UNTAPPED RENEWABLE ENERGY POTENTIAL: LESSONS FOR REFORMING VIRGINIA'S RENEWABLE ENERGY PORTFOLIO STANDARD FROM TEXAS AND CALIFORNIA

NOTE

Corey N. Allen[*]

This note analyzes the policy efficacy of a Renewable Energy Portfolio Standard ("RPS") utilizing a case comparison method, in order to make recommendations for energy policy in the Commonwealth of Virginia. First, the RPS is analyzed as a stand-alone policy device by way of its design, implementation, and utilization. The RPS represents an effective medium-term policy tool for states that wish to take smaller steps to incentivize renewable energy development. While an RPS may not be able to create economy-wide incentive effects that are created through a carbon pricing mechanism, such as a carbon tax or a cap and trade system, the RPS's inherent support for in-state energy development, as well as its lack of the often negative political capital associated with carbon pricing mechanisms, may make it an easier political pill for state legislatures to swallow. Second, Virginia's RPS is analyzed for its policy effectiveness, through a comparison with two other states who have successfully implemented RPSs—California and Texas. Both California and Texas have used their RPSs, albeit in vastly different political climates and with very different energy portfolios, to create a strong regulatory incentive for increased renewable energy development. In contrast, Virginia's current voluntary RPS falls far short in its ability to incentivize renewable power development. However, borrowing from the lessons of the mandatory California and Texas RPSs can improve Virginia's program and provide tools to further develop a more balanced and renewable power source mix in the Commonwealth.

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I. INTRODUCTION

A Renewable Energy Portfolio Standard ("RPS") is a common policy tool used by U.S. states to promote broader investment in renewable energy without requiring passage of a comprehensive energy policy measure that includes a pricing mechanism for carbon. The passage of an RPS either recommends a goal of generating some level or percentage of the state's power portfolio from eligible renewable energy sources by a fixed future date (a "non-binding" or "voluntary" RPS), or legally mandates the generation of that level or percentage of eligible renewable power in the state's power portfolio by the fixed future date (a "mandatory RPS").[1] RPSs are also known as "renewable electricity standards," "renewable energy standards," "clean energy standards," and "clean energy portfolio standards."[2]

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[1] RYAN H. WISER & GALEN L. BARBOSE, LAWRENCE BERKELEY NAT'L LAB., LBNL-154E, RENEWABLE PORTFOLIO STANDARDS IN THE UNITED STATES – A STATUS REPORT WITH DATA THROUGH 2007 2 (2008).

[2] WARREN LEON, CLEAN ENERGY STATES ALLIANCE, DESIGNING THE RIGHT RPS: A GUIDE TO SELECTING GOALS AND PROGRAM OPTIONS FOR A RENEWABLE PORTFOLIO STANDARD 3 (2012).

Through enforcement of a fixed renewable energy target in the state's power portfolio, a mandatory RPS can provide an important incentive to drive continuing investment in renewable energy generation that may not otherwise occur in the absence of a pricing mechanism for carbon emissions. Also, to comply with the implementation of the federal Clean Power Plan, states will be required to make considerable greenhouse gas emissions reductions.[3] While the Clean Power Plan does not require a state to have an RPS at all, states could use a mandatory RPS that forces development of new low-to-zero emission power generation to meet its Clean Power Plan obligations.[4]

Virginia does not have a state-level pricing mechanism for carbon emissions. The state legislature has enacted a non-binding RPS, and there are various state-level and locality-based policy measures in place incentivize energy efficiency and investment in small-scale renewable energy projects.[5] While locality-based incentives are useful to encourage investment in renewable energy, they seem unlikely to bring about expansive renewable energy growth in Virginia's electric power industry without further state-level policy development. Barring the unlikely enactment of a carbon pricing mechanism, reform of Virginia's non-binding RPS may provide the state-level incentive to push utilities to make larger investments in renewable power production.

As currently structured, Virginia's non-binding RPS leaves significant untapped potential for future renewable energy production. It also falls short on sufficiently incentivizing long-term planning for grid investment and development of less carbon-intensive sources of power generation that will be necessary in a lower carbon future. However, Virginia can learn from the policy design and implementation experiences of many states that have successfully implemented mandatory RPSs—chief among them, California and Texas. While this analysis is not limited to California and Texas alone, these states provide effective case studies of

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[3] *A Historic Commitment to Protecting the Environment and Reversing Climate Change*, THE WHITE HOUSE, https://www.whitehouse.gov/the-record/climate#section-clean-power-plan (last visited Sept. 21, 2016).

[4] EDWARD A. HOLT, CLEAN ENERGY STATES ALLIANCE, THE EPA CLEAN POWER PLAN AND STATE RPS PROGRAMS 6–10 (2016).

[5] N.C. CLEAN ENERGY TECH. CENTER, *Programs*, DATABASE OF STATE INCENTIVES FOR RENEWABLE ENERGY ("DSIRE"), http://programs.dsireusa.org/system/program?state=VA (apply "Virginia" filter) (last visited Dec. 14, 2015). For examples of energy efficiency policy measures, see the program links for "Charlottesville Gas – Residential Energy Efficiency Rebate Program" and "Energy Efficiency Resource Goal," the latter a state policy measure to set a statewide energy savings goal. *Id.* For examples of renewable energy project investment measures, see the program links for "Commercial Solar Property Tax Exemption" to encourage small commercial solar energy projects through a tax credit, and "Energy Project and Equipment Financing," which gives local governments financial assistance through the Virginia Resources Authority to fund small-scale renewable energy projects. *Id.*

the renewable energy development possible under a mandatory RPS and many lessons for how Virginia can reform its own RPS.

II. RPS DESIGN AND IMPLEMENTATION HISTORY

As stated above, an RPS is a policy requirement that either mandates or recommends that a state achieve a specific percentage or level of renewable power production out of the state's total power production pool by a specified target date.[6] A mandatory RPS may also employ an additional, more aggressive non-binding goal above the mandated production level or percentage to further incentivize renewable power development.[7] RPS policies are normally adopted at the state level through legislation rather than through state administrative regulations.[8] An RPS is normally designed around six criteria discussed in depth below: 1) the mandated level or percentage of renewable energy required from the state's power production pool for compliance and the timeline for compliance; 2) the renewable energy technologies that are eligible to satisfy the RPS targets; 3) the parties in the power production and distribution network who are regulated under and must comply with the RPS; 4) whether renewable energy credits ("RECs") will be utilized as compliance mechanisms; 5) the organizations or government agencies that will administer the RPS in whole or in part; and 6) the penalties that can be levied for non-compliance with the RPS.[9]

A. RPS Target & Compliance Timeline

An RPS requires power producers to generate, or retail power suppliers to procure and deliver, a certain amount of electricity in megawatts ("MW")—or more commonly, a certain percentage of overall power generated or procured—from renewable sources, deemed the RPS "target."[10] Commonly, RPSs feature "tiered" targets, where different

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[6] Sanya Carley & Chris J. Miller, *Regulatory Stringency and Policy Drivers: A Reassessment of Renewable Portfolio Standards*, 40 POL'Y STUD. J. 730, 731 (2012). An RPS can be passed at a local, state/province, or federal level, but this note focuses on U.S. state-level RPSs (the most commonly implemented) unless otherwise stated.

[7] WISER & BARBOSE, *supra* note 1, at 4.

[8] Deborah Behles, *Why California Failed to Meet its RPS Target*, 17 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 163, 166 (2011) (noting that administrative agencies normally implement the RPS once it is passed by the legislature). Some states have developed RPS programs through administrative and regulatory channels, and other states have developed RPS programs through voter-approved ballot initiatives. WISER & BARBOSE, *supra* note 1, at 4.

[9] Robin J. Lunt, Comment, *Recharging U.S. Energy Policy: Advocating for a National Renewable Portfolio Standard*, 25 UCLA J. ENVTL. L. & POL'Y 371, 381–82 (2007).

[10] WISER & BARBOSE, *supra* note 1, at 1–2; *see also* Ivan Gold & Nidhi Thakar, *A Survey of State Renewable Portfolio Standards: Square Pegs for Round Climate Change-Holes?*, 35 WM. & MARY ENVTL. L & POL'Y REV. 183, 192 (2010).

energy technologies and different power generation facility vintages have different levels of energy generation or procurement to achieve, as well as different timelines to come into compliance.[11] RPS targets are normally structured to encourage power producers and providers to compete to produce and procure the most reliable sources of renewable power in the most cost-effective fashion.[12] However, targets or set-asides for differing levels of production can also be used to encourage the development of specific types of renewable energy (e.g., solar and wind over hydropower and landfill gas), rather than the least-cost types of power production.[13] RPS targets tend not to fix a specific sale price for power generators or purchase price for retail power providers regardless of the particular type of renewable power, which allows market forces to drive the development and distribution of the RPS's target level of renewable power to customers at the least-possible cost.[14]

An RPS also sets a compliance date and reporting system, which requires regulated power producers or retail energy providers to report their energy mix, broken down by level or percentage of each type of power source, to show compliance.[15] The renewable power mandates under an RPS typically increase over time, and regulated producers or providers are normally obligated to demonstrate compliance on an annual basis, subject to enforcement mechanisms.[16] RPS targets are set optimally when the increase in renewable energy production as a portion of the state's power portfolio is reasonably achievable, yet unlikely to occur within the RPS timeframe, without the incentive effects of the RPS.[17] To ensure sufficient time for compliance, and to prevent against hasty abandonment of prior investments in more carbon-intensive power production, an RPS normally sets incrementally increasing targets over time, rather than fixing one date and one percentage or level for compliance.[18] This practice helps regulated utilities measure their efforts at compliance over time and gives those utilities more lead-time to get renewable energy projects on-line, such that compliance is achieved with minimized administrative costs.

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11 WISER & BARBOSE, *supra* note 1, at 6.

12 *Id.* at 1, 6.

13 *Id.*

14 LEON, *supra* note 2, at 3.

15 EDWARD HOLT, CLEAN ENERGY STATES ALLIANCE, CESA STATE RPS POLICY REPORT: INCREASING COORDINATION AND UNIFORMITY AMONG STATE RENEWABLE PORTFOLIO STANDARDS 7 (2008).

16 *Id.* at 5, 7; see also Gold & Thakar, *supra* note 10, at 250.

17 Lunt, *supra* note 9, at 381.

18 Maria C. Faconti, *How Texas Overcame California as a Renewable State: A Look at the Texan Renewable Energy Success*, 14 VT. J. ENVTL. L. 411, 416 (2013).

B. Eligible Renewable Energy Production

An RPS also must specify which types of energy production technologies qualify as "renewable energy" or "renewable electricity production" under the RPS.[19] Eligibility criteria vary widely across states, but wind, solar, biomass/biofuels, and hydropower are always eligible technologies, with geothermal eligible in nearly all states.[20] Hydropower's eligibility criteria are the most variable of these technologies, with states differentiating on facility vintage, type, and capacity.[21] Definitions of eligible biomass and biofuel are also varied, with some states providing specific lists of fuel types, and others requiring sustainable cultivation and harvest for biomass to be eligible.[22] State RPS policies frequently include wave and tidal energy, fuel cells, municipal solid waste/landfill gas, and cogeneration facilities as eligible renewable technologies.[23] An RPS may also allow supply- and demand-side energy efficiency programs to be eligible, but this is much less common in the United States.[24] Most states do not currently allow nuclear power facilities to be an eligible renewable technology, even though nuclear power has very low carbon emissions.[25]

RPS eligibility determinations, beyond fuel type, also cover temporal (facility "vintage") and geographic eligibility. Temporal eligibility guidelines determine if facilities that are currently producing or under construction may be used for compliance with RPS mandates, as opposed to solely facilities constructed after the RPS is implemented.[26] An RPS may establish different tiers of compliance for different vintages, commonly setting distinctions between existing facilities, facilities under construction, and facilities built after implementation of the RPS.[27] An RPS may also credit existing facilities that make incremental increases in

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19 Lunt, *supra* note 9, at 382.

20 Gold & Thakar, *supra* note 10, at 193 (noting that geothermal energy is eligible in 30 of 36 states with an RPS); *see also* WISER & BARBOSE, *supra* note 1, at 8. "Solar" energy normally includes both solar PV and solar thermal projects.

21 HOLT, *supra* note 15, at 8.

22 *Id.* at 8–9.

23 Gold & Thakar, *supra* note 10, at 193.

24 WISER & BARBOSE, *supra* note 1, at 11; see also LEON, *supra* note 2, at 40–42.

25 Gold & Thakar, *supra* note 10, at 193, 251 n.181.

26 Lunt, *supra* note 9, at 382. For example, if a state passed a 10 percent mandatory RPS, and had its electricity production made up of five coal plants that supply 98 percent of the state's power, and one solar plant that supplied the remaining 2 percent, depending on whether existing sources can be used to comply with the RPS, the state would either have to add an additional 8 percent (existing sources can be used for compliance) or an additional 10 percent (existing sources cannot be used for compliance) of renewable sources to its electricity portfolio at the expense of the coal plants.

27 HOLT, *supra* note 15, at 9–10.

generation capacity.[28] Finally, an RPS may allow adjustment of temporal compliance by permitting regulated utilities to "bank" current excess renewable generation to use for future compliance or to "borrow" from a future compliance period to meet a shortfall in the current period.[29]

With respect to geographic compliance, an RPS may require all or some amount of the required renewable power generation to occur within the present state.[30] Geographic compliance requirements may be adjusted for renewable power sources that are more generally distributed, such as rooftop solar cells or small-scale wind projects.[31] Also, an RPS may require that eligible power come from facilities located in a state that is interconnected to the same regional transmission operator as the RPS state. This effectively requires that power produced outside a state to be used for RPS compliance must be technically deliverable, through the regional interconnection, into the RPS state's power grid.[32] An RPS may provide for multipliers for intrastate qualifying renewable energy production, such that it receives higher credit towards compliance than out-of-state qualifying energy production.[33]

C. Determination of Regulated Entity Under RPS

An RPS must specify which entities will be regulated and required to comply with the RPS mandates.[34] The RPS may be applied to power producers,[35] who then meet their mandated level or percentage load of renewable power by generating that much power from eligible renewable energy sources.[36] Alternatively, the RPS can require retail suppliers of power to purchase the mandated level or percentage of power from eligible producers of renewable power.[37] Regulating retail power suppliers is more common because it places the onus of compliance on

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[28] *Id.* An example would be if an operational wind farm added more turbines and increased its nameplate capacity.

[29] Gold & Thakar, *supra* note 10, at 194 (citing HOLT, *supra* note 15, at 17). Borrowing from future compliance periods would require a facility to secure excess eligible capacity in the period from which it borrowed.

[30] Gold & Thakar, *supra* note 10, at 193–94; HOLT, *supra* note 15, at 11–13.

[31] HOLT, *supra* note 15, at 10–11.

[32] HOLT, *supra* note 15, at 11–12. For example, this type of requirement would prevent Oregon from being able to satisfy RPS requirements using eligible renewable power produced in New Hampshire, because those two states are not on the same regional interconnection operator, but it would allow New Hampshire-generated eligible renewable power to be used to satisfy RPS requirements in Massachusetts because New Hampshire and Massachusetts are both on the same regional interconnection operator.

[33] Gold & Thakar, *supra* note 10, at 207.

[34] *Id.* at 192; *see also* WISER & BARBOSE, *supra* note 1, at 2.

[35] Lunt, *supra* note 9, at 382.

[36] Gold & Thakar, *supra* note 10, at 192.

[37] WISER & BARBOSE, *supra* note 1, at 2.

parties who have capacity to secure power from a great diversity of sources, encourages the development of new independent renewable power producers, and allows utilities with significant fossil-fuel fired capacity time to diversify their power source mix.[38]

D. REC Trading Mechanisms

An RPS must establish if it will use a renewable energy credit ("REC") trading system as its primary compliance mechanism.[39] The RPS administrator certifies and grants a REC every time a qualifying renewable energy producer generates one megawatt-hour ("MWh") of electricity and transmits it into the grid.[40] A REC is a tangible, durable, and accurate record of a particular energy generator's production of a defined amount of a specific type of renewable electricity.[41] RECs normally are eligible until they are retired from circulation, which occurs when a REC is expressly matched to an identical quantity of electricity consumed by an end-user.[42] An RPS that does not use RECs as the primary compliance mechanism will require significant reporting to show exact levels or percentages of power generated or provided, broken down by source type, and then a calculation of the regulated utility's source mix to show it has complied with its RPS mandate.[43] If the RPS uses RECs, a regulated producer or retail power provider must, in each compliance period, simply secure a sufficient number of RECs to present to the RPS administrator in satisfaction of its applicable RPS mandate.[44]

An RPS can require that RECs remain bundled with the renewable power produced, which has the effect of requiring a retail energy provider to buy sufficient eligible renewable power to allow it to accumulate the requisite number of RECs for compliance.[45] Requiring RECs to remain bundled helps assure intermittent renewable sources have a consistent market for their power, may better promote localized generation of renewable energy, and forecloses risks of market manipulation and short-

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38 *Id.*

39 LEON, *supra* note 2, at 30–35.

40 Gold & Thakar, *supra* note 10, at 218; LEON, *supra* note 2, at 10; Lunt, *supra* note 9, at 383.

41 LEON, *supra* note 2, at 10.

42 *Id.*

43 Gold & Thakar, *supra* note 10, at 221.

44 LEON, *supra* note 2, at 30; Lunt, *supra* note 9, at 382–83.

45 Gold & Thakar, *supra* note 10, at 206 (citing EDWARD A. HOLT & RYAN H. WISER, LAWRENCE BERKELEY NAT'L LAB., LBNL-62574, THE TREATMENT OF RENEWABLE ENERGY CERTIFICATES, EMISSIONS ALLOWANCES, AND GREEN POWER PROGRAMS IN STATE RENEWABLES PORTFOLIO STANDARDS 5 tbl.1 (2007)); HOLT, *supra* note 15, at 15.

term focus that may arise from allowing separate markets for RECs.[46] An RPS may also allow RECs to be "unbundled" and traded separately from their associated renewable power generation, which prevents the need for the retail provider to actually have power delivered along with the REC.[47] Unbundling of RECs creates a second salable product, the REC, outside of the power itself, which could incentivize renewable power production even in the absence of a mandatory RPS.[48] Unbundled RECs are an easier commodity to trade than electricity, may channel power to less restricted pathways and lower transmission costs, and can help avoid problems of load-matching between seller and buyer for retail power.[49] An RPS commonly allows both bundled and unbundled RECs to satisfy an RPS target, though unbundled RECs may be capped at some lesser level or percentage of the full RPS target.[50] Credit multipliers may also be used to magnify the value of RECs from specific renewable energy technologies as an incentive to encourage certain types of renewable energy development.[51] Thus, to generate sufficient RECs to comply with the RPS, a regulated producer or retail provider could: generate electric power from an eligible renewable resource the producer or provider owns or controls and secure the associated RECs; purchase eligible renewable power from another producer and secure the RECs bundled with that power; or generate power by a non-qualifying resource and purchase sufficient unbundled RECs from another eligible producer to meet the statutory mandate.[52]

When an RPS uses RECs as a compliance mechanism and allows trading of unbundled RECs, allowing RECs to be bankable or borrowable can enhance compliance flexibility.[53] Similar to banking power production, bankable RECs can be generated or purchased in excess during the present year and then used for compliance in a later year,

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[46] EDWARD A. HOLT & RYAN H. WISER, LAWRENCE BERKELEY NAT'L LAB., LBNL-62574, THE TREATMENT OF RENEWABLE ENERGY CERTIFICATES, EMISSIONS ALLOWANCES, AND GREEN POWER PROGRAMS IN STATE RENEWABLES PORTFOLIO STANDARDS 3–4 (2007).

[47] Gold & Thakar, *supra* note 10, at 206.

[48] Lunt, *supra* note 9, at 383–84. A small renewable energy producer that might not otherwise break even simply selling its power because of high production costs might be able to make sufficient revenue selling its RECs to fossil-fuel heavy utilities that must comply with an RPS such that it can cover its costs and operate in the black.

[49] HOLT & WISER, *supra* note 46, at 3.

[50] Lunt, *supra* note 9, at 383; HOLT, *supra* note 15, at 11–12. For example, a state may only allow a regulated utility to meet 25 percent of its RPS mandate using unbundled RECs that are not associated with renewable power delivered into the state.

[51] HOLT, *supra* note 15, at 14.

[52] Gold & Thakar, *supra* note 10, at 194; HOLT, *supra* note 15, at 17.

[53] Gold & Thakar, *supra* note 10, at 194; HOLT, *supra* note 15, at 17; LEON, *supra* note 2, at 32–33.

effectively lengthening the "shelf life" of the REC.[54] Borrowing mechanisms allow a regulated producer or retail provider to fall short of the necessary amount of RECs to meet its RPS mandate in the present year, so long as the producer or provider makes up that shortfall by securing extra RECs in subsequent years.[55] REC banking and borrowing mechanisms help smooth fluctuations in REC price from year to year, assist in more seamless implementation of the RPS, and can decrease costs of compliance with the RPS that are ultimately passed through to ratepayers, preventing retail rate spikes.[56]

E. RPS Governance and Administration

An RPS must designate a governing organization or government agency responsible for handling compliance reporting from regulated producers or retail providers, determining compliance with RPS mandates, and levying penalties for non-compliance.[57] An RPS is often implemented by state utility regulatory agencies because of their body of experience with monitoring and regulating electric power providers, but an RPS may also be administered by a standalone, separate agency created specially for the RPS.[58] An RPS may delegate oversight to other bodies, such as municipal power cooperatives[59] or regional interconnection operators,[60] the latter of which is commonly empowered to monitor REC trading.[61] Further, if an RPS uses RECs as a compliance mechanism, the administrator is normally given the authority to define, grant, and collect RECs.[62] RPS administrators should be able to devote considerable attention to monitoring the market and investments in renewable energy production, and also need to have a mechanism to make or recommend changes to the RPS in light of market conditions.[63]

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[54] HOLT, *supra* note 15, at 17 (describing a REC's eligibility through banking and borrowing as "shelf life"). *See also* Gold & Thakar, *supra* note 10, at 194; LEON, *supra* note 2, at 32–34.

[55] Gold & Thakar, *supra* note 10, at 194; HOLT, *supra* note 15, at 17; LEON, *supra* note 2, at 33.

[56] HOLT, *supra* note 15, at 17; LEON, *supra* note 2, at 32–34; Gold & Thakar, *supra* note 10, at 194.

[57] Gold & Thakar, *supra* note 10, at 192.

[58] WISER & BARBOSE, *supra* note 1, at 4.

[59] *Id.* at 35–36.

[60] Gold & Thakar, *supra* note 10, at 196 n.101 (referencing ERCOT, Texas's interconnection operator, and PJM Interconnection, the interconnector for a large part of the eastern US).

[61] An example of this delegated oversight is the REC issuance, tracking, and trading program run by the Western Electricity Coordinating Council's Western Renewable Energy Generation Information System, or "WREGIS." *Western Renewable Energy Generation Information System*, W. ELEC. COORDINATING COUNCIL, http://www.wecc.biz/WREGIS/Pages/Default.aspx (last visited Dec. 14, 2016).

[62] Lunt, *supra* note 9, at 383.

[63] LEON, *supra* note 2, at 9.

F. RPS Enforcement

An effective RPS utilizes a variety of penalty mechanisms to ensure compliance.[64] An RPS may provide for an Alternative Compliance Payment ("ACP"), where a regulated producer or retail provider makes a payment to the RPS administrator to make up for its shortfall in renewable energy production or procurement, such that it is not penalized further for non-compliance.[65] ACP prices are normally defined in advance at fixed levels, which helps regulated producers or providers find a price-out level in the market if renewable energy becomes significantly less cost-effective.[66] An effective RPS also normally provides financial penalties for a regulated producer or retail provider's failure to meet its obligation under the RPS mandate.[67] Penalties may be mandatory or discretionary, and in some circumstances may be recovered from the regulated producer or provider's rates, rather than through the levying of a fixed fine through a judgment or order of the RPS administrator.[68]

Outside of financial penalties, an RPS may provide for the temporary suspension or permanent revocation of a regulated producer or provider's license to sell electricity in the state if the RPS obligation is not met.[69] An RPS may grant the administrator the authority to force regulated producers or providers to invest in a certain level of eligible renewable energy production so that they can meet their RPS obligations in the future.[70] An RPS may also provide waivers from RPS obligations for limited periods of time to a regulated producer or provider, following a petition for waiver and a showing of specific circumstances that hamper compliance.[71] Compliance waivers are most effective when the criteria for application and for issuance are very specific, but commonly, criteria for granting waivers are much more vague.[72] Outside of specific compliance waivers, an RPS may provide general discretionary authority for enforcing compliance to the administrator.[73] Provisions for discretionary enforcement authority may provide specific guidelines concerning when enforcement should be waived or may leave that

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64 WISER & BARBOSE, *supra* note 1, at 2.
65 HOLT, *supra* note 15, at 17–18; WISER & BARBOSE, *supra* note 1, at 23.
66 Gold & Thakar, *supra* note 10, at 195 (citing HOLT, *supra* note 15, at 17–19).
67 *Id.* at 195.
68 *Id.* at 195; WISER & BARBOSE, *supra* note 1, at 24.
69 WISER & BARBOSE, *supra* note 1, at 24.
70 *Id.* at 24.
71 LEON, *supra* note 2, at 34–35; WISER & BARBOSE, *supra* note 1, at 24.
72 LEON, *supra* note 2, at 35.
73 Gold & Thakar, *supra* note 10, at 195; WISER & BARBOSE, *supra* note 1, at 24.

decision to the administrator's discretion with little to no statutory or regulatory oversight.[74]

G. Implementation of RPS Policies in the United States

As noted above, while an RPS fundamentally sets a mandatory or voluntary standard of eligible renewable energy for regulated producers or retail providers to provide to end-users and empowers an administrator with various tools to incentivize and enforce compliance, an RPS can be designed with a wide range of variations.[75] Variety in design has been a hallmark of RPS policies since the first RPS, requiring compliance in 1999, was passed in Iowa in 1983.[76] RPS development remained slow until the late 1990s, and by 2000, an additional eleven states implemented an RPS.[77] By 2008, twenty-five states and Washington, D.C. had implemented an RPS, and in 2007 alone eleven states made a significant modification to their RPS, such as raising their targets.[78] Currently, twenty-nine states, the District of Columbia, and three U.S. territories have adopted a mandatory RPS.[79] Another eight states and one U.S. territory have adopted voluntary, non-binding RPS goals.[80] The federal government has never adopted an RPS covering the whole United States, though many comprehensive energy bills have sought to implement a federal RPS,[81] including the Waxman-Markey bill that passed the House in 2009 but never was considered by the Senate.[82]

The wide development of RPS policies at the state level features an equally broad set of policy goals that undergird RPS policies. Common RPS development goals include reducing reliance on fossil fuel-fired electricity production,[83] creating market carve-outs to grant renewable

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74 WISER & BARBOSE, *supra* note 1, at 24.

75 *See, e.g.*, Gold & Thakar, *supra* note 10, at 192; HOLT, *supra* note 15, at i–ii; LEON, *supra* note 2, at 3; WISER & BARBOSE, *supra* note 1, at 2–4.

76 WISER & BARBOSE, *supra* note 1, at 4, 8.

77 *Id.*

78 *Id.* at 3–4.

79 JOCELYN DURKAY, *State Renewable Portfolio Standards and Goals*, NAT'L CONF. OF STATE LEGISLATURES (July 27, 2016), http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx.

80 *Id.*

81 Gold & Thakar, *supra* note 10, at 188 (discussing, as one example, the Support Renewable Energy Act of 2010, S. 3021, 111th Cong. (2010)).

82 *See* Gold & Thakar, *supra* note 10, at 239 (citing the American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009)).

83 Joshua J. Houser, Note, *Supplying the Light at the End of the Tunnel: Using State-Level Experience to Develop Federal-Level Renewable Energy Policy*, 19 SE. ENVTL. L.J. 153, 154 (2010).

energy a defined share of the retail power market,[84] diversifying the power supply market by encouraging technology development and removing barriers to entry for renewables,[85] correcting power market failures and encouraging sustainable development,[86] preventing excessive policy intrusions to promote renewable power development,[87] promoting environmental benefits through reducing carbon intensity in power generation,[88] and providing an alternative policy tool to direct carbon pricing mechanisms that will still effectively reduce carbon emissions.[89] RPS policies may also result in a number of societal benefits, such as air emissions reductions, health benefits, fuel diversity, electricity price stability, energy security, and economic development.[90] Professor Warren Leon's review of RPS design factors and goals provides a detailed analysis of how an RPS may be designed and implemented to meet a myriad of policy goals.[91] While such policy goals are admirable, they beg questions of whether RPSs are driving more investment in renewable power generation, as well as increases in the share of the electric power market generated by renewable sources, and whether other policy tools may lead to more renewable energy development.[92] A detailed review of this debate requires further empirical study beyond the scope of this Note,

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84 Faconti, *supra* note 18, at 415–16 (citing Kevin S. Golden, Comment, *Senate Bill 1078: The Renewable Portfolio Standard-California Asserts its Renewable Energy Leadership*, 30 ECOLOGY L.Q. 693, 700 (2003)).

85 Jenny Heeter & Lori Bird, *Including Alternative Resources in State Renewable Portfolio Standards: Current Design and Implementation Experience*, 61 J. ENERGY POL'Y 1388, 1389 (2013).

86 Kevin S. Golden, Comment, *Senate Bill 1078: The Renewable Portfolio Standard-California Asserts its Renewable Energy Leadership*, 30 ECOLOGY L.Q. 693, 700 (2003) (citing Nancy A. Rader & Richard B. Norgaard, *Efficiency and Sustainability in Restructured Electricity Markets: The Renewable Portfolio Standard*, 9 ELEC. J. 37, 44 (1996)).

87 Benjamin K. Sovacool & Christopher Cooper, *The Hidden Costs of State Renewable Portfolio Standards (RPS)*, 15 BUFF. ENVTL. L.J. 1, 2 (2007).

88 HOLT & WISER, *supra* note 46, at 12–13.

89 Carley & Miller, *supra* note 6, at 731.

90 JENNY HEETER ET AL., NAT'L RENEWABLE ENERGY LAB., NREL/TP-6A20-61042, A SURVEY OF STATE-LEVEL COST AND BENEFIT ESTIMATES OF RENEWABLE PORTFOLIO STANDARDS 51 (2010); Karlynn S. Cory & Blair G. Swezey, *Renewable Portfolio Standards in the States: Balancing Goals and Rules*, 20 ELEC. J. 21, 31 (2007).

91 LEON, *supra* note 2.

92 William Shobe, an economist at University of Virginia's Frank Batten School of Public Policy, discussed during a presentation the author attended on October 26, 2015, that if a state were to pass a direct pricing mechanism, such as a carbon tax or a cap and trade system that covered the power sector, as well as an RPS, the RPS would become unnecessary. This is because the pricing mechanism would necessarily drive increased development and deployment of renewable energy to an optimal level because of its low or zero carbon emissions, and the RPS would force a certain, different level of renewable energy production that may not otherwise be efficient under the pricing mechanism. However, without a pricing mechanism, an RPS can better serve its purpose to use market forces to incentivize further development and deployment of renewable power capacity and generation.

but I give a brief analysis below before moving to a discussion of Virginia's RPS.

Renewable energy has increased in the United States as more states have implemented RPS policies. From 1998–2007, over 8,900 MW of new, non-hydropower renewable energy capacity has come on-line in states with an RPS, and while most of this capacity (93 percent) has come from wind, other sources of renewable power also saw accelerated growth rates.[93] Two-thirds of all non-hydroelectric renewable capacity additions in the United States since 1998 have occurred in states with RPS policies.[94] This trend has continued, as production and use of biofuels, as well as of non-hydropower renewables, doubled from 2000 to 2014, and by 2014, renewable sources generated approximately 10 percent of U.S. electricity.[95] Further, if full compliance is to be achieved in all states with a mandatory RPS, a significant amount of new renewable power capacity, over 60,000 MW, will be necessary to develop over the next twenty years to reach full compliance.[96] Average incremental costs to comply with RPS mandates have stayed below 2 percent of average retail rates in most states with an RPS, and benefits from RPS-driven increased renewable energy production have ranged from four to twenty-three dollars/MWh for emissions reduction and from twenty-two to thirty dollars/MWh for economic development.[97]

While it appears that renewable power generation is growing as a share of the U.S. power market,[98] commentators maintain that quantifying the contribution of RPSs to this growth presents a difficult empirical question. Some commentators have suggested that renewable power growth, especially that due to RPS policies, is actually slower than the robust growth figures cited by RPS advocates.[99] Also, well-respected RPS advocates acknowledge that most states initially adopting an RPS were

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93 WISER & BARBOSE, *supra* note 1, at 13–15.

94 HEETER ET AL., *supra* note 90, at 1.

95 *Renewable Energy Explained*, ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, http://www.eia.gov/energyexplained/index.cfm?page=renewable_home (last visited Nov. 9, 2015).

96 WISER & BARBOSE, *supra* note 1, at 14; Gold & Thakar, *supra* note 10, at 191.

97 HEETER ET AL., *supra* note 90, at v–viii.

98 *Electricity Generation*, *Annual Energy Outlook 2016*, ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, http://www.eia.gov/forecasts/aeo/section_elecgeneration.cfm (last visited Sep. 22, 2016) [hereinafter EIA, *Annual Energy Outlook 2016*].

99 Sovacool & Cooper, *supra* note 87, at 8 (citing ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2007: WITH PROJECTIONS TO 2030 ii, 82–88 (2007); ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, AEO 2007 OVERVIEW 3–10 (2007)). This 2007 EIA data suggests that of the newly required generating capacity necessary to meet 2030 power demand, only six percent will come from renewables (including hydropower) and RPS policies will only contribute to one percent of new renewable capacity by 2030. This data gives a much more pessimistic outlook than more up to date data from the EIA. *See* EIA, *Annual Energy Outlook 2016*, *supra* note 98.

states with a higher natural capacity for renewable power, indicating the RPS may not be as dominant a causal factor in promoting a fuller and higher growth renewable energy project pipeline.[100] Carley and Miller, reviewing the literature, find some analyses indicating a positive and significant effect of RPS policies on incentivizing renewable energy development, but others finding no significant effect on renewable energy development from an RPS.[101] No clear empirical consensus has been reached concerning the full impact of RPS policies on actual renewable energy development.[102]

Debate also exists on whether RPS policies will lead to economic growth, or will instead hamper growth due to increased energy costs from forcing the use of less cost-competitive renewable power. A series of analyses by Strata Policy suggest that implementation of RPS policies in Michigan, Kansas, North Carolina, and Ohio have led to substantial losses in personal and household income, tens of billions of dollars of declines in overall state income, and tens of thousands of job losses in each state.[103] However, the Strata reports have been criticized as overly simplistic and unrealistic in methodology, as well as for failing to control across economic conditions in other states, both with and without RPS policies.[104] The Strata reports' methodology, which uses an event study framework to analyze the market before and after the passage of an RPS, is very weak because it assumes no outside influences on the economy during an event window of two years before and two years after the passage of the RPS, such that all resulting economic change is being driven by the passage of the RPS policies.[105] With a hugely broad event window, inclusive of the run-up to and aftermath of the 2008 financial crisis, the Strata reports suggest a clear causal relationship between RPS policies and economic decline that in reality could not be less clear because so many other intervening causes within such a broad event window also influenced state economic conditions.

Further empirical analysis is necessary to determine the true macroeconomic impacts of RPS policies and their responsibility for increased renewable energy development in the U.S in the twenty-first

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100 WISER & BARBOSE, *supra* note 1, at 13.

101 Carley & Miller, *supra* note 6, at 734.

102 *Id. See also* Thomas Lyon & Haitao Yin, *Why do States Adopt Renewable Portfolio Standards? An Empirical Investigation*, 31 ENERGY J. 131 (2010).

103 *Renewable Portfolio Standards*, STRATA POLICY (Sept. 27, 2015), http://www.strata.org/rps/.

104 Andy Balaskovitz, *Michigan Researchers Criticize 'Absurd' Out-of-State RPS Study*, MIDWEST ENERGY NEWS (Oct. 29, 2015), http://midwestenergynews.com/2015/10/29/michigan-researchers-criticize-absurd-out-of-state-rps-study/.

105 *Id.*

century. However, RPS policies represent a well-designed policy tool that can be used by states with varying levels of renewable energy development to smoothly ramp up renewable energy production. RPS policies represent a less drastic energy policy device than a carbon pricing mechanism, can be adjusted in stringency to respond to market developments, and can feature a range of compliance mechanisms. States may set RPS administrators and enforcement mechanisms to meet their state agencies' expertise, and can use the RPS to direct development of specific renewable energy technologies. Finally, through the use of RECs for trading and RPS compliance, a mandatory RPS can utilize market forces and principles of cost-effectiveness to reach increased levels of renewable energy capacity, while still maximizing net social welfare. Given the reticence of most states to pass carbon pricing mechanisms, an RPS presents a middle ground between completely deregulated power markets and a price on carbon that still assures a lower carbon future if compliance is achieved. A mandatory RPS can serve as a flexible policy mechanism that Virginia, learning from its own policy experience under a non-binding RPS and the experience of other mandatory RPS states, can utilize to diversify and grow its renewable energy power portfolio mix in a flexible manner.

III. VIRGINIA'S RPS

A. History of the RPS and RPS Design

While many other states implemented RPS policies beginning in the late 1990s, Virginia did not pass its non-binding RPS goal until 2007.[106] Prior to the passage of the RPS, multiple studies were completed regarding the potential impact of an RPS on Virginia's electric power sector. A 2006 study found that without a mandatory RPS, Virginia's electric power sector would be comprised of 87 percent coal-fired power, 9 percent natural gas-fired power, and 4 percent oil-fired power.[107] Additionally, a study was commissioned in 2005 by the Virginia Commission on Electric Utility Restructuring to determine the impacts of increased deployment of renewable energy sources in Virginia.[108] This study found that as of 2005, approximately 1,340 MW of renewable energy capacity (excluding pumped-storage hydropower) was installed in

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[106] WISER & BARBOSE, *supra* note 1, at 4.

[107] Sovacool & Cooper, *supra* note 87, at 23–24 n.71 (citing ALDEN HATHAWAY, ENVTL. RES. TRUST, THE IMPACT OF A RENEWABLE/EE PORTFOLIO STANDARD ON FUTURE RATE HIKES IN VIRGINIA (2006) (on file with Sovacool & Cooper)).

[108] MICHAEL J. KARMIS ET AL., VA. CENTER FOR COAL & ENERGY RES., A STUDY OF INCREASED USE OF RENEWABLE ENERGY RESOURCES IN VIRGINIA (2005).

Virginia, including 750 MW of hydropower, 415 MW of wood or waste-wood fired plants, 140 MW of municipal solid waste burners, 30 MW of landfill gas facilities, and less than one MW each of wind and solar.[109] The study also summarized the near-term potential (installable in five to ten years) and projected total technical generation potential for on-shore and offshore wind, landfill gas, biomass, solar PV, and hydropower.[110] Technologies found to be "generally competitive" in costs with conventional fossil fuel technologies included hydropower, biomass co-firing with coal, wind, and landfill gas technologies.[111] Ultimately, the study found 930 MW of renewable power capacity was developable in the near term and at least 15,000 MW of renewable power capacity was possible overall, though further analysis was recommended on optimal policy structuring to incentivize renewable energy development in the Commonwealth.[112] Though further analysis has been completed showing a path forward for more renewable energy development, lobbying by utilities and a reticence by the General Assembly led to Virginia's adoption of a non-binding form of an RPS and has stymied revisions of RPS goals ever since.[113]

Virginia's non-binding RPS was approved April 4, 2007 and codified as § 56-585.2 of the Virginia Code.[114] Any incumbent investor-owned electric utility can apply to the State Corporation Commission to participate in the RPS program.[115] To participate, the utility must demonstrate it reasonably expects to achieve increasing percentages of its electricity sales from eligible renewable energy sources.[116] Participating

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[109] *Id.* at 16. Virginia's total power generation capacity at the time was 20,200 MW, thus renewables made up 6.63 percent of the Commonwealth's total power generation capacity. *Id.*

[110] Near-term potential breaks down as follows: onshore wind 400 MW; offshore wind 0 MW; landfill gas 30 MW; biomass 300 MW; solar PV 2 MW; and hydropower 200 MW. Total technical generation potential breaks down as follows: onshore wind 910–1,960 MW; offshore wind 1,300–32,000 MW; landfill gas 30 MW; biomass 760 MW; solar PV 11,700–13,000 MW; and hydropower, not applicable. *Id.* at 19.

[111] *Id.* at 20–21. This comparison was based on levelized cost of energy, which includes capital and operations costs, fuel costs, financing, taxes, and incentives. *Id.*

[112] *Id.* at 31–32.

[113] Bill Sizemore, *In Va. Politics, Renewable Energy Dwarfed by Big Utility*, THE VIRGINIAN-PILOT (Mar. 1, 2014), http://pilotonline.com/news/government/politics/virginia/in-va-politics-renewable-energy-dwarfed-by-big-utility/article_d3b2072d-9b31-5f2a-ace9-5e2f16c13f58.html (last visited Sep. 22, 2016).

[114] H.B. 3068, 2007 Va. Acts., Ch. 888 (codified at VA. CODE ANN. § 56-585.2 (2007)).

[115] N.C. CLEAN ENERGY TECH. CENTER, *Program Overview – Virginia Voluntary Renewable Energy Portfolio Standard*, DSIRE, http://programs.dsireusa.org/system/program/detail/2528 (last updated Feb. 8, 2015) [hereinafter *Program Overview – Virginia RPS*].

[116] VA. CODE ANN. § 56-585.2(B) (2015). Percentages of electricity sales are measured pursuant to a "base year" (2007), which is defined as the total electricity sold to Virginia jurisdictional retail customers by the utility in calendar year 2007, minus the average annual amount

utilities are given a series of four escalating goals to meet based on percentages of base year energy sales that constituted eligible renewable energy sources: Goal 1, 4 percent of base year sales by calendar year 2010; Goal 2, averaging 4 percent of base year sales for calendar years 2011–2015 and reaching 7 percent of base year sales by calendar year 2016; Goal 3, averaging 7 percent of base year sales for calendar years 2017–2021 and reaching 12 percent of base year sales by calendar year 2022; and Goal 4, averaging 12 percent of base year sales for calendar years 2023–2024 and reaching 15 percent of base year sales by calendar year 2025.[117]

Qualifying sources of renewable energy include solar, wind, geothermal, hydropower, wave, tidal, and biomass energy.[118] Utilities receive double credit for generation from onshore wind, solar, and facilities fueled primarily by animal waste, and receive triple credit for generation from offshore wind.[119] Eligible renewable energy sources must be generated within the Commonwealth, within the interconnection region of the regional transmission entity of which a participating utility is a member, or within a control area adjacent to the interconnection region of the regional transmission entity of which a participating utility is a member.[120]

The State Corporation Commission administers Virginia's RPS program.[121] Participating utilities must produce an annual report detailing the utility's efforts, if any, to meet the RPS, the utility's overall generation of renewable energy, and any advances in renewable generation technology that may affect meeting the RPS or the utility's ability to generate renewable energy.[122] Participating utilities may recover incremental costs incurred for purposes of participation in the RPS program through their rate base, including costs for the construction of renewable energy generation facilities.[123] Participating utilities may gain an increased rate bonus from achieving each RPS Goal using qualified

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(calculated for calendar years 2004–2006) of electricity supplied by nuclear generating plants under the utility's control. *Id.* § 56-585.2(A).

117 *Id.* § 56-285.2(D).

118 *Program Overview – Virginia RPS*, *supra* note 115. Eligible hydropower excludes sources that are solely pumped storage, but includes sources that are combined pumped storage and run-of-river power stations. *Id.*

119 VA. CODE ANN. § 56-285.2(C); WISER & BARBOSE, *supra* note 1, at 37.

120 VA. CODE ANN. § 56-285.2(A).

121 *Program Overview – Virginia RPS*, *supra* note 115.

122 VA. CODE ANN. § 56-285.2(H). The utility must specifically identify a list of all states where purchased or owned renewable energy is generated, a list of the decades in which purchased or owned renewable energy generating units were placed into service, and a list of fuel types used to generate the purchased or owned renewable energy, all broken down by number of MWhs or RECs. *Id.*

123 *Id.* § 56-285.2(E); *see also* WISER & BARBOSE, supra note 1, at 37.

renewable energy generation facilities approved before January 1, 2013, as well as from offshore wind and nuclear power facilities approved after July 1, 2013.[124]

Virginia's RPS provides a number of alternative compliance mechanisms. Participating utilities may meet up to 20 percent of any RPS goal through certificated research and development activity expenses related to renewable energy and alternative energy sources.[125] Participating utilities may also use RECs to meet up to 20 percent of any of the RPS goals in a given year.[126] RECs may be issued by the regional transmission entity of which a participating utility is a member[127] or by the State Corporation Commission, but only upon validation of the utility's making a "qualified investment."[128] RECs issued by a regional transmission entity do not have to be bundled with power provided to the Commonwealth.[129] Participating utilities may bank qualifying renewable energy sales or RECs acquired in excess of a particular year's RPS goal to apply to future RPS goals in the next five calendar years.[130] Any RECs acquired by a participating utility prior to January 1, 2014 may be applied to any future RPS goal,[131] and any RECs acquired after January 1, 2014 expire in five years unless they are used for compliance with an RPS goal.[132]

As Virginia's RPS is a non-binding goal, there are no penalties for failure to comply, but all annual reports by participating utilities are posted on the State Corporation Commission's website and available in full to the public for review.[133] Dominion Virginia Power and Appalachian Power elected to participate in 2009 and have complied with

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124 *Program Overview – Virginia RPS*, *supra* note 115; WISER & BARBOSE, *supra* note 1, at 37.

125 VA. CODE ANN. § 56-285.2(D).

126 *Id.*

127 *Id.* § 56-285.2(A). Such RECs must validate the generation of renewable energy by eligible sources in the interconnection region of the regional transmission entity. *Id.*

128 *Id.* § 56-285.2(J). Qualified investments are expenses connected to research and development activities concerning renewable or alternative energy sources which: i) enhance the utility's understanding of emerging energy technologies and their potential impact on the utility and its customers; ii) promote economic development within the Commonwealth; iii) supplement customer-driven alternative energy or energy efficiency initiatives; iv) supplement alternative energy and energy efficiency initiatives at state or local government facilities in the Commonwealth; or v) mitigate the environmental impacts of renewable energy projects. *Id.* § 56-285.2(A).

129 *Id.* § 56-285.2(A). The eligible renewable energy must be delivered into the entity's interconnection system. *Id.*

130 *Id.* § 56-285.2(D).

131 *Id.*

132 *Program Overview – Virginia RPS*, *supra* note 115.

133 *Id.*

reporting requirements through 2016.[134] No other utilities have elected to participate in the RPS program.[135]

B. Virginia's RPS Successes and Shortcomings

As a stand-alone policy instrument, Virginia's RPS has succeeded by getting large utilities—Dominion Virginia Power and Appalachian Power—to participate by providing them with a bevy of incentives to meet the RPS goals outlined in section 56-285.2(D).[136] Virginia's RPS also allows the use of RECs for partial RPS compliance and allows unbundled RECs to be traded, which creates a flexible compliance mechanism that can be built out as renewable energy policy evolves.[137] Virginia's RPS also incentivizes investment in renewable energy research, provides a broad scope of eligible renewable energy sources, and provides credit multipliers to help promote wind and solar sources with significant untapped potential for development in the Commonwealth.[138]

In spite of these successes, Virginia's non-binding RPS—which lacks enforcement mechanisms for non-compliance beyond mere public notification—leaves significant potential to be a driver of further renewable energy development within the Commonwealth untapped. Virginia lawmakers can draw upon a large body of RPS policies throughout the United States to learn from and further improve Virginia's own RPS. In particular, Virginia can learn from California, which has found success in adjusting its RPS continuously over time to adjust to market conditions, and from Texas, where a clear enforcement framework and broad REC trading have been used to drive even greater renewable energy development than in California.

IV. CALIFORNIA'S RPS

A. California's RPS History and RPS Design

California has a long history of promoting renewable energy. California implemented a 1991 mandate to determine a future portion of the state's energy portfolio to be generated from renewable sources.[139] California created a Renewable Energy Fund in 1996 to subsidize

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134 *Renewable Energy Portfolio Standards*, STATE CORP. COMM'N, COMMONWEALTH OF VIRGINIA, https://scc.virginia.gov/SCC-INTERNET/pur/renew.aspx (last visited Dec. 3, 2016).

135 *Id.*

136 *Id.*

137 VA. CODE ANN. §§ 56-285.2(A), (D).

138 *Id.* § 56-285.2(D).

139 Golden, *supra* note 86, at 697 (citing CAL. PUB. UTIL. CODE § 701.3 (Deering 2003)).

renewable energy producers and purchasers.[140] In 2001, California first attempted to pass an RPS in S.B. 532, which failed in committee on the last week of the legislative session after passing the state senate.[141] An RPS bill, S.B. 1078, was revived in the next session, passed by a large margin, and was signed into law September 12, 2002.[142]

S.B. 1078 required 20 percent of energy from investor-owned utilities and other "retail sellers" of electricity in California to come from renewable resources by 2017.[143] Regulated utilities and retail sellers who were not sufficiently creditworthy were exempt from the RPS.[144] S.B. 1078 made some significant concessions compared to earlier S.B. 532, including slowing the timeframe for compliance and replacing a large mandatory monetary penalty for non-compliance with a discretionary contempt penalty.[145] In spite of these limitations, the RPS administrators, the California Energy Resources Conservation and Development Commission ("California Energy Commission" or "CEC") and the California Public Utilities Commission ("CPUC") commenced proceedings to implement the RPS in March 2003[146] and issued a final implementation order in June 2003.[147]

Since its passage, California's RPS has been accelerated and strengthened multiple times. First, in 2006, the timeframe for completing compliance was bumped up to 2010 (previously, compliance had to be achieved by 2017), and utilities were required to increase procurement from renewable energy resources by 1 percent of annual retail sales until

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140 *Id.* at 697–98 (citing CAL. PUB. UTIL. CODE § 381(c)(3)–(d) (Deering 2003)).

141 *Id.* at 703 (citing S.B. 532, 2001 Sen., Reg. Sess. (Cal. 2001)).

142 *Id.* at 703 (citing S.B. 1078, 2001 Sen., Reg. Sess. (Cal. 2002)). S.B. 1078 added §§ 387, 390.1, and 399.25 to Chapter 2.3 of Part 1 of Division 1 of the California Public Utilities Code. It also added Article 16 to Chapter 2.3 of Part 1 of Division 1 of the Public Utilities Code, and it is this Article 16 that forms the meat of California's RPS. *See* CAL. PUB. UTIL. CODE § 399.11 *et seq.* (West 2015).

143 Behles, *supra* note 8, at 167; Golden, *supra* note 86, at 703. *See* S.B. 1087, 2001 Sen., Reg. Sess., § 3 (Cal. 2002) (codified primarily in CAL. PUB. UTIL. CODE § 399.11(a) (West 2002)).

144 Golden, *supra* note 86, at 705 (citing CAL. PUB. UTIL. CODE § 399.15(b)(4) (Deering 2003)).

145 *Id.* at 704. Golden notes that the S.B. 532 penalty for "at least twice" compliance cost is similar to the non-compliance penalty in Texas's RPS. Golden, *supra* note 86, at 704 n.69 (citing S.B. 532, 2001 Sen., Reg. Sess., § 1 (Cal. 2001)).

146 James W. Moeller, *Of Credits and Quotas: Federal Tax Incentives for Renewable Resources, State Renewable Portfolio Standards, and the Evolution of Proposals for a Federal Renewable Portfolio Standard*, 15 FORDHAM ENVTL. L. REV. 69, 100 n.165 (2004) (citing Implementation of Renewable Portfolio Standard Legislation, Docket No. 03-RPS-1078 (Cal. Renewables Comm'n Mar. 13, 2003) (order and guidelines)).

147 Moeller, *supra* note 146, at 100 n.170 (citing Order Initiating Implementation of the Senate Bill 1078: Renewable Portfolio Standard Program, Decision No. 03-06-071 (Cal. Pub. Util. Comm'n June 19, 2003)).

they reached 20 percent by 2010.[148] Second, Governor Schwarzenegger strengthened the RPS mandates by executive order in 2008, requiring all retail sellers to provide 33 percent of their electricity from renewable energy by 2020.[149] While this requirement would only last for Governor Schwarzenegger's term, he ordered the increases implemented by regulatory action in 2009[150] and pushed for legislation signed April 12, 2011 which codified the 33 percent of retail sales by 2020 mandate into the RPS.[151] Third, the RPS was recently strengthened again by the passage of S.B. 350 in October 2015, which required regulated utilities and retail sellers, but not Publicly Owned Municipal Utilities ("POUs," who must set similar procurement requirements) to provide 50 percent of retail power sales from renewable energy by 2030.[152] Interim targets, similar to the tiered targets in Virginia's RPS, have been set to achieve compliance with the new 50 percent mandate.[153] CPUC must set final procurement targets for regulated utilities and retail sellers, and has authority to set the final targets in excess of the interim targets to incentivize compliance.[154]

California's RPS is dually administered by two state agencies, CEC and CPUC. CEC's roles include: certifying eligible renewable energy sources under the RPS; designing and implementing a tracking and verification system to count renewable energy output for RPS compliance; specifying enforcement procedures for POUs; certifying and monitoring compliance by POUs in procurement of eligible renewable energy; and referring compliance failures of POUs to the California Air Resources Board ("CARB") for imposition of penalties.[155] Conversely,

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148 Behles, *supra* note 8, at 167 (citing S.B. 107, 2005–06 Leg., Reg. Sess. (Cal. 2006) (codified primarily in CAL. PUB. UTIL. CODE § 399.11 *et seq.* (West 2010)).

149 Behles, *supra* note 8, at 168 (citing Cal. Exec. Order S-14-08 (Nov. 17, 2008), *available at* http://gov.ca.gov/executive-order/11072 (last visited Dec. 14, 2015)).

150 Cal. Exec. Order S-21-09 (Sept. 15, 2009). *See also* Press Release, Gov. Schwarzenegger Signs Executive Order to Advance State's Renewable Energy Portfolio Standard to 33 Percent by 2020 (Sept. 15, 2009), http://www.gov.ca.gov/news.php?id=13282.

151 Faconti, *supra* note 18, at 417 (citing S.B. X1-2, 2011–12 Leg., Reg. Sess. (Cal. 2011)). S.B. X1-2 was codified across various sections of California's statutory codes, primarily in CAL. PUB. RES. CODE § 25740 *et seq.* (West 2011) and CAL. PUB. UTIL. CODE § 399.11 *et seq.* (West 2011).

152 S.B. 350, 2015–16 Leg., Reg. Sess., § 17 (Cal. 2015) (codified primarily in CAL. PUB. UTIL. CODE § 399.11 *et seq.* (West 2015)).

153 S.B. 350, 2015–16 Leg., Reg. Sess., § 20 (Cal. 2015) (codified at CAL. PUB. UTIL. CODE § 399.15(b)(1) (West 2015)). Each target is to be met by December 31 of the year provided. The interim targets are as follows: 2013 – 20% of retail sales; 2016 – 25% of retail sales; 2020 – 33% of retail sales; 2024 – 40% of retail sales; 2027 – 45% of retail sales; and 2030 – 50% of retail sales. *Id.*

154 A.B. 327, 2013–14 Leg., Reg. Sess., § 2 (Cal. 2013) (codified at CAL. PUB. UTIL. CODE § 399.15(b)(3) (West 2013)).

155 N.C. CLEAN ENERGY TECH. CENTER, *Program Overview – California Renewables Portfolio Standard*, DSIRE, http://programs.dsireusa.org/system/program/detail/840 (last updated Oct. 7, 2015) [hereinafter *Program Overview – California RPS*].

CPUC's roles include: determining procurement targets for regulated utilities and retail sellers; reviewing and enforcing regulated utilities' contracts to purchase eligible renewable energy; calculating and administering applicable cost caps on renewable energy procurement; establishing standard contract terms and conditions for regulated utilities to procure eligible renewable energy; implementing compliance rules for procurement quantity requirements; and reviewing the procurement plans and processes regulated utilities use to select least-cost bidders to provide the regulated utilities with eligible renewable energy.[156]

Eligible renewable energy technologies include: biodiesel; certain biomass resources; fuel cells using renewable fuels; geothermal and ocean thermal; certain hydroelectric projects; landfill gas; municipal solid waste conversion; solar PV and solar thermal electric; tidal; wave; and wind.[157] Biomethane was eligible until it was suspended by the CEC in March 2012,[158] but biomethane contracts signed prior to March 29, 2012 remain eligible if they meet certain requirements.[159] Regulated utilities may use a combination of long-term (minimum ten-year term length) and short-term contracts (term less than ten years) for procurement of renewable energy and RECs,[160] but beginning January 1, 2021, at least 65 percent of a regulated utility's procurement of eligible renewable energy must come from contracts of ten years or greater duration.[161]

California allows unbundled RECs to be used for partial compliance with RPS mandates and has ceded authority to issue and monitor RECs to the Western Renewable Energy Generation Information System ("WREGIS"), operated through its regional interconnection operator.[162] RECs must be generated within the WREGIS system, which includes fourteen U.S. states and two Canadian provinces that are members of the Western Electricity Coordinating Council.[163] Use of tradable, unbundled RECs for compliance with a regulated utility's RPS mandate is capped at 25 percent of the RPS mandate for compliance years 2010–2013,[164] which

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156 *Id.*

157 CAL. ENERGY COMM'N, CEC-33-2015-001-ED8-CMF, RENEWABLES PORTFOLIO STANDARD ELIGIBILITY: COMMISSION GUIDEBOOK 5 (8th ed. June 2015).

158 Suspension of RPS Eligibility Guidelines Related to Biomethane, Decision No. 12-0328-2, Docket Nos. 11-RPS-01, 02-REN-1038 (Cal. Energy Comm'n Apr. 5, 2012).

159 A.B. 2196, 2011-12 Leg., Reg. Sess., § 2 (Cal. 2012) (codified at CAL. PUB. UTIL. CODE §§ 399.12.6(a)(1), (b) (West 2013)).

160 CAL. PUB. UTIL. CODE § 399.13(b) (West 2015).

161 *Program Overview – California RPS*, *supra* note 155 (citing CAL. PUB. UTIL. CODE § 399.16(c)(1) (West 2015)).

162 *See supra* note 61 and accompanying text.

163 *See supra* note 61 and accompanying text. The included Canadian provinces are British Columbia and Alberta.

164 Decision Resolving Petitions for Modification of Decision 10-03-021 Authorizing Use of Renewable Energy Credits for Compliance with the California Renewables Portfolio Standard and

lowers to 10 percent of the RPS mandate by compliance year 2017.[165] Regulated utilities may bank excess procurement for three years and may borrow from excess procurement in three subsequent years to cure a year of inadequate procurement.[166]

CPUC has authority to impose penalties on regulated utilities for non-compliance with their RPS procurement requirements.[167] However, CPUC may also waive enforcement of procurement requirements for inadequate transmission capacity, delays from permitting and interconnection, and insufficient supply of eligible renewable energy projects.[168] S.B. 350 further authorizes waiver of enforcement for unanticipated curtailments of renewable energy resources and for unanticipated increases in retail sales due to large-scale transportation electrification.[169] Enforcement history has been varied under the RPS.

B. California's RPS Successes

California's RPS has experienced a number of successes. The continued increases in stringency of the RPS mandates suggest sustained political momentum behind the state government's commitment to renewable energy development.[170] The RPS has also led to an expansion of reserve capacity natural gas plants to back up renewable resources when they cannot produce power, promoting reliable supplies of power.[171] The requirement for regulated utilities to sign a majority of procurement contracts of renewable energy for the long-term[172] and the ability for regulated utilities to recover capital expenditures for new energy projects in their rates have both led to further build-out of renewable energy capacity.[173]

Lifting Stay and Moratorium Imposed by Decision 10-05-018, Decision No. 06-02-12 (Cal. Pub. Util. Comm'n Jan. 13, 2011).

165 S.B. X1-2, 2011-12 Leg., Reg. Sess., § 22 (Cal. 2011) (codified at CAL. PUB. UTIL. CODE § 399.16(c)(2) (West 2011)).

166 Behles, *supra* note 8, at 176 (citing CAL. PUB. UTIL. CODE § 399.14(a)(2)(C) (West 2010)).

167 CAL. PUB. UTIL. CODE § 399.13(e) (West 2015); CAL. PUB. UTIL. CODE § 399.15(b)(8) (West 2015).

168 CAL. PUB. UTIL. CODE § 399.15(b)(5) (West 2015).

169 S.B. 350, 2015–16 Leg., Reg. Sess., § 20 (Cal. 2015) (codified at CAL. PUB. UTIL. CODE §§ 399.15(b)(5)(C)–(D) (West 2015)).

170 Behles, *supra* note 8, at 167–68.

171 *Id.* at 178–79. However, this capacity has become so large that it may crowd out future renewable energy deployment. *See also infra* Section IV.C.

172 WISER & BARBOSE, *supra* note 1, at 28.

173 Behles, *supra* note 8, at 179–80. However, if the levelized cost of natural gas remains well below renewable energy sources, rate recovery may create a cross-cutting incentive to build excessive reserve capacity and make it more challenging to add further renewable energy sources to the grid. *Id.*

Renewable energy capacity has also grown every year over the course of California's RPS.[174] From 2002–2007, regulated utilities signed contracts to procure over 7,000 MW of renewable power from new or repowered renewable sources, in a source mix that was more diverse than prior state and national trends in renewable energy development.[175] Recent studies of regulated utilities' energy portfolios show strong resource diversity to comply with the RPS, including a mix of 35 percent geothermal, 34 percent wind, and 12 percent biomass, among other sources.[176] Wind energy, the highest initial growth renewable energy source,[177] and solar energy have experienced significant growth under the RPS program, as their combined share of total in-state power generation has grown from 2.4 percent in 2002 to 11.7 percent in 2014,[178] in spite of slowing wind capacity installation after 2008.[179] Renewable energy growth rates, due to a continued emphasis on on-shore wind and solar PV deployment, reached 19.6 percent in 2013, just below the 20 percent interim targets, and are projected to continue rising as renewable incentive programs expand.[180]

Consumer energy costs have increased over the course of the RPS program and are projected to continue increasing, but the current estimated cost penalty of 8 percent for RPS compliance has not exceeded projections and appears to be "politically acceptable" to the legislature and the population at large.[181] Compliance mechanisms have been described as "flexible" and allowing for adjustment in times of extenuating circumstances.[182] Finally, creditworthiness exemptions from RPS mandates have helped new generating sources get their credit in order before being forced to sign long-term power procurement contracts, which ensure price security and reliable delivery of power.[183]

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174 Houser, *supra* note 83, at 166.

175 WISER & BARBOSE, *supra* note 1, at 14.

176 HEETER ET AL., *supra* note 90, at 79.

177 Houser, *supra* note 83, at 165.

178 Michael R.W. Walmsley et al., *Achieving 33% Renewable Electricity Generation by 2020 in California*, 92 ENERGY J. 260, 263 (2015) (citing CHRIS KAVALEC ET AL., ELEC. SUPPLY ANALYSIS DIV., CAL. ENERGY COMM'N, CALIFORNIA ENERGY DEMAND 2014-2024 REVISED FORECAST: STATEWIDE ELECTRICITY DEMAND, END-USER NATURAL GAS DEMAND, AND ENERGY EFFICIENCY (2013)).

179 Brent Stahl et al., *Wind Energy Laws and Incentives: A Survey of Selected State Rules*, 49 WASHBURN L.J. 99, 100 (2009).

180 Walmsley et al., *supra* note 178, at 267.

181 *Id.* at 268 (citing ANNE GILLETTE & JACLYN MARKS, CAL. PUB. UTIL. COMM'N, 33% RENEWABLES PORTFOLIO STANDARD IMPLEMENTATION ANALYSIS PRELIMINARY RESULTS (2009)).

182 Houser, *supra* note 83, at 164.

183 WISER & BARBOSE, *supra* note 1, at 28.

C. California's RPS Shortcomings

Still, California's RPS has had a number of shortcomings. Virginia would be wise to learn from a number of them. Notably, California failed to meet its 20 percent RPS goal by 2010.[184] California also achieved much of its growth in renewable energy procurement using short-term contracts with out-of-state resources, rather than the long-term contracts with in-state resources that policy-makers desired.[185] Commentators highlight three other key areas where California's RPS has struggled: 1) a lack of a central administrator and unclear lines of authority between several administrative agencies; 2) a lack of a strong enforcement mechanism; and 3) an overreliance on utilities to provide information about RPS compliance, which has resulted in an excessive increase in reserve capacity that may hamstring renewable energy development moving forward.[186]

As noted above, multiple agencies are involved in administering California's RPS program, including CEC, CPUC, and CARB, and their authority overlaps in numerous ways.[187] Commentators recount multiple instances over of the course of the RPS program where different administrator agencies published inconsistent reports, recommendations, and opinions, which left utilities unclear on which authority to follow.[188] Also, utilities must secure numerous and overlapping permits from the various administrator agencies before they can generate or procure renewable energy. This requirement leads to application backlogs and project delays, provides chances for permit preemption, and creates opportunities for intervening opposition groups to challenge projects.[189] These factors increase transaction costs and administrative delays over all stages of the development of a renewable energy project, naturally incentivizing against further renewable energy build-out.[190] While the administrator agencies have signed numerous memoranda of understanding to coordinate and work together to increase uniformity in decision-making, delay, inconsistency, and uncertainty will continue to

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184 Behles, *supra* note 8, at 164, 170.

185 *Id.* at 170 (citing CAL. INDEP. SYS. OPERATOR, INTEGRATION OF RENEWABLE RESOURCES, OPERATIONAL REQUIREMENTS AND GENERATION FLEET CAPABILITY AT 20% RPS 3 (Aug. 2010)). Stahl, Chavarria, & Nydegger report that over half of projected new contracts for renewable energy to comply with RPS mandates will come from out-of-state projects. Stahl et al., *supra* note 179, at 102.

186 Behles, *supra* note 8, at 165. *See also* Faconti, *supra* note 18, at 426 (citing Behles, *supra* note 8, with approval and expanding upon Behles's analysis).

187 Faconti, *supra* note 18, at 427; Golden, *supra* note 86, at 712.

188 Behles, *supra* note 8, at 173–75.

189 Faconti, *supra* note 18, at 427–28. *See also* Houser, *supra* note 83, at 166.

190 Faconti, *supra* note 18, at 427–28.

be hallmarks of the RPS's administration until significant reform is made to the core design of the RPS program.[191]

Second, a lack of a mandatory penalty mechanism has been a concern since S.B. 1078's passage, as discretionary penalties were viewed as creating a ready opportunity for regulated utilities to delay procurement compliance and use litigation to defend against enforcement action.[192] CPUC has been highly resistant to impose penalties for non-compliance, and the lack of penalties, combined with the flexibility granted through California's many compliance measures, has resulted in most regulated utilities and retail sellers falling short of their RPS mandates.[193] Additionally, regulated utilities may avoid penalty payments by demonstrating "good faith efforts" towards compliance, among other expansive waiver conditions.[194] A further concern is the ability to partially comply with RPS mandates through signing contracts to procure renewable energy to escape penalties.[195] Regulated utilities are able to contract for nonviable, speculative projects at below-market cost, comply with the RPS, and at the same time prevent other, viable renewable energy projects from coming online which cannot compete at those cost margins.[196] Lastly, where compliance penalties can be levied, they are to be calculated on a case-by-case basis, which undercuts any certainty as to penalty size, promotes further administrative delay, and prevents non-complying utilities and retail sellers from feeling effective enforcement that may be necessary to force compliance.[197]

However, the problems associated with discretionary penalties may be a vestige of the past under the 2015 RPS revisions. S.B. 350 significantly reformed the penalty structure for non-compliance and requires CPUC to levy a pre-determined list of penalties on regulated utilities for non-compliance with the RPS.[198] It remains to be seen how this significant

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191 Behles, *supra* note 8, at 174–75.

192 Golden, *supra* note 86, at 711.

193 Behles, *supra* note 8, at 176–78. As of 2010, CPUC had never levied a penalty for non-compliance. *Id.*

194 *See supra* notes 168–69 and accompanying text; *see also* Faconti, *supra* note 18, at 430–31.

195 However, contracts do not have to assure that the associated renewable project is ever completed or comes online during the compliance period. *See, e.g.*, Jesse Broehl, *California Utilities Hide Behind Solar Smokescreen: Legal Loophole Allows Penalties to be Avoided for Failing to Bring Wind Power Online*, WIND POWER MONTHLY (April 1, 2009), *available at* http://www.windpowermonthly.com/article/958579/california-utilities-hide-behind-solar-smokescreen—legal-loophole-allows- penalties-avoided-failing-bring-wind-power-online.

196 Faconti, *supra* note 18, at 429–30.

197 *Id.* at 430; Stahl et al., *supra* note 179, at 102.

198 S.B. 350, 2015–16 Leg., Reg. Sess., § 20 (Cal. 2015) (codified at CAL. PUB. UTIL. CODE §§ 399.15(b)(8) (West 2015)). The statute reads:

If a retail seller fails to procure sufficient eligible renewable energy resources to comply with a procurement requirement . . . and fails to obtain an order from the commission waiving

change in enforcement will play out in California, but non-compliance, in theory, should significantly drop off moving forward with the implementation of a penalty system that pre-determines penalties and leaves less room for discretionary compliance enforcement.

Third, California has suffered from an excessive build-out of natural gas reserve capacity, as well as a proliferation of proposed renewable energy projects that are unlikely to be built, due to a reliance on utilities to provide the administrator agencies with compliance information for implementing the RPS.[199] While reserve capacity is necessary to support renewables, reserve capacity in California has grown to the point where it is crowding out development of new renewable energy projects; the administrator agencies have not been able to slow reserve capacity growth.[200] The administrator agencies have also been hamstrung by their inability to obtain accurate information as to transmission capacity from regulated utilities, preventing the development of new renewable energy projects and causing projects to fail when they are located in remote areas with inadequate transmission capacity.[201] While the implementation of stricter contracting terms to require that sufficient transmission capacity be in place for all procurement contracts may be used to close the information gap and to promote more viable projects, the RPS administrator agencies have not yet tightened contracting terms and requirements.[202] Information problems have also made regulators slower to recommend smaller, distributed generation projects that have fewer transmission challenges compared to larger projects and are more likely to succeed due to lower capital expenditure requirements.[203]

While these problems have limited California's success in its own RPS compliance, Virginia can learn from both the California RPS's design benefits and design failures to help it set up a broad, ambitious RPS for incentivizing renewable energy development. Virginia can also learn a number of lessons from Texas, which has taken a different approach to RPS design from California and has achieved greater success rates in RPS compliance.

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enforcement . . . the commission shall assess penalties for noncompliance. A schedule of penalties shall be adopted by the commission that shall be comparable for electrical corporations and other retail sellers. *Id.*

199 Behles, *supra* note 8, at 178–80.

200 *Id.* at 169, 179.

201 Faconti, *supra* note 18, at 431; Behles, *supra* note 8, at 185–87.

202 Behles, *supra* note 8, at 181–82.

203 *Id.* at 185–86.

V. TEXAS'S RPS

A. Texas's RPS History and RPS Design

Texas's RPS, S.B. 7, was passed in 1999, prior to California's RPS.[204] Texas's RPS sets a state goal for a capacity contribution, designated by a level of megawatt capacity in the grid that must be provided by renewable energy sources.[205] This goal required an installation of 2,000 MW of new renewable capacity by 2009, while preserving the 880 MW of renewable energy that was already connected to the grid as of 1999.[206] Texas's RPS set intermediate capacity goals for newly added renewable capacity of 400 MW by 2003, 850 MW by 2005, and 1,400 MW by 2007 on the pathway to achieving the 2009 goal.[207]

In 2005, following high levels of citizen support for increased renewable energy production,[208] S.B. 20 updated Texas's RPS.[209] S.B. 20 increased the capacity contribution goals to 5,880 MW by 2015, with an ultimate goal of 10,000 MW of new renewable capacity by 2025,[210] and also requires incrementally higher goals every two years after 2005.[211] While the RPS is expressed as a goal of production of a fixed amount of renewable energy into the state's grid, Texas's RPS still requires all

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[204] Kathryn B. Daniel, Comment, *Winds of Change: Competitive Renewable Energy Zones and the Emerging Regulatory of Texas Wind Energy*, 42 TEX. TECH L. REV. 157, 161–62 (2009) (citing Act of May 27, 1999, 76th Leg., R.S., ch. 405, §39, 1999 Tex. Gen. Laws 2558, 2598). In this act, the Texas legislature recommended achieving the RPS as a state goal, and ordered the Public Utility Commission of Texas to implement the RPS with regulatory action, codified later in 16 TEX. ADMIN. CODE § 25.173 (1999). Act of May 27, 1999, 76th Leg., R.S., ch. 405, 1999 Tex. Gen. Laws 2558 *et seq.* (codified at TEX. UTIL. CODE. ANN. § 39.904 (West 1999)).

[205] Faconti, *supra* note 18, at 419 (citing Stahl et al., *supra* note 169, at 138).

[206] RYAN H. WISER & OLE LANGNISS, LAWRENCE BERKELEY NAT'L LAB., LBNL-49107, THE RENEWABLES PORTFOLIO STANDARD IN TEXAS: AN EARLY ASSESSMENT 8 (2001). Wiser & Langniss note that 2,880 MW represents about three percent of Texas's 1998 level electricity consumption. *Id.*

[207] *Id. See also* Act of May 27, 1999, 76th Leg., R.S., ch. 405, §39, 1999 Tex. Gen. Laws 2558, 2598 (codified at TEX. UTIL. CODE ANN. § 39.904(a) (West 1999)).

[208] Houser, *supra* note 83, at 167.

[209] Daniel, *supra* note 204, at 162 (citing Act of July 20, 2005, 79th Leg., 1st C.S., ch. 1, §3, 2005 Tex. Gen. Laws 1 (codified at TEX. UTIL. CODE ANN. § 39.904(a) (West 2005))).

[210] Faconti, *supra* note 18, at 419; TEX. UTIL. CODE ANN. § 39.904(a) (West 2005).

[211] Lunt, *supra* note 9, at 387 (citing TEX. UTIL. CODE ANN. § 39.904(a) (West 2007)). Incremental goals are for cumulative new renewable energy capacity and must be met by January 1 of the year listed: 2007 – 2,280 MW; 2009 – 3,272 MW; 2011 – 4,264 MW; 2013 – 5, 256 MW; 2015 – 5,880 MW. *See* N.C. CLEAN ENERGY TECH. CENTER, *Program Overview – Texas Renewable Generation Requirement*, DSIRE, http://programs.dsireusa.org/system/program/detail/182 (last updated Feb. 4, 2015)*; see also* Order Adopting Amendment to § 25.173 as Approved at the December 4, 2008 Open Meeting (Pub. Util. Comm'n of Tex. Dec. 4, 2008) (same).

individual retail energy providers to obtain a percentage of their electricity from renewable sources, like most other RPSs.[212]

To qualify under the Texas RPS, a renewable energy facility must be installed to the grid after September 1999.[213] Qualifying renewable energy sources include: solar PV and solar thermal electric; wind; geothermal and ocean thermal; biomass; hydroelectric; landfill gas; tidal; and wave.[214] Texas, unlike California, allows voluntary purchases by consumers that request renewable energy to count for satisfying the RPS mandates.[215] Texas's RPS also sets a voluntary target for the state to achieve 500 MW of renewable capacity from non-wind resources by 2015,[216] as the state has primarily achieved its renewable energy capacity through wind resources that are much more cost-effective throughout the state than solar and biomass, its next two most economical renewable resources.[217] Further, the RPS authorizes the designation of Competitive Renewable Energy Zones ("CREZs"),[218] areas where "renewable energy resources and suitable land areas are sufficient to develop generating capacity from renewable energy technologies."[219] CREZs are designated to help build-out transmission infrastructure in areas where particularly high development potential for wind energy generation exists, but is held up because of the absence of transmission infrastructure.[220] This is achieved by allowing expedited approval processes for utilities to recoup the costs of constructing further transmission infrastructure in the CREZ if they plan to develop renewable energy in the CREZ.[221]

Texas's RPS is administered by the Public Utility Commission of Texas ("PUCT"), which has authority to set rules and regulations governing the RPS, monitor RPS compliance, and establish a REC

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212 Lunt, *supra* note 9, at 387 (citing WISER & LANGNISS, *supra* note 196, at 9). The percentage of power a regulated power retailer must supply is determined according to the retailer's share of total energy sales within the state and the state's respective renewable energy target in a given year. Lunt, *supra* note 9, at 387; 16 TEX. ADMIN CODE § 25.173(h)(2) (2015). Total annual new renewable capacity requirements are broken down by year, and escalate from 1,400 MW of new renewable energy resources in compliance year 2006 to 5,000 MW of new renewable energy resources in each year 2014 and beyond. 16 TEX. ADMIN. CODE § 25.173(h)(1) (2015).

213 16 TEX. ADMIN. CODE §§ 25.173(c)(7), (e)–(f) (2015).

214 *Id.* § 25.173(c)(17).

215 HOLT & WISER, *supra* note 46, at 23.

216 TEX. UTIL. CODE ANN. § 39.904(a) (West 2015); 16 TEX. ADMIN. CODE §§ 25.173(a), (m) (2015).

217 Faconti, *supra* note 18, at 420.

218 16 TEX. ADMIN. CODE § 25.174 (2015).

219 Daniel, *supra* note 204, at 164 (quoting TEX. UTIL. CODE ANN. § 39.904(g)(1) (West 2007)).

220 *Id.* at 165; Stahl et al., *supra* note 179, at 136.

221 Faconti, *supra* note 18, at 423 (citing Houser, *supra* note 83, at 169).

trading program.[222] Commentators have praised PUCT for implementing straightforward rules with clear definitions that simplify the compliance process.[223] The REC trading program is administered by the Electric Reliability Council of Texas ("ERCOT," an affiliate of Texas's interconnection operator), which establishes REC accounts for eligible power retailers and renewable power generators to hold RECs as they are awarded, tracked, and retired.[224] ERCOT grants RECs for each MWh of qualifying renewable energy granted in Texas, which are eligible for three years.[225] RECs are then allocated to retail energy providers according to the percentage of the state grid's capacity the provider serves.[226] Regulated retail providers show compliance through obtaining sufficient RECs to meet their required percentage of the RPS mandate and may acquire RECs by generating qualifying renewable energy, purchasing qualifying renewable energy with bundled RECs, or purchasing unbundled RECs from other qualifying renewable energy facilities.[227] RECs may be banked for two additional compliance periods, but REC borrowing is not permitted.[228]

RPS compliance is tracked annually with a three-month "true-up" period that allows a regulated utility or retail provider to acquire sufficient RECs to comply with the RPS mandate.[229] No waivers for non-compliance are permitted.[230] Penalties under the RPS are mandatory and do not decline over time, even if extra RECs are secured in future compliance years.[231] Penalties were set in 1999 at the lesser of five cents for every missing kilowatt-hour of eligible renewable energy required under the utility's RPS mandate or 200 percent of the mean trade value of RECs during the present compliance period,[232] and as of 2012, were updated to $50/MWh for every MWh a utility falls short of compliance with its RPS mandate.[233] Common practice in Texas for long-term contracts between renewable energy producers and regulated retail suppliers dictates specific penalty provisions be placed in the contracts to

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222 Lunt, *supra* note 9, at 387–88 (citing TEX. UTIL. CODE ANN. § 39.904(a) (West 2005)); Moeller, *supra* note 146, at 127–28 (citing TEX. UTIL. CODE ANN. § 39.904(a) (West 2004)).

223 *See, e.g.*, Lunt, *supra* note 9, at 388–89; Faconti, *supra* note 18, at 422.

224 Lunt, *supra* note 9, at 388–89 (citing 16 TEX. ADMIN. CODE § 25.173(c)(18) (2005)).

225 Lunt, *supra* note 9, at 389–90 (citing 16 TEX. ADMIN. CODE § 25.173(m)(4) (2005)).

226 Faconti, *supra* note 18, at 424 (citing 16 TEX. ADMIN. CODE § 25.173(h) (2011)).

227 Lunt, *supra* note 9, at 388 (citing 16 TEX. ADMIN. CODE §§ 25.173(d), 25.173(h) (2005)).

228 16 TEX. ADMIN. CODE § 25.173(l) (2015).

229 WISER & LANGNISS, *supra* note 206, at 14–15; 16 TEX. ADMIN. CODE § 25.173(n) (2015).

230 16 TEX. ADMIN. CODE § 25.173(n).

231 WISER & LANGNISS, *supra* note 206, at 14.

232 *Id.*

233 HEETER ET AL., *supra* note 90, at 96; Gabriella Stockmayer et al., *Limiting the Costs of Renewable Portfolio Standards: A Review and Critique of Current Methods*, 42 J. ENERGY POL'Y 155, 160 (2012).

ensure that facility construction deadlines are met and the qualifying renewable energy is delivered at precise dates to ensure RPS compliance.[234]

B. Texas's RPS Successes

For its design and its ability to help incentivize renewable energy development at a much quicker pace than expected, the Texas RPS has been declared a "model RPS."[235] Following passage of the RPS, renewable energy production, particularly from wind power, has grown exponentially in Texas,[236] even in areas where transmission capacity previously was limited.[237] Texas has had overwhelming success achieving its RPS goals, installing 900 MW of wind power, twice the cumulative requirement for all eligible renewable energy sources, between 2001 and 2002,[238] meeting its original 2009 goal by 2005,[239] installing 7,118 MW of capacity by September 2008 to exceed its 2015 goal,[240] and exceeding its 2025 goal of 10,000 MW of capacity by 2010.[241] Texas generated 29.9 million MWh of total renewable energy in 2013, with 28.9 million MWh coming from wind energy.[242] Texas's RPS has been praised for requiring the addition of more retail capacity of new renewable energy than all but three other states with an RPS, which speaks to the success Texas has had in meeting its goal ahead of schedule.[243] Texas has also achieved high praise for having mandatory penalties as a core part of its RPS design, and for actually levying penalties for non-compliance, which strongly incentivizes using a robust REC trading market to seek the most cost-effective means to comply, and to actually comply, with the RPS mandates.[244]

Texas's creation of CREZs has helped ensure renewable energy is developed at the most optimal sites for generation, even if away from

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234 Faconti, *supra* note 18, at 426 (citing WISER & LANGNISS, *supra* note 206, at 14).

235 *See* Golden, *supra* note 86, at 702; WISER & LANGNISS, *supra* note 206, at 4; Lunt, *supra* note 9, at 387–89.

236 Stahl et al., *supra* note 179 at 136.

237 Daniel, *supra* note 204, at 158–59. By 2006, Texas had passed California in installed wind capacity, and only five countries as a whole (including the United States) had more installed wind capacity than Texas at that date. *Id.*

238 Faconti, *supra* note 18, at 420.

239 Houser, *supra* note 83, at 168.

240 Daniel, *supra* note 204, at 164.

241 *See* Press Release, Texas Posts Record Increase in Voluntary RECs, State Exceeds Legislature's 2025 Goal 15 Years Early (May 14, 2010), http://www.ercot.com/news/releases/show/330.

242 HEETER ET AL., *supra* note 90, at 96.

243 WISER & BARBOSE, *supra* note 1, at 15.

244 *Id.* at 23; Faconti, *supra* note 18, at 425–26; Gold & Thakar, *supra* note 10, at 250 n.467; Houser, *supra* note 83, at 169–170

transmission infrastructure, and has provided for further transmission capacity build-out to better serve retail customers with cheaper, cleaner electricity.[245] Further, Texas's RPS is driving updates of the transmission grid to prevent overcrowding, such that renewable power can actually be produced at full capacity in western Texas and then successfully moved to major metropolitan areas in eastern Texas, including Houston, Austin, San Antonio, and Dallas/Fort Worth.[246] Texas's RPS is successfully facilitating suppliers to sign long-term contracts with penalty terms for construction and operational lags, even though minimum contract term length is not a requirement under the RPS.[247] The RPS is also preventing speculative, non-viable renewable projects from being proposed, clearing a path for viable renewable energy development that will not be wasted in the grid.[248] Finally, Texas's RPS, compared to California's RPS, benefits hugely from having a single agency, PUCT, administering the RPS, which streamlines the permitting and enforcement process, prevents discrepancies in rules and opinions, and can be more directly supported by the legislature.[249]

C. Texas's RPS Shortcomings

While Texas's RPS has a number of positive benefits, it does have some shortcomings. First, Texas's REC trading market is limited to primarily renewable projects located within Texas[250] because Texas's regional transmission interconnection is separate from the interconnections that serve the Western United States and the Eastern United States.[251] Opening the REC trading market to other interconnections may not be possible, but would help maintain the ability for retail providers to obtain low cost RECs from outside of Texas in the event REC prices, or prices for eligible renewable energy in Texas, spike. Second, while transmission investment has increased in Texas, work is needed to improve the ability of the grid's load centers near eastern Texas's major cities to reliably be able to receive high volumes of renewable wind energy generated in western Texas and distribute it to major population centers without waste.[252]

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245 Faconti, *supra* note 18, at 422–23; Daniel, *supra* note 194, at 164–65; Stahl et al., *supra* note 169, at 138; Houser, *supra* note 83, at 168–69.

246 Daniel, *supra* note 204, at 166–67, 169–71.

247 WISER & LANGNISS, *supra* note 206, at 11.

248 Faconti, *supra* note 18, at 431–32.

249 *Id.* at 421–22, 426–28.

250 *Id.* at 424–25.

251 *About ERCOT*, ELEC. RELIABILITY COUNCIL OF TEXAS, http://www.ercot.com/about (last visited Dec. 14, 2015).

252 Daniel, *supra* note 44, at 171–73; Houser, *supra* note 83, at 168–69.

Third, the growth of wind power in Texas has not solely been driven by the RPS and is strongly a function of Texas's natural capacity for wind power generation.[253] The growth in Texas's renewable energy portfolio has been almost entirely from wind energy, with much slower growth rates for other renewable energy technologies.[254]

Finally, Texas has not updated its RPS since passing the 2025 goal of 10,000 MW of cumulative renewable energy capacity in 2010.[255] Without an increase in the RPS mandates, incentives for the further development of renewable energy are slackened unless its cost remains competitive with other types of energy production. Still, due to Texas's high success rates in developing new renewable power capacity, flexible design, and range of alternative compliance mechanisms, Texas's RPS can also provide a baseline for Virginia to develop a more successful RPS policy.

VI. POLICY PRESCRIPTIONS FOR VIRGINIA'S RPS

California and Texas's mandatory RPS policies can provide effective lessons for Virginia to further develop its own renewable energy policy. Both California and Texas show that a mandatory RPS can be the driving force behind substantial increases in renewable energy development and deployment.[256] In order to best promote renewable energy in the Commonwealth, outside of the passage of a carbon pricing mechanism, Virginia should revise its currently non-binding RPS goal into a mandatory RPS policy that applies to all investor-owned utilities and retail power sellers operating in Virginia. As Dominion Virginia Power and Appalachian Power, two large suppliers, are already complying with reporting requirements under the non-binding RPS, additional reporting requirements to comply with a mandatory RPS would not likely result in excessive administrative costs to them. Other retail power sellers operating in Virginia have ready examples from Dominion Virginia Power and Appalachian Power's past reports for preparing their own reporting. A mandatory RPS policy could also give a brief exemption to other retail power providers to allow them to ramp up their reporting capacity and prepare procurement portfolios for compliance without imposing excessive administrative cost or delay.

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253 WISER & LANGNISS, *supra* note 206, at 17.

254 Faconti, *supra* note 18, at 420 (citing Stahl et al., *supra* note 169, at 138).

255 Nicholas G. Morrow, Note, *Federal Regulation of Greenhouse Gas Emissions A Practical Certainty: How Will the Texas Energy Industry Survive-Maybe Thrive?*, 17 TEX. WESLEYAN L. REV. 237, 259 (2011).

256 *See supra* Sections IV.A–B, V.A–B.

In terms of structuring the mandatory RPS, Virginia should follow California's lead when setting the stringency of the RPS targets.[257] California's repeated revision of its RPS targets to make them increasingly stringent has fostered continued growth of large-scale and small-scale renewable energy projects, promoted a greater diversity of renewable energy sources than many other states, and consolidated social momentum towards a greater reliance on renewable energy sources.[258] Like California, Virginia should also establish clear guidelines for eligible renewable energy projects, as well as to allow a broader range of renewable energy sources to become eligible projects than it currently employs.[259] Virginia may benefit from incentivizing the signing of longer-term procurement contracts between retail energy providers and eligible renewable energy producers in the Commonwealth, possibly through REC multipliers for long-term contracts, to promote stable retail prices and stable revenues for renewable energy producers.

Texas's RPS can inform Virginia's RPS policy revisions in other ways. Like Texas, Virginia should establish RPS compliance through RECs rather than reported levels of power procurement or generation. Virginia should continue to promote REC trading and continue to allow RECs generated within Virginia's regional interconnection operator to satisfy RPS targets.[260] Virginia may benefit by giving a multiplier for RECs that are generated within the Commonwealth to further promote in-state renewable energy development. Virginia should mimic Texas's RPS and ensure that a single agency is given full authority to administer and implement the RPS program and is the sole authority that may levy penalties for non-compliance.[261] Using a single administrator will prevent inconsistencies in opinion, lower administrative cost, and allow a single clearinghouse location for renewable energy siting, permitting, and compliance measures.[262] Finally, Virginia should follow Texas's enforcement structure and set a mandatory penalty for non-compliance, and should either completely ban or severely restrict the availability of waivers for non-compliance.[263] Providing certainty in enforcement, along with the already available alternative compliance mechanisms for unbundled RECs and qualified investments in renewable energy projects and research, will help ensure compliance and promote further renewable energy development in the Commonwealth.

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257 *See supra* Section V.C.
258 *See supra* Section IV.B.
259 *See supra* Section IV.A.
260 *See supra* Sections III.A, V.A.
261 *See supra* Section V.B.
262 *See supra* Section IV.C.
263 *See supra* Section V.A.

While these policy proposals represent a significant step for Virginia away from its current non-binding RPS goals, the Commonwealth will face an impending requirement to curtail its greenhouse gas emission levels to comply with the Clean Power Plan if the Clean Power Plan passes judicial review.[264] Promotion of low carbon renewable energy sources is a sensible means to achieve greenhouse gas emissions reduction while encouraging diversification and stabilization of the retail power market. While Virginia may have less renewable energy potential than Texas, it still has significant renewable energy potential, and further study may find greater potential for renewable energy development than was previously thought possible in Virginia.[265] Ratcheting up Virginia's RPS to a mandatory policy, while incorporating design and implementation lessons learned from California and Texas, can serve as a strong and successful incentive to develop further renewable energy in the Commonwealth.

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[264] *See* Chamber of Commerce v. EPA, No. 15A787, 136 S.Ct. 999 (Feb. 9, 2016) (order staying implementation of the Clean Power Plan rule until review by the Supreme Court).

[265] *See supra* Section III.A.