK 206–09 (2006), *available at* http://www.nrel.gov/analysis/power_databook/docs/pdf/39728_complete.pdf; Energy Info. Admin., Fuel and Energy Source Codes and Emission Coefficients, http://www.eia.doe.gov/oiaf/1605/factors.html (last visited Nov. 23, 2007). The amount of these pollutants actually released into the environment varies depending on what types of clean coal technologies are employed. *See* BBC News, Clean Coal Technology: How It Works, http://news.bbc.co.uk/2/hi/science/nature/4468076.stm (last visited Nov. 23, 2007).

ments of society damaged by air pollution. Ideally, the net cost of an efficient RPS program would be zero in the short term, since increases in energy prices will be offset by reductions in environmental costs. As prices for renewable sources continue to approach prices for pollution-causing sources, the environmental cost savings should increasingly result in a net cost *savings*.[140]

State RPS programs have been highly effective in stimulating renewable energy growth. States with a mandatory RPS accounted for 60% of the renewable energy capacity added during 2004 and 2005.[141] In particular, RPS programs have been successful in stimulating growth of wind power, which utilities have turned to as the least expensive non-hydroelectric renewable alternative.[142] Through the end of 2006, twenty-one states and the District of Columbia have implemented mandatory RPS programs.[143]

A. *Virginia's RPS: Fuzzy Math*

The RPS that Dominion shepherded through the Virginia General Assembly in 2007[144] is a convoluted work of statutory draftsmanship. It purports to set ambitious renewable energy goals, and create reasonable incentives for utilities to achieve those goals. However, a hard look at the statute reveals that it does a poor job on both accounts. Utilities participating in the RPS can fulfill their renewable energy goals with significantly lower quantities of renewable energy than the statute appears to require. Furthermore, the financial rewards for utilities that meet the misleading goals are unnecessary to accomplish the purposes of the RPS.

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140. *Cf.* Perkins, *supra* note 36, at 994–95 (comparing externality costs saved by replacing coal with natural gas as a fuel source for power generation).

141. Kevin L. Doran, *Can the U.S. Achieve a Sustainable Energy Economy from the Bottom-Up?: An Assessment of State Sustainable Energy Initiatives*, 7 VT. J. ENVTL. L. 95, 114 (2006).

142. *Id.*

143. *See* ENERGY INFO. ADMIN., *supra* note 17. These states are Arizona, California, Colorado, Connecticut, Delaware, Florida, Iowa, Maine, Maryland, Massachusetts, Minnesota, Montana, Nevada, New Jersey, New Mexico, New York, Pennsylvania, Rhode Island, Texas, Washington, and Wisconsin. *Id.* Hawaii, Illinois, and Vermont have voluntary RPSs. *Id.*

144. *See supra* notes 10–12 and accompanying text.

Virginia's RPS is flawed in many respects, especially when judged against some of the programs in other states. Unlike other states that have had success with mandatory renewable energy goals, Virginia's RPS imposes no mandatory obligations on state energy utilities.[145] On the contrary, investor-owned utilities must apply to the Commission for approval to participate.[146] If utilities are approved to participate, they are eligible for lucrative "Performance Incentives" which permit participating utilities to recover all incremental costs of complying with the program through rate adjustments,[147] and they can also earn a fifty basis point (0.5%) increase on their rate of return on common equity.[148] There are no penalties if a utility chooses not to participate or if the utility fails to meet its RPS goals.

A participating utility must certify that a predetermined quantity of energy sold during each year originated from renewable sources.[149] The goal quantities are based on a percentage of en-

145. *See* VA. CODE ANN. § 56-585.2 (2007).

146. *Id.* § 56-585.2(B).

147. *Id.* § 56-585.2(C), (E).

148. *Id.* § 56-585.2(C). Utilities that receive the Performance Incentive for meeting the RPS goals are not subject to certain other Performance Incentives. This has a troubling potential consequence. The statute provides that,

> Such Performance Incentive shall first be used in the calculation of a fair combined rate of return for the purposes of the immediately succeeding biennial review conducted pursuant to § 56-585.1 after any such RPS Goal is attained, and shall remain in effect if the utility continues to meet the RPS Goals established in this section through and including the third succeeding biennial review conducted thereafter. Any such Performance Incentive, if implemented, shall be in lieu of any other Performance Incentive reducing or increasing such utility's fair combined rate of return on common equity for the same time periods. However, if the utility receives any other Performance Incentive increasing its fair combined rate of return on common equity by more than 50 basis points, the utility shall be entitled to such other Performance Incentive in lieu of this Performance Incentive during the term of such other Performance Incentive.

Id. § 56-585.2(C). Other Performance Incentives refers to the Commission's discretionary authority to increase or decrease utilities' rate of return by up to 100 basis points for such factors as, "generating plant performance, customer service, and operating efficiency of a utility." *Id.* § 56-585.1(A)(2)(c). What is significant, and troubling, about this provision is that utilities may earn the Performance Incentive for meeting the RPS goal "in lieu of any other Performance Incentive reducing . . . such utility's fair combined rate of return." *Id.* § 56-585.2(C). Therefore, a utility that earns the RPS's Performance Incentive has the opportunity to erase determinations by the Commission that utilities' rate of return should be *decreased* due to poor plant performance, customer service, or operating efficiency. *See id.* § 56-585.1(A)(2)(c). Although this consequence functions as an incentive for utilities to meet the RPS goals, it also serves as a significant disincentive for utilities to provide good, efficient service in other respects.

149. *See id.* § 56-585.2(D).

ergy sold in the "base year," which is fixed as 2007.[150] The "base year" remains 2007 for the life of the RPS program, meaning that the goals are static; they do not grow with each year's increased energy usage. There are three "RPS Goals" that participating utilities must achieve to be eligible for Performance Incentives.[151] By 2010, the goal is "4 percent of total electric energy sold in the base year."[152] The RPS Goal increases to 7% by 2016 and to 12% by 2022.[153] Thus, under the existing RPS, in the year 2022 a utility will only need to have renewable energy supplies equal to 12% of the amount of electricity sold in 2007. Given that Virginia's electric energy demands are expected to grow significantly in the next decade, the "12%" RPS goal for 2022 will be satisfied by a percentage of renewable energy that is significantly less than 12% of the energy sold during 2022.[154]

Further, it is a misnomer for the RPS goals to refer to the "total" energy sold in 2007.[155] Energy generated by Virginia's nuclear plants in 2007 is not included in the "total" energy sold for the base year.[156] Therefore, in 2015 a utility can earn the Performance Incentive merely by selling a quantity of renewable energy equal to 4% of the non-nuclear energy the utility sold in 2007.[157]

Using Dominion as an example, nuclear energy will account for nearly one-third of the electricity Dominion sells in 2007.[158] This

150. *Id.* § 56-585.2(A).

151. *Id.* § 56-585.2(D).

152. *Id.*

153. *Id.*

154. On its website, Dominion mischaracterizes the RPS goals. It states, "Participating utilities must pledge to furnish 12 percent of their electricity through renewable energy by 2022." Dominion, *supra* note 8. Dominion does not account for the fact that the goals are based on 2007 usage and exclude nuclear power. Dominion further states that its customers will require "4,000 MW of new capacity in ten years." *Id.* Four thousand MW would increase the Commonwealth's generating capacity by 17% by 2017. *See* MCGARVEY ET AL., *supra* note 45, at 130 (stating current total capacity). Extrapolating this growth to 2022, Dominion will have increased Virginia's generating capacity by nearly 26%. Assuming that energy usage grows proportionally to capacity, Virginians within Dominion's service area will use 26% more energy in 2022 than they did in 2007. Consequently, 12% of renewable energy from the "base year" would account for only 9% of energy sold in 2022.

155. VA. CODE ANN. § 56-585.2(D).

156. *Id.* § 56-585.2(A). The amount of nuclear power for 2007 would be equal to the average annual percent supplied to customers from 2004 through 2006. *Id.*

157. *See id.* § 56-585.2(A), (D).

158. *See* Va. Elec. & Power Co., 2006 Annual Report (Form 10-K), at 15 (Feb. 28, 2007). This assumes that Dominion's power generation mix for 2007 is roughly equivalent to its 2006 generation.

produces the counterintuitive result that, for the purposes of its RPS goals, the total electric energy sold [by Dominion] in the base year represents only two-thirds of its actual generation. Since Dominion's base year energy totals are reduced by a third, the 4% goal actually represents only 2.7% of the *total* electricity produced in the base year.

The actual percentage of energy sold to satisfy the initial 4% RPS goal becomes less impressive when we look forward five years to 2012. If we assume that Dominion's energy output will increase 8.5% by 2012,[159] even less renewable energy generation will be required to satisfy the 4% RPS goal, relative to the total energy generated in 2012. Adjusting for the estimated increased energy production in the next five years, Dominion could potentially satisfy its 4% RPS goal in 2012 by selling a scant 2.5% of its energy from renewable sources.

Further diluting the meaningfulness of the RPS goals, utilities receive "double credit" for renewable energy generated by wind or solar power.[160] Allowing double credit for wind power amounts to a de facto halving of the RPS goals. Wind power is generally the least expensive and most common form of non-hydroelectric renewable energy. In states with RPSs, wind power has been the primary source of renewable power growth.[161] Moreover, wind power is already subsidized by the federal government.[162] Given the economics of wind and the fact that it is already favored by the market, it begs the question why the General Assembly provided additional incentives for wind power development.

The RPS also allows utilities to receive credit towards their RPS goals by claiming electricity from existing hydroelectric power sources.[163] Excluding pumped storage operations, which are not considered renewable energy under the RPS, Virginia has fifty operating hydraulic turbine generating facilities.[164] Hydroelectric power is mature and fully commercialized in Virginia.[165]

159. *See supra* note 154.

160. *See* VA. CODE ANN. § 56-585.2(C).

161. Doran, *supra* note 141, at 109–11.

162. *See* 26 U.S.C. § 45 (2005 & Supp. IV 2004); *see supra* note 46 and accompanying text).

163. *See* VA. CODE ANN. § 56-585.2(A).

164. MCGARVEY ET AL., *supra* note 45, at 130.

165. *See* Va. Energy Patterns & Trends, Virginia Electric Energy, http://www.energy.vt.edu/vept/electric/index.asp (last visited Nov. 23, 2007).

The median age of such plants in the Commonwealth is sixty-seven years.[166] Moreover, there are currently no planned or proposed new hydroelectric power operations in Virginia.[167] The purpose of the RPS—to provide incentives to develop new sources of renewable energy—is not served by existing hydroelectric power, which has little to no growth potential in the state. Furthermore, Virginia utilities have recouped a fair return on their investment in the state's hydro plants in the decades they have been in operation. Allowing utilities to obtain a higher rate of return on common equity due to the continued operation of these facilities[168] is an unjustifiable windfall at the expense of ratepayers.

In addition to hydroelectric power, Virginia's RPS allows utilities to apply energy generated by all existing sources of renewable power towards their RPS goals. Herein lies the plan's greatest flaw. According to Department of Energy data from 2005, utility-owned hydroelectric plants account for 2.2% of Virginia utilities' total energy generation.[169] Utilities generated an additional 0.8% of their electricity from non-hydroelectric renewable energy.[170] Combined, 3% of Virginia's utility-generated power already comes from renewable sources. Yet Virginia utilities must only generate 2.3% or less of their total electricity from renewable sources to satisfy the 4% RPS Goal that participating utilities are subject to through 2015.[171] Thus, Virginia's utilities could potentially fulfill the existing RPS goals through 2015, and possibly beyond, without producing *any* new renewable energy sources.[172]

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166. MCGARVEY ET AL., *supra* note 45, at 130.

167. *See* Energy Info. Admin. Electric Power Annual 2006–State Data Tables, 2007–2011 Proposed Nameplate Capacity by Year, Energy Source, & State (E/A-860), http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html (last visited Nov. 23, 2007).

168. *See* VA. CODE ANN. § 56–585.2(C).

169. *See* ENERGY INFO. ADMIN. *supra* note 24. Note that the table lists utility-generated hydroelectric generation as 1.8% of *total* electricity generated from all sources in Virginia, and that utilities represent only 82.9% of this total. Therefore, this 1.8% is really 2.2% of total energy generation.

170. *See id.*

171. *See id.* Based on generation statistics from 2005, Virginia's utilities, in aggregate, generated 42.7% of their energy from nuclear power. Assuming the average nuclear generation totals for 2004 through 2006 are similar to the total for 2005, the "total energy produced in the base year," VA. CODE ANN. § 56-585.2(A), must be correspondingly reduced by roughly 42.7%. Reducing the 4% RPS Goal in proportion to the amount of excluded nuclear energy, we arrive at a total of 2.3% of energy that must be supplied from renewable sources to achieve the 4% target.

172. *See supra* pp. 162–63. Virginia utilities, in aggregate, generate enough renewable energy to meet the 4% RPS goal. Although individual utilities may not possess the capac-

In sum, Virginia's RPS is a broken system. It represents a potentially significant transfer of wealth from the state's retail ratepayers to energy utilities, with little or no attendant environmental or economic benefits. The experience of other states demonstrates that effective RPS programs can stimulate substantial growth in renewable energy generation without significantly increasing costs for consumers. The best option is for the General Assembly to redraft the RPS.

B. *Virginia's New Hybrid Re-Regulated Energy Market*

When existing rate caps expire on December 31, 2008, Virginia will have a unique hybrid "re-regulated" energy market,[173] which must be considered when designing an effective RPS. For retail sales, Virginia will function much like a traditional regulated energy market in that it will be subject to government regulation.[174] With a few exceptions for high-demand customers, incumbent investor-owned utilities ("IOUs") hold state-granted monopolies to supply electricity to retail customers.[175] In exchange for this privilege, retail sellers' rates traditionally have been, and will continue to be, determined by the Commission through periodic rate cases.[176] Unlike traditional rate setting, however, the Commission will be required to benchmark utilities' rates of return to the average returns of other utilities in the southeastern region of the country.[177]

As in most traditional regulated energy markets, Virginia's IOUs own their own generation facilities.[178] The market is made a "hybrid" by the involvement of PJM Interconnection ("PJM"), a wholesale energy market serving customers throughout the Mid-

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ity to satisfy the renewable generation threshold, it would be a simple transaction for these utilities to purchase renewable energy credits or power from other in-state utilities that have a surplus.

173. *See* Dominion, *supra* note 8 (summarizing the General Assembly's 2007 wholesale revisions to the Virginia Electric Utility Restructuring Act).

174. *See* VA. CODE ANN. §§ 56-581, -585.1 (2007).

175. *See id.* § 56-577(3).

176. *See id.* §§ 56-581, -585.1.

177. *Id.* § 56-585.1(A); Dominion, *supra* note 8.

178. *Cf.* VA. STATE CORP. COMM'N, 2006 STATUS REPORT: THE DEVELOPMENT OF A COMPETITIVE RETAIL MARKET FOR ELECTRIC GENERATION WITHIN THE COMMONWEALTH OF VIRGINIA, pt. 2, at 25–29 (2006), *available at* http://www.scc.virginia.gov/caseinfo/reports/2006_part2.pdf.

Atlantic and parts of the Midwest.[179] Generators deliver electricity into the PJM-operated grid and it is auctioned off in a competitive bidding process.[180] Most jurisdictions serviced by PJM have competitive retail energy markets where consumers have the ability to choose their supplier.[181] Virginia has no competitive retail energy market, but, due to PJM, it does have a quasi-competitive generation market. Virginia's energy market is hybridized by the fact that Virginia's IOUs deliver their generated electricity into the PJM grid and buy electricity back from the wholesale market.[182] By virtue of Virginia's connection to the PJM grid, the state may have competitive and independent generators even though there is no competitive retail market. Any Virginia RPS should be tailored to the Commonwealth's hybridized market.

C. *Fixing Virginia's RPS*

Virginia's hybrid energy market is unique because there is an opportunity to have a competitive market for electricity generation in an environment where the retail energy market is not competitive. Virginia's RPS should take advantage of this situation by being based on a credit-trading model. Such a model would foster the competitive generation market by issuing credits to any in-state generator—independent or utility-owned—that delivers renewable energy into PJM's grid. Utilities, which would be responsible for acquiring credits to satisfy their RPS targets for the year, would naturally try to fulfill their obligations in the most cost-effective manner. Independent renewable generators would have the opportunity to compete in the generation market by selling credits to utilities. Thus, utilizing the competitive gen-

179. All of Virginia's large utilities have joined PJM. *Id.* at 33. PJM, Territory Served, http://www.pjm.com/about/territory-served.html (last visited Nov. 23, 2007).

180. *See* PJM, Overview, http://www.pjm.com/about/overview.html (last visited Nov. 23, 2007).

181. *See id.* (listing states within PJM's grid); Mark Clayton, *In Deregulation of Electric Markets, A Consumer Pinch*, CHRISTIAN SCI. MONITOR, Apr. 25, 2006 (discussing restructuring efforts within PJM's territory and identifying states with restructured energy markets).

182. *See generally* MKT. MONITORING UNIT, PJM INTERCONNECTION, 2005 STATE OF THE MARKET REPORT (2006), *available at* http://www.pjm.com/markets/market-monitor/downloads/mmu-reports/20060411-som-web-1.pdf (detailing operation of PJM's energy market in 2005, the year Dominion joined PJM); PJM INTERCONNECTION, OPERATING AGREEMENT OF PJM INTERCONNECTION, L.L.C. (2007) (setting forth terms of agreement between PJM and its members).

eration market serves the function of ensuring that the state's renewable energy comes from the most competitive and least expensive sources. By lowering the overall cost of complying with the RPS, consumers benefit from this approach.

A Virginia RPS should have the following goals: encourage renewable energy entrepreneurs to enter the Virginia energy market; produce significant increases in renewable energy generation capacity; allow small-scale renewable suppliers to participate; let the market determine the most cost effective sources of renewable energy; permit utilities to earn a fair return on their investments; and keep retail energy costs low. The following outlines a proposal to rewrite Virginia's RPS, based on a credit-trading model, to address each of these goals.[183]

1. Encourage Renewable Energy Entrepreneurs to Enter the Market

Borrowing a successful idea from other states, Virginia's RPS should create a market for tradable renewable energy credits. Under the current system, a predetermined quantity of electricity actually sold by the participating utilities must be derived from renewable sources.[184] Such a system encourages the utilities to build their own renewable generation, thus increasing their rate base, which makes it easy for incumbent utilities to monopolize the renewables market. Because there is no ready market for renewable energy in Virginia's re-regulated market,[185] an individual wishing to build a renewable power generator in Virginia would have to either be competitive on the wholesale energy market or have a contract with an energy retail seller.

A better system would divorce the generation of renewable energy from the sale of renewable energy by creating a system of tradable renewable energy credits.[186] Under this system, a utility would satisfy its RPS requirements by holding a quantity of cred-

183. The statutory text of the proposed amendments is included as an Appendix, *infra*.

184. VA. CODE ANN. § 56-585.2(D).

185. *Cf.* Act of Apr. 4, 2007, ch. 933, 2007 Va. Acts 1044 (codified as amended in scattered sections of VA. CODE ANN. title 56) (signaling return in Virginia to traditional retail energy monopolies).

186. *See infra* Appendix ¶ 11. Eligible generators, called "commercial suppliers," are defined at *id.* ¶ 5. This group includes all in-state generators of renewable energy and other generators within the PJM grid that sell power to Virginia utilities.

its equivalent to the target percentage of its total energy sales for the year.[187] For instance, if a utility sold 100 MWh of electricity to retail customers under a 10% RPS Goal, it would need to hold 10 credits representing the generation of 10 MWh of renewable energy.

The Commission would issue credits to any eligible generator who produced electricity from a renewable source.[188] These credits would be a separate tradable commodity from the electricity itself.[189] Thus, for independent renewables generators, there would be a ready market among Virginia's electricity retailers who would need to obtain credits. This would provide an incentive for entrepreneurs who could produce the least expensive renewable energy to enter the market. This would not, however, prevent IOUs from building renewable energy generators and earning credits for their own accounts if they could produce credits at a cheaper margin.

In order to foster competition between independent renewable energy generators and IOUs, the playing field must be level. Accordingly, a tax break, subsidy, or other incentive should not be afforded to an IOU that would not be available to an independent renewable power generator. Virginia's voluntary RPS was designed to entice incumbent utilities to participate in the RPS with lucrative financial incentives.[190] One of the incentives is an enhanced rate of return of 200 basis points (2%) on costs associated with construction of renewable energy facilities.[191] This means that utilities are permitted to recover from ratepayers a higher rate of return from a $100 million investment in a wind farm, than it would from the same investment in a gas-fired or conventional coal plant.[192] Such an incentive has no place in a system

187. *Id.* ¶¶ 18, 20.

188. *Id.* ¶ 26.

189. *Id.* ¶ 11.

190. VA. CODE ANN. § 56-585.2(C) (2007).

191. *Id.* § 56-585.1(A)(6). Even without the incentive, the utility is able to recover the construction costs of renewables facilities as well as a "fair rate of return." *Id.* § 56-585.2(E).

192. The existing statute does, however, provide for an enhanced rate of return for costs associated with the construction of nuclear and certain clean-coal facilities. *Id.* § 56-585.1(A)(6). This enhanced rate of return incentive is appropriate because it discourages utilities from using dirtier technologies, such as conventional coal, to meet new energy demand. Accordingly, these incentives would not be deleted from the proposed RPS. *See* Appendix ¶ 44.

that penalizes utilities for failure to meet their RPS targets.[193] The threat of financial penalties, such as being required to purchase deficient renewable energy credits from the Commission at twice the market rate, serves the incentive function.[194] Consequently, preferential treatment of renewable power from IOUs should be avoided so that the market dictates the source of renewable energy—whoever can produce it at the lowest price.

2. Produce Significant Increases in Renewable Energy Generation Capacity

To be effective, target percentages for renewable energy generation must be set at meaningful levels. As discussed above, Virginia's RPS goals are much too low to encourage substantive increases in renewable generation capacity for at least a decade. As an initial threshold, the RPS Goal should be set at the level of existing renewable energy supply in the state—the renewable generation base ("RGB").[195] This will ensure that any subsequent goals are based on actual growth in capacity, rather than maintenance of the status quo.

As explained above, the current RPS goals, initially set at 4%, allow utilities to include generation from existing sources of renewable energy, including hydro power. But, hydro power should be excluded because utilities need no incentives to maintain their hydroelectric facilities, but all other existing sources of renewable energy should be included in the state's RGB. The RGB forms a baseline against which future increases can be measured.[196] Existing sources of non-hydro renewables that form the RGB should be fully eligible to receive renewable energy credits.[197] To exclude existing renewable sources from participating in the RPS, as some other states have done, would put existing generators at a severe competitive disadvantage. The purposes of the RPS would be harmed if existing renewable generators went out of business. Including existing sources in the RGB ensures the continued economic viability of these generators.

193. *Infra* Appendix ¶¶ 23–25.
194. *Id.* ¶ 24.
195. *See id.* ¶ 6.
196. *See id.* ¶ 20.
197. *See id.* ¶ 10.

Building on the RGB, the RPS goals should be raised in increments that are aggressive and yet attainable at a reasonable cost. A reasonable target would be to increase Virginia's renewable production by 0.9% a year.[198] This figure represents the average annual RPS target increase of several of Virginia's neighbors—Maryland, Delaware, Pennsylvania, and the District of Columbia.[199] A 0.9% increase would necessitate roughly 200 additional megawatts of renewable generation capacity per year, which is an attainable goal.[200]

Yearly target increases avoid the potential "boom and bust" building cycles that can occur when RPS targets change in large increments every few years.[201] Virginia's RPS, for example, jumps from 4% to 7% to 12% during 2010, 2016, and 2022, respectively.[202] Yearly increases allow individuals and businesses engaged in renewable energy facility construction to have a greater opportunity for continuous employment.[203]

One apparent drawback to yearly increases is that it advantages more modular sources of power, such as wind farms, that can add capacity in small increments.[204] Other facilities, such as LFG, that benefit from the economies of scale inherent in building larger plants are less modular—once constructed, it is difficult to increase capacity.[205] The proposed RPS addresses this problem by allowing utilities to bank credits for up to three years.[206] Therefore, if a large facility is constructed that provides

198. *See id.* ¶ 20.

199. These data can be found at the Database of State Incentives for Renewables & Efficiency, http://www.dsireusa.org/ (last visited Nov. 23, 2007).

200. The estimation is based on data from 2005 showing that Virginia utilities generated 65,456,080 MWh of electricity for that year. ENERGY INFO. ADMIN., *supra* note 24, tbl. 5, at 233. It also assumes that the average capacity factor for renewable energy generation sources will be 30%—the average for wind farms. *See* RENEWABLE ENERGY RESEARCH LAB., *supra* note 36, at 1. Thus, 0.9% of 56,456,080 MWh is 508,104 MWh that would have to be supplied from renewable energy. It would require renewable generators with approximately 200 MW of nameplate capacity running 30% of the time for an entire year to generate 508,104 MWh of electricity. This figure of 200 MW per year would, of course, have to be adjusted for yearly increases in actual generation.

201. *See* Am. Wind, Mechanics of RPS, *supra* note 124.

202. VA. CODE ANN. § 56-585.2(D) (2007).

203. *See* Am. Wind, Mechanics of RPS, *supra* note 124.

204. *See id.*

205. *See id.*

206. *See infra* Appendix ¶ 21.

more credits than are needed in any particular year, the credits can be stored for use in subsequent years.

3. Allow Small-Scale Renewable Generators to Participate

Virginia's RPS need not be limited to utility-scale energy generation. It serves the objectives of the RPS to encourage the development of small-scale distributed renewable power generation as well. Virginia's existing net metering program provides a convenient starting point for involving small-scale generators in the RPS.

Virginia's net metering program allows electricity customers to sell power back to the utility.[207] To be eligible, the customer must own a small-scale device capable of producing electricity, such as a PV panel or small wind turbine, and a specialized electricity meter.[208] In essence, a net metering customer's electricity meter spins in two directions so that the customer's electricity bill is reduced by the amount of electricity the customer produces.[209] As producers of renewable power, net metering participants should be able to reap the benefits of an RPS.

Typical residential-scale wind turbines range from 5 to 15 kilowatts of capacity.[210] Over the course of a year, turbines of this size would produce between 6000 and 18,000 kWh of renewable electric energy.[211] This is a significant amount of electricity, representing the potential for six to eighteen renewable energy credits under the proposed RPS.[212]

The proposed RPS involves and encourages net metering participants, which would provide a further monetary incentive for individuals to construct small-scale distributed sources of renewable energy.[213] To accomplish this, utilities would be required to

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207. VA. CODE ANN. § 56-594 (2007).

208. *Id.* § 56-594(B)–(C). The generating capacity limit for residential and non-residential customers is 10 kilowatts and 500 kilowatts respectively. *Id.* § 56-594(B).

209. *Id.* § 56-594(C), (E). The utility is not required to compensate a net metering customer who generates more than he consumes. *See id.* § 56-594(E).

210. AM. WIND ENERGY ASS'N, ROADMAP: A 20-YEAR INDUSTRY PLAN FOR SMALL WIND TURBINE TECHNOLOGY 12 (2002), *available at* http://www.awea.org/smallwind/documents/31958.pdf.

211. *See id.*

212. *See infra* Appendix ¶ 11. One credit is equivalent to 1000 kWh of electricity.

213. *See id.* ¶¶ 8, 27, 46–48.

include in their quarterly reports the quantities of renewable power generated by net metering participants.[214] The Commission would issue renewable energy credits for the generation directly to the utility's account for use by the utility in meeting its annual RPS Goal. The utility would then be required to reimburse the net-metering participant for the value of the credits.[215]

4. Let the Market Determine the Most Cost-Effective Sources of Renewable Energy

Electrical energy is a fungible commodity. To the end user, it makes no practical difference whether the particular electrons reaching her house or business came from a coal plant, a nuclear reactor, or a wind farm. Of importance to most customers is the price of that electricity. Where market conditions prevail, retail sellers will opt for the least expensive generation alternative. A well-designed RPS should embrace this basic economic principle and allow the market unfettered discretion to determine which sources of renewable energy are developed to satisfy the RPS targets. Accordingly, the proposed RPS will include no provisions that give any source of renewable energy an unnecessary competitive advantage over other sources of renewable energy.[216]

Virginia's current RPS interferes with the efficient operation of the market in several significant ways that should be corrected. As discussed above, the RPS currently extends incentives to utilities that build renewable generators that are not available to independent generators.[217] Unless removed, these incentives would create a barrier to competition by entrepreneurial generators who may wish to develop innovative or unorthodox renewable sources.

The current RPS also contains unnecessary preferences for wind and solar power. Utilities receive double credit towards their RPS goals for energy derived from these sources.[218] As wind is the cheapest non-hydroelectric renewable technology currently available in Virginia, the market will heavily favor the development of wind farms to satisfy the state's RPS targets, and addi-

214. *Id.* ¶ 27.

215. *Id.*

216. *See id.* ¶ 17.

217. *See supra* notes 191–92 and accompanying text (discussing an enhanced rate of return available to utilities for the construction of renewable generators).

218. *See* VA. CODE ANN. § 56-585.2(C) (2007).

tional incentives for wind are not needed.[219] Double-crediting wind energy reduces by half the cost of using wind to comply with the RPS. If, for example, the RPS goals require a utility to increase its renewable generation by 1000 MWh in a given year, the utility could meet its obligation by generating only 500 MWh of electricity from a wind farm. This will virtually ensure that wind power is the predominant source of non-hydroelectric renewable energy in Virginia.

Although there is nothing inherently wrong with wind power, the wind incentive will have two negative consequences. First, the primary use of double-credited wind power will effectively halve the Commonwealth's already inadequate RPS goals. Second, the double credit for wind and solar makes other sources of renewable energy less competitive. Although commercially viable tidal, hydrogen fuel-cell, or fusion power plants may be years off, these, and other sources, of renewable energy should not be made less competitive by the structure of Virginia's RPS.[220] New sources of renewable energy—especially those in relatively early stages of development—should not face RPS-created structural barriers to market entry. Further, LFG generation is already a commercially viable source of renewable energy in Virginia.[221] Given the ancillary environmental benefits of burning LFGs rather than venting them into the atmosphere, LFG generation should not be comparatively disadvantaged by the RPS.

Extending double credit to solar power is equally perplexing. As it stands, Virginia's RPS is geared towards large-scale utility-owned renewable power facilities. However, utility-scale PV

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219. It should be pointed out that the double credit wind incentive is qualitatively different from financial incentives that favor particular renewables sources, such as subsidies and tax breaks. Financial incentives have the benefit of making renewable energy less expensive to produce, and therefore more competitive with non-renewable sources of energy. By contrast, the double credit makes wind no more competitive with non-renewable sources since the credit has no effect on the per kWh cost of producing wind energy; it simply makes wind more competitive *in relation to other sources of renewable power*.

220. Some of these alternative sources of energy are in advanced stages of development. For instance, the first large-scale tidal power generator is currently being constructed off the coast of Portugal. *See* Jason Margolis, *Wave Farms Show Energy Potential*, BBC NEWS, Mar. 2, 2007, *available at* http://news.bbc.co.uk/2/hi/technology/6410839.stm. Although the project was heavily subsidized by the Portuguese government, the continued development of the technology promises to reduce its costs. *Id.* Small-scale tidal power tests are also being conducted off the shores of New Jersey and Hawaii. *Id.*

221. *See supra* Part II.B.

power generation is not a viable option in the Commonwealth, at least not in the foreseeable future. There is no reason to afford solar power a competitive advantage under the system.[222] The market should dictate which sources of renewable energy are developed to satisfy the RPS targets.

5. Permit Utilities to Earn a Fair Return on Their Investments

Eighty-six percent of Virginia's retail electricity customers are served by five publicly held utilities.[223] The shareholders of these utilities "expect and are entitled to" a fair return on their investment.[224] Although an RPS should present a risk of monetary loss to shareholders if the utility does not comply, it should not penalize utilities that meet their RPS targets. Likewise, an RPS should not be a vehicle for public utilities to unjustly enrich themselves at the expense of ratepayers. An ideal RPS should be revenue-neutral for utilities.

Whereas most states require utilities to participate in RPSs, Virginia has made its RPS optional. In order to induce utility participation, Virginia has had to include substantial financial incentives in its RPS. Apart from the incentives, the existing and proposed RPSs permit utilities to recover all incremental costs of participating in the program.[225] This should be sufficient to compensate utilities for complying with a mandatory RPS, and it preserves the ability of the utility shareholders to earn a fair rate of return on their investment. However, Virginia's current RPS goes a step further by allowing the utility to increase its combined rate of return on common equity by fifty basis points (0.5%) when it meets the RPS Goal.[226] Returning to Dominion as an example, we find that Dominion reported over $4.6 billion in common equity in

222. The cynical explanation for solar power's presence in the double-crediting provision is that it is a distraction. Ostensibly, the provision is a reasonable incentive representing the General Assembly's approval of wind and solar technologies. A preference for wind alone would be much more conspicuous. Under the current RPS, a utility could hypothetically announce that it had "satisfied its 4% RPS Goal" despite only generating 2% of its energy from one renewable source: wind.

223. *See* ENERGY INFO ADMIN., STATE ELECTRICITY PROFILES 2005, at 235 (2007), *available at* http://www.eia.doe.gov/cneaf/electricity/st_profiles/sep2005.pdf; Va. State Corp. Comm'n, Investor-Owned Electric Companies Regulated by the SCC, http://www.scc.virginia.gov/division/pue/elec/co_tariff.htm (last visited Nov. 23, 2007).

224. Re Pub. Serv. Co. of N.M., 8 P.U.R. 4th 113, 126 (N.M. Pub. Serv. Comm'n 1975).

225. VA. CODE ANN. § 56-585.2(C), (E) (2007).

226. *Id.* § 56-585.2(C).

2006.[227] A half percentage point increase in rate of return on $4.6 billion amounts to roughly $23 million dollars a year in additional revenue that must be paid by Dominion's retail electricity customers. Thus, a Virginia utility that meets its RPS targets may increase the rates it charges customers twice: once to cover the expenses of complying with the RPS, and again to earn the additional 0.5% percent rate of return.

Under the proposed RPS, utilities would still be able to recover the costs of compliance, such as building new renewable generators, and buying credits.[228] The Commission, however, would be able to deny recovery of any expenses that are not "reasonably and prudently incurred."[229] The fifty basis point enhanced rate of return would be eliminated.[230] Its sole purpose in the current RPS is to encourage participation in the program. Since participation would be mandatory, there would be no need for such an incentive.

Further, the RPS should penalize non-compliant utilities. Utilities would be given a three-month "settlement period" following the end of each year to purchase credits on the market to make up for the previous year's shortfall.[231] Should a utility fail to acquire sufficient credits, it would be required to purchase "proxy credits" from the Commission at twice the average market price for the previous year.[232] Penalties would not be considered "reasonably and prudently" incurred expenses and therefore would not be recoverable from ratepayers.[233] Presumably, the threat of diminished shareholder profits would be an adequate deterrence to RPS noncompliance.

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227. Va. Elec. & Power Co., 2006 Annual Information Filing, sch. 15, ln. 26, col. 5 (May 14, 2007), *available at* http://docket.scc.state.va.us:8080/CyberDocs/Libraries/Default_Library/Common/frameviewdsp.asp?doc=69783&lib=CASEWEBP%5FLIB&mimetype=application%2Fpdf&rendition=native.

228. *Infra* Appendix ¶ 29.

229. *See id.*

230. *Id.* ¶ 17.

231. *Id.* ¶¶ 13, 22.

232. *Id.* ¶ 24. The utility would be excused from the penalty if the Commission determined that "[e]vents or circumstances that are outside of a [utility's] reasonable control" caused the shortfall. *Id.* ¶ 25. In this case, the proxy credit price would be set at the average market price for the year. *Id.*

233. *Id.* ¶ 29.

6. Keep Retail Energy Costs Low

Other states have proven that RPS programs can be implemented without significantly raising the cost of energy for consumers.[234] The proposed RPS, which is no more ambitious than RPSs in many other states, should be no different. However, to protect against unforeseen price increases, the Commission would have the power to cap the price of renewable energy credits if it determined that "doing so is necessary to prevent unreasonable retail price increases."[235] If freezing the price of credits was not sufficient to ensure the stability of retail prices, the Commission would be able to suspend the RPS goals altogether for up to one year.[236] This last-resort measure would allow the General Assembly time to adjust the RPS goals if needed.

IV. CONCLUSION

Virginia's General Assembly should be lauded for attempting to encourage renewable energy development in the state. The benefits of renewable energy are manifest, and renewable sources are steadily approaching economic parity with traditional high-polluting energy sources. Soundly designed state RPS programs can accelerate the commercialization of renewable energy without adversely affecting energy prices for consumers.

However, Virginia's RPS is not well designed. Its goals are surreptitiously watered down so that state energy utilities can claim credit for largely illusory increases in environmentally friendly power production. State ratepayers will pay a steep price to afford utilities these accolades. Virginia should not reward energy companies for revenue-neutral actions that could be accomplished through the threat of penalties for noncompliance.

Accordingly, the General Assembly should revisit the RPS to fix its many flaws. Virginia should join the twenty-one other states that require utilities to comply with renewable energy mandates. The renewable generation goals should be set at transparent levels that will result in meaningful increases in the

234. *See supra* notes 136–37 and accompanying text.
235. *Infra* Appendix ¶ 32.
236. *Id.*

state's renewable power generation capacity. By allowing utilities to pass through to consumers the reasonable and prudent costs associated with complying with the standards, the economic vitality of the utilities would not be affected. The threat of penalties is a sufficient substitute for incentives. Virginia's utilities should not be earning windfall profits at the expense of Virginia's electricity customers when there are plausible alternatives. The proposed RPS in this comment is a humble suggestion.

APPENDIX

VIRGINIA'S RPS STATUTE AND PROPOSED AMENDMENTS

This Appendix contains selected portions of Virginia's re-regulation statute, Act of Apr. 4, 2007, ch. 933, 2007 *VA. ACTS 1044 (including the RPS section in its entirety), as well as the author's proposed amendments. Language in normal type is the original language of the Act. Words stricken-through represent language that should be excised from the current statute. Italicized wording represents proposed additions to the current statute. Bracketed information has been inserted where appropriate in order to aid the reader. Much of the added statutory language was borrowed from the RPS programs of California, CAL. PUB. UTIL. CODE §§ 399.11–.16 (West 2004 & Supp. 2007), Delaware, DEL. CODE ANN. tit. 26, §§ 351–363 (Supp. 2006), Pennsylvania, 73 PA. STAT. ANN. §§ 1648.1–1648.8 (2007), and Texas, TEX. UTIL. CODE ANN. § 39.904 (Vernon 2007); 16 TEX. ADMIN. CODE § 25.173 (2007), and from S.B. 1275, 2007 Gen. Assemb., Reg. Sess. (Va. 2007).*

§ 56-585.2. Sale of electricity from renewable sources through a renewable energy portfolio standard program.

A. As used in this section:

"Average market price" is the average price of renewable energy credits sold within the state during the compliance period at issue. The [State Corporation] *Commission shall determine average market price based on annual reports supplied by utilities.*

"Bank" refers to the act of accumulating renewable energy credits that are not needed to satisfy a utility's RPS Goal.

"Commercial supplier" means all in-state generators of renewable energy possessing a certificate of public convenience and necessity from the Commission, or out-of-state generators of renewable energy that (i) have sold electricity into the Commonwealth; (ii) are in the interconnection region of the regional transmission entity of which the purchasing utility

is a member; and (iii) have applied to receive renewable energy credits. Eligible customer-generators participating in a net metering program shall not be considered commercial suppliers.

6 *"Renewable generation base" (RGB) refers to the total amount of electricity generated from renewable sources in the Commonwealth for calendar year 2007, represented as a percentage of total electrical energy generated in-state for that year.*

7 *"Compliance period" means a calendar year beginning January 1 and ending December 31 of each year in which renewable energy credits are required of a competitive retailer.*

8 *"Eligible customer-generator" shall have the same meaning ascribed to it in § 56-594* [net metering participant].

9 *"Proxy credit" is a renewable energy credit equivalent issued by the Commission that may be used by a utility to satisfy its RPS Goal.*

10 "Renewable energy" shall have the same meaning ascribed to it in § 56-576~~, provided such renewable energy is (i) generated or purchased in the Commonwealth or in the interconnection region of the regional transmission entity of which the participating utility is a member, as it may change from time to time; (ii) generated by a public utility providing electric service in the Commonwealth from a facility in which the public utility owns at least a 49 percent interest and that is located in a control area adjacent to such interconnection region; or (iii) represented by certificates issued by an affiliate of such regional transmission entity, or any successor to such affiliate, and held or acquired by such utility, which validate the generation of renewable energy by eligible sources in such region.~~ "Renewable energy" shall not include electricity generated from pumped storage, ~~but shall include~~ run-of-river generation from a combined pumped-storage, *or* ~~and~~ run-of-river facility.

11 *"Renewable energy credit" (credit) means a tradable instrument issued by the Commission pursuant to subsection F of this section that certifies that one megawatt-hour of electricity was generated and delivered, sold, or consumed by an eligible renewable energy supplier. Credits shall expire if not used within three compliance periods.*

12 *"RPS Goal" refers to the total number of renewable energy credits a utility must possess at the end of each compliance period.*

13 *"Settlement period" refers to the first calendar quarter following a compliance period.*

14 "Total electric energy sold ~~for the base year~~ *in [year] compliance period*" means total electric energy sold to Virginia jurisdictional retail customers by a ~~participating~~ utility in ~~calendar year 2007~~ *the compliance period for that year*, excluding an amount equivalent to the average of the annual percentages of the electric energy that was supplied to ~~such~~ *the utility's* customers from nuclear generating plants for the calendar years 2004 through 2006.

15 *"Utility" means any investor-owned incumbent electric utility or municipal power utility engaged in the retail sale of electricity to end-use customers located within the Commonwealth.*

16 B. Any ~~investor-owned incumbent~~ electric utility *must* ~~may apply to the Commission for approval to~~ participate in a renewable energy portfolio standard program (RPS), as defined in this section. ~~The Commission shall approve such application if the applicant demonstrates that it has a reasonable expectation of achieving 12 percent of its base year electric energy sales from renewable energy sources during calendar year 2022, as provided in subsection D.~~

17 ~~C. It is in the public interest for utilities to achieve the goals set forth in subsection D, such goals being referred to herein as "RPS Goals". Accordingly, the Commission, in addition to providing recovery of incremental RPS program costs pursuant to subsection E, shall increase the fair combined rate of return on common equity for each utility participating in such program by a single Performance Incentive, as defined in subdivision A 2 of § 56-585.1, of 50 basis points whenever the utility attains an RPS Goal established in subsection D. Such Performance Incentive shall first be used in the calculation of a fair combined rate of return for the purposes of the immediately succeeding biennial review conducted pursuant to § 56-585.1 after any such RPS Goal is attained, and shall remain in effect if the utility continues to meet the RPS Goals established in this sec-~~

~~tion through and including the third succeeding biennial review conducted thereafter. Any such Performance Incentive, if implemented, shall be in lieu of any other Performance Incentive reducing or increasing such utility's fair combined rate of return on common equity for the same time periods. However, if the utility receives any other Performance Incentive increasing its fair combined rate of return on common equity by more than 50 basis points, the utility shall be entitled to such other Performance Incentive in lieu of this Performance Incentive during the term of such other Performance Incentive. A utility shall receive double credit toward meeting the renewable energy portfolio standard for energy derived from sunlight or from wind.~~

18 *C.* ~~D.~~ *To meet its RPS Goal, a utility must possess renewable energy credits equivalent to the following:* ~~To qualify for the Performance Incentive established in subsection C, the total electric energy sold by a utility to meet the RPS Goal shall be composed of the following amounts of electric energy from renewable energy sources, as adjusted for any sales volumes lost through operation of the customer choice provisions of subdivision A 3 or A 4 of § 56-577:~~

19 ~~RPS Goal I: In calendar year 2010, 4 percent of total electric energy sold in the base year.~~

~~RPS Goal II: For calendar years 2011 through 2015, inclusive, an average of 4 percent of total electric energy sold in the base year, and in calendar year 2016, 7 percent of total electric energy sold in the base year.~~

~~RPS Goal III: For calendar years 2017 through 2021, inclusive, an average of 7 percent of total electric energy sold in the base year, and in calendar year 2022, 12 percent of total electric energy sold in the base year.~~

20 *RGB + 0.9% of total electric energy sold in 2008 compliance period.*

RGB + 1.8% of total electric energy sold in 2009 compliance period.

RGB + 2.7% of total electric energy sold in 2010 compliance period.

RGB + 3.6% of total electric energy sold in 2011 compliance period.

RGB + 4.5% of total electric energy sold in 2012 compliance period.

RGB + 5.4% of total electric energy sold in 2013 compliance period.

RGB + 6.3% of total electric energy sold in 2014 compliance period.

RGB + 7.2% of total electric energy sold in 2015 compliance period.

RGB + 8.1% of total electric energy sold in 2016 compliance period.

RGB + 9.0% of total electric energy sold in 2017 compliance period.

RGB + 9.9% of total electric energy sold in 2018 compliance period.

RGB + 10.8% of total electric energy sold in 2019 compliance period.

RGB + 11.7% of total electric energy sold in 2020 compliance period.

21 A utility may ~~apply renewable energy sales achieved or~~ *bank* renewable energy *credits* ~~certificates~~ acquired during ~~the periods covered by~~ any *compliance period* ~~such RPS Goal~~ that are in excess of the sales requirement for that ~~RPS Goal~~ *compliance period* ~~to the sales requirements~~ for *use in a* ~~any~~ future ~~RPS Goal~~ *compliance period. Banked credits expire if not used within three full compliance periods.*

22 *D. If the utility has a deficit in the number of credits required at the end of the compliance period, it may acquire existing credits during the settlement period. Utilities may not borrow against future credits. By the end of the settlement period, each utility must submit credits to the Commission from its account equivalent to its RPS Goal for the previous compliance period. If the utility has insufficient credits in its account to satisfy its obligation, the utility is subject to the provisions in subsection E of this section.*

23 *E. If by the conclusion of the settlement period the* [State Corporation] *Commission determines that a utility subject to this section has insufficient credits to satisfy its RPS Goal for the compliance period, the Commission shall:*

24 *1. Issue to the utility a number of proxy credits equal to the utility's deficit. The Commission shall charge 200% of the average market price for each proxy credit issued, or;*

25 *2. In the event the Commission determines that the deficit was caused by events beyond the reasonable control of the utility, it shall issue proxy credits to the utility. The utility shall pay the average market price for each credit. Events or circumstances that are outside of a party's reasonable control may include weather-related damage, mechanical failure, lack of transmission capacity or availability, strikes, lockouts, or actions of a governmental authority that ad-*

versely affect the generation, transmission, or distribution of renewable energy.

26 *F. Within thirty days after the end of each quarter, each commercial supplier shall file a report with the Commission certifying the number of megawatt-hours of electric energy generated and distributed, sold, or consumed during that quarter. The Commission shall issue one credit for each certified megawatt-hour of electric energy from a renewable source.*

27 *Utilities shall include in their quarterly reports the gross quantity of electric energy sold or displaced by eligible customer-generators participating in a net metering program (§ 56-594). Credits shall be issued to the utility for this quantity. Utilities shall reimburse each eligible customer-generator for any credits thus issued at the lower price of (i) the average market price for the last full compliance period as determined by the Commission, or (ii) the average price paid by the utility for credits during the last full compliance period.*

28 *If a commercial supplier sells electricity in any other jurisdiction and participates in a RPS program in that jurisdiction, it shall list any such requirement and shall indicate how it satisfied those renewable energy portfolio requirements in its quarterly report to the Commission. To prevent double-counting, suppliers shall not satisfy Virginia's renewable energy portfolio requirements using renewable energy or renewable energy credits used to satisfy another jurisdiction's portfolio requirements. Suppliers shall document that this energy was not used to satisfy another jurisdiction's renewable energy portfolio standards.*

29 *G.* ~~E.~~ A utility participating in such program shall have the right to recover all incremental costs *reasonably and prudently* incurred for the purpose of *complying with this section* ~~such participation in such program, as accrued against income~~, through rate adjustment clauses as provided in subdivisions A 5 and A 6 of § 56-585.1, including, but not limited to, administrative costs, ancillary costs, capacity costs, costs of energy represented by certificates described in subsection A, and, in the case of construction of renewable energy generation facilities, allowance for funds used

during construction, ~~until such time as an enhanced rate of return, as determined pursuant to subdivision A 6 of § 56-585.1, on construction work in progress is included in rates~~, projected construction work in progress, planning, development and construction costs, life-cycle costs, and costs of infrastructure associated therewith~~, plus an enhanced rate of return, as determined pursuant to subdivision A 6 of § 56-585.1~~. *Costs incurred as a result of credit deficits pursuant to subsection (E)(1) of this section shall not be considered reasonably and prudently incurred and shall not be recoverable.* All incremental costs of the RPS program shall be allocated to and recovered from the utility's customer classes based on the demand created by the class and within the class based on energy used by the individual customer in the class, except that the incremental costs of the RPS program shall not be allocated to or recovered from customers that are served within the large industrial rate classes of the participating utilities and that are served at primary or transmission voltage.

H. ~~F~~. A utility *shall be issued credits for* ~~participating in such program may apply towards meeting its RPS Goals~~ any renewable energy from existing renewable energy sources owned by the participating utility ~~or purchased as allowed by contract at no additional cost to customers to the extent feasible.~~ A utility ~~participating in such program~~ shall not apply towards meeting its RPS Goal renewable energy *credits* ~~certificates~~ attributable to any renewable energy generated at a renewable energy generation source in operation as of July 1, 2007, that is operated by a person that is served within a utility's large industrial rate class and that is served at primary or transmission voltage. A ~~participating~~ utility shall be required to fulfill any remaining deficit needed to fulfill its RPS Goal *with renewable energy credits purchased from a commercial supplier.* ~~from new renewable energy supplies at reasonable cost and in a prudent manner to be determined by the Commission at the time of approval of any application made pursuant to subsection B.~~ Utilities ~~participating in such program~~ shall collectively, either through the installation of new generating facilities, through retrofit of existing facilities or through purchases of *credits* from new facilities located in Virginia, use or cause to be used no more than a total of 1.5

million tons per year of green wood chips, bark, sawdust, a tree or any portion of a tree which is used or can be used for lumber and pulp manufacturing by facilities located in Virginia, towards meeting RPS goals, excluding such fuel used at electric generating facilities using wood as fuel prior to January 1, 2007. A utility ~~with an approved application~~ shall be allocated a portion of the 1.5 million tons per year in proportion to its share of the total electric energy sold in *the 2007 calendar year* ~~the base year, as defined in subsection A, for all utilities participating in the RPS program~~. A utility may use in meeting RPS goals, without limitation, the following sustainable biomass and biomass based waste to energy resources: mill residue, except wood chips, sawdust and bark; pre-commercial soft wood thinning; slash; logging and construction debris; brush; yard waste; shipping crates; dunnage; non-merchantable waste paper; landscape or right-of-way tree trimmings; agricultural and vineyard materials; grain; legumes; sugar; and gas produced from the anaerobic decomposition of animal waste.

I. Proceeds from the sale of proxy credits shall be paid, in equal amounts, into the Renewable Electricity Production Grant Fund (§ 67-902) and the Photovoltaic, Solar, and Wind Energy Utilization Grant Fund (§ 67-1002).

J. Upon the application of any party, the Commission shall have the authority to cap the price of renewable energy credits if it determines that doing so is necessary to prevent unreasonable retail price increases. If prices have been capped and the Commission determines that further actions are necessary to prevent unreasonable retail price increases, it may suspend the RPS goals for no more than one year.

K. ~~G.~~ The Commission shall promulgate such rules and regulations as may be necessary to implement the provisions of this section including, *but not limited to:* ~~a requirement that participants verify whether the RPS goals are met in accordance with this section~~.

1. Establishing procedures for quarterly reporting of renewable energy generated and for issuing credits on the basis of the reports.

2. Performing periodic audits of commercial suppliers to ensure the accuracy of renewable energy generation data.

36 *3. Creating and administering renewable energy credit accounts for each utility and participating commercial supplier.*

37 *4. Developing procedures for the purchase and sale of renewable energy credits.*

38 *5. Determining standards for capping the price of renewable energy credits.*

. . . .

39 § 56-585.1. Generation, distribution, and transmission rates after capped rates terminate or expire.

40 A. During the first six months of 2009, the Commission shall, after notice and opportunity for hearing, initiate proceedings to review the rates, terms and conditions for the provision of generation, distribution and transmission services of each investor-owned incumbent electric utility.... In such proceedings the Commission shall determine fair rates of return on common equity applicable to the generation and distribution services of the utility.... Commencing in 2011, the Commission, after notice and opportunity for hearing, shall conduct biennial reviews of the rates, terms and conditions for the provision of generation, distribution and transmission services by each investor-owned incumbent electric utility, subject to the following provisions:

. . . .

41 5. A utility may at any time, after the expiration or termination of capped rates, but not more than once in any 12-month period, petition the Commission for approval of one or more rate adjustment clauses for the timely and current recovery from customers of the following costs:

. . . .

42 c. Projected and actual costs of participation in a renewable energy portfolio standard program pursuant to § 56-585.2 that are not recoverable under subdivision 6. The Commission shall approve such a petition allowing the recovery of such costs as are provided for in a program approved pursuant to § 56-585.2;

. . . .

43 6. To ensure a reliable and adequate supply of electricity, to meet the utility's projected native load obligations and to promote economic development, a utility may at any time, after the expiration or termination of capped rates, petition the Commission for approval of a rate adjustment clause for recovery on a timely and current basis from customers of the costs of (i) a coal-fueled generation facility that utilizes Virginia coal and is located in the coalfield region of the Commonwealth, as described in § 15.2-6002, regardless of whether such facility is located within or without the utility's service territory, (ii) one or more other generation facilities, or (iii) one or more major unit modifications of generation facilities; however, such a petition concerning facilities described in clause (ii) that utilize nuclear power, facilities described in clause (ii) that are coal-fueled and will be built by a Phase I utility, or facilities described in clause (i) may also be filed before the expiration or termination of capped rates. A utility that constructs any such facility shall have the right to recover the costs of the facility, as accrued against income, through its rates, including projected construction work in progress, and any associated allowance for funds used during construction, planning, development and construction costs, life-cycle costs, and costs of infrastructure associated therewith, plus, as an incentive to undertake such projects, an enhanced rate of return on common equity calculated as specified below. The costs of the facility, other than return on projected construction work in progress and allowance for funds used during construction, shall not be recovered prior to the date the facility begins commercial operation. Such enhanced rate of return on common equity shall be applied to allowance for funds used during construction and to construction work in progress during the construction phase of the facility and shall thereafter be applied to the entire facility during the first portion of the service life of the facility. The first portion of the service life shall be as specified in the table below; however, the Commission shall determine the duration of the first portion of the service life of any facility, within the range specified in the table below, which determination shall be consistent with the public interest and shall reflect the Commission's determinations regarding how critical the facility may be in meeting the energy needs of the citi-

zens of the Commonwealth and the risks involved in the development of the facility. After the first portion of the service life of the facility is concluded, the utility's general rate of return shall be applied to such facility for the remainder of its service life. As used herein, the service life of the facility shall be deemed to begin on the date the facility begins commercial operation, and such service life shall be deemed equal in years to the life of that facility as used to calculate the utility's depreciation expense. Such enhanced rate of return on common equity shall be calculated by adding the basis points specified in the table below to the utility's general rate of return, and such enhanced rate of return shall apply only to the facility that is the subject of such rate adjustment clause. No change shall be made to any Performance Incentive previously adopted by the Commission in implementing any rate of return under this subdivision. Allowance for funds used during construction shall be calculated for any such facility utilizing the utility's actual capital structure and overall cost of capital, including an enhanced rate of return on common equity as determined pursuant to this subdivision, until such construction work in progress is included in rates. The construction of any facility described in clause (i) is in the public interest, and in determining whether to approve such facility, the Commission shall liberally construe the provisions of this title. The basis points to be added to the utility's general rate of return to calculate the enhanced rate of return on common equity, and the first portion of that facility's service life to which such enhanced rate of return shall be applied, shall vary by type of facility, as specified in the following table:

44

Type of Generation Facility	Basis Points	First Portion of Service Life
Nuclear-powered	200	Between 12 and 25 years
Carbon capture compatible, clean-coal powered	200	Between 10 and 20 years
~~Renewable-powered~~	~~200~~	~~Between 5 and 15 years~~
~~Conventional coal or combined-cycle combustion turbine~~	~~100~~	~~Between 10 and 20 years~~

. . . .

45 § 56-594. Net energy metering provisions.

46 A. The Commission shall establish by regulation a program, to begin no later than July 1, 2000, which affords eligible customer-generators the opportunity to participate in net energy metering. The regulations may include, but need not be limited to, requirements for (i) retail sellers; (ii) owners and/or operators of distribution or transmission facilities; (iii) providers of default service; (iv) eligible customer-generators; or (v) any combination of the foregoing, as the Commission determines will facilitate the provision of net energy metering, provided that the Commission determines that such requirements do not adversely affect the public interest.

47 B. For the purpose of this section:

"Eligible customer-generator" means a customer that owns and operates, or contracts with other persons to own, operate, or both, an electrical generating facility that (i) has a capacity of not more than 20 ~~10~~ kilowatts for residential customers and 500 kilowatts for nonresidential customers; (ii) uses as its total source of fuel renewable energy, as defined in § 56-576; (iii) is located on the customer's premises and is connected to the customer's wiring on the customer's side of its interconnection with the distributor; (iv) is inter-

connected and operated in parallel with an electric company's transmission and distribution facilities; and (v) is intended primarily to offset all or part of the customer's own electricity requirements.

. . . .

48 D. The Commission shall establish minimum requirements for contracts to be entered into by the parties to net metering arrangements. Such requirements shall protect the customer-generator against discrimination by virtue of its status as a customer-generator. Where electricity generated by the customer-generator over the net metering period exceeds the electricity consumed by the customer-generator, the customer-generator shall not be compensated for the excess electricity unless the entity contracting to receive such electric energy and the customer-generator enter into a power purchase agreement for such excess electricity. *The eligible customer-generator shall receive compensation for all renewable energy credits issued to the utility pursuant to § 56-585.2, including credits for excess electric energy.* The net metering standard contract or tariff shall be available to eligible customer-generators on a first-come, first-served basis in each electric distribution company's Virginia service area until the rated generating capacity owned and operated by eligible customer-generators in the state reaches one percent of each electric distribution company's adjusted Virginia peak-load forecast for the previous year.

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