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Defining "Biomass": An Examination of State Renewable Energy Standards

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DEFINING "BIOMASS": AN EXAMINATION OF STATE RENEWABLE ENERGY STANDARDS

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I. INTRODUCTION

As an energy source that can provide electricity and fuel, biomass will contribute significantly to the global energy supply. Although biomass is a renewable energy source, the use of biomass for energy is not always sustainable. With a potential for environmental harm, energy policy may clash with environmental policy. The potential negative environmental consequences are of particular concern as governments in recent years have begun enacting enforceable standards to increase the use of renewable energy. Through renewable portfolio standards ("RPS"s), many states require annual increases in the percentage of electricity from renewable sources, such as biomass. The trend of enacting renewable energy standards continues: the federal government is considering adopting a national RPS; some states without a RPS are considering enacting one; and other states are mod-

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ifying renewable targets. These various energy policies must be fused with sound environmental policy.

This Article encourages state and federal policymakers to consider the sustainability of biomass when establishing or implementing standards that mandate or incentivize the use of biomass for energy, whether as fuel or electricity. Revealing the important role biomass plays in renewable energy standards, Section II introduces the concepts of biomass, renewable energy objectives, and sustainability. Section III surveys the various definitions of "biomass." The survey exposes widespread use of an inadequate definition of "biomass," primarily due to the policy oversight that renewable does not equal sustainable. Section IV provides a discussion of two solutions to remedy the problem of the deficient definition of "biomass." The first solution discussed is a model approach to be utilized by policymakers. The approach can be utilized when a state renews or revises RPS goals, when a state without a RPS enacts a RPS, or when an agency managing a program encounters an ambiguous, broad definition. The approach includes factors to consider when developing a definition of "biomass." One such consideration is sustainability certification. Environmental and energy objectives can be fused by the adoption of a certification program, such as sustainability certification based on standards and procedures developed by the Roundtable on Sustainable Biofuels ("RSB"). The approach also suggests utilizing Renewable Energy Credit ("REC") multipliers based on those meeting or exceeding sustainability goals. The second proposed solution encourages a national RPS, preferably non-preemptive. A national RPS will help develop nationwide standards while providing latitude for state-specific energy objectives. National policymakers should also consider utilizing the model approach. Alone or combined, these solutions help ensure that progressive energy policy does not negatively impact the environment.

II. Background on Biomass, Renewable Energy Objectives, and Sustainability

Prior to examining the various definitions of "biomass" in the context of renewable energy objectives, it is necessary to provide background on a number of terms that are used throughout this Article. As an introduction to these terms, this Section examines the terms "biomass," "renewable energy objective," "renewable energy standard," "renewable energy goal," and "sustainability."

A. *Biomass*

Because this Article examines the various statutory definitions of "biomass," it is imperative to understand biomass in a general sense.

Further, it is also important to understand the usage of the term in the context of energy.

Generally speaking, biomass is any form of organic matter. It is a broad term and encompasses a variety of materials, all of which are renewable at some rate.[2] In terms of energy use, biomass can be utilized one of three ways: (1) burned directly as fuel, either as a sole source or co-fired or blended with fossil fuels; (2) processed into a synthetic fuel that can be combusted to produce energy; or (3) decomposed for methane that can be used to produce energy.[3] With these many uses, it should not be surprising that energy from biomass is the largest renewable source of energy in the United States.[4] The percentage of energy from biomass reached 4% in 2009 following a gradual increase since 2000.[5] However, the potential is even greater.

A study sponsored by the Department of Energy and the United States Department of Agriculture, the *Billion Ton Study* ("BTS"), aimed to determine if the United States could replace 30% of its petroleum consumption with biomass, requiring one billion tons of biomass.[6] BTS concluded that this is possible and that a one billion ton supply is not even the upper limit of the potential of biomass.[7]

The recently released *Billion Ton Update* ("BTU") confirmed the potential of biomass as a significant energy resource.[8] The purpose of BTU was to address a number of shortcomings of the BTS; BTU accounts for economics, county-by-county data, and biomass sustainability.[9] BTS, BTU, and the work of others confirm that biomass is widely available, renewable, and may be used in multiple ways—a

2. Angela Morrison Uhland, *Improving Regulations for Biomass-Based Electrical Generating Facilities*, 23 NAT. RESOURCES & ENV'T 15, 15 (2008).

3. *Id.*; The Billion Ton Study defines "biomass" as "all plant and plant-derived material." U.S. DEP'T OF ENERGY & U.S. DEP'T OF AGRIC., BIOMASS AS FEEDSTOCK FOR A BIOENERGY AND BIOPRODUCTS INDUSTRY: THE TECHNICAL FEASIBILITY OF A BILLION-TON ANNUAL SUPPLY 16 (April 2005), [hereinafter BTS Report], feedstock review.ornl.gov/pdf/billion_ton_vision.pdf. While broad, the definition leaves out at least two sources of a potentially large amount of biomass: algae and municipal solid waste.

4. BTS Report, *supra* note 3, at 16.

5. U.S. DEP'T OF ENERGY, U.S. BILLON-TON UPDATE 7 (August 2011) [hereinafter BTU Report], http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf.

6. BTS Report, *supra* note 3, at 16. Note that this is not a complete replacement of all fossil fuels; however, biomass can play a significant role in reducing the use of coal. *See* U.S. DEP'T OF ENERGY, BIOMASS COFIRING IN COAL-FIRED BOILERS, 1 (2004), http://www1.eere.energy.gov/femp/pdfs/fta_biomass_cofiring.pdf.

7. BTS Report, *supra* note 3, at 16 (stating that the potential was 1.366 billion tons—998 million from agricultural resources and 368 million from forest-based resources).

8. BTU Report, *supra* note 5, at 21. However, the BTU did adjust the figures of biomass availability, reducing the amount associated from crop residue and forest resources but increasing the amount from energy crops. *Id.*

9. *Id.* at 21, 145.

true, long-term energy resource.[10] Thus, the use of biomass can reduce energy dependency of those utilizing it, particularly in the United States.[11]

Biomass may also provide environmental benefits. When compared to fossil fuels, biomass energy emits less atmospheric greenhouse gases, sometimes remaining carbon neutral.[12] Biomass may also reduce other emissions such as nitrous oxide and sulfur dioxide.[13] Although the reduction in greenhouse gas emissions is often based on sustainability assumptions, the use of biomass was recommended by the Intergovernmental Panel on Climate Change as a method of reducing atmospheric greenhouse gas emissions.[14]

The use of biomass for energy does have potential drawbacks, however. Three points are typically raised by opponents or skeptics of biomass-based energy: indirect land use change, competition between end uses of agricultural products (i.e., food versus fuel), and the possibility of bioenergy quickly becoming unsustainable without appropriate policy measures.[15] These concerns are valid. The effects of utilizing biomass as an energy resource can vary dramatically depending on the approach.[16]

The concern with indirect land use change is that as bioenergy production increases, lands that are currently not used for crop production, such as grasslands and forests, must be converted into production to meet the growing demand.[17] Direct land use change, on the other hand, occurs when land use has been changed to bioenergy production.[18] Direct land use change is less problematic as the impacts are easier to determine and measure.[19] Indirect land use change, however, has been identified as a problem with increased biomass usage.[20]

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10. Allan M. Richards, *Biomass Energy: An Agricultural Role in Pollution Control?*, 45 DRAKE L. REV. 143, 149 (1997).

11. *See* Erik Bluemel, *Biomass Energy: Ensuring Sustainability Through Conditioned Economic Incentives*, 19 GEO. INT'L ENVTL. L. REV. 673, 679 (2007).

12. *Id.* at 680, 689–90.

13. *Id.*

14. Uhland, *supra* note 2, at 16.

15. *See* Jody M. Endres, *Agriculture at a Crossroads: Energy Biomass Standards and a New Sustainability Paradigm?*, 2011 U. ILL. L. REV. 503 (2011) (focusing on the third argument, as the first two concerns can be addressed with adequate policy measures to ensure sustainable cultivation and use).

16. Bluemel, *supra* note 11, at 678–79 (comparing the development of Brazil's sugarcane-based ethanol industry with the development of Malaysia's palm oil industry).

17. Richard J. Plevin et al., *Greenhouse Gas Emissions from Biofuels' Indirect Land Use Change are Uncertain but May Be Much Greater Than Previously Estimated*, 44 ENVTL. SCI. & TECH. 8015, 8015 (2010), *available at* http://pubs.acs.org/doi/pdfplus/10.1021/es101946t.

18. *Id.*

19. *See id.*

20. Bluemel, *supra* note 11, at 683–84.

Although, there is significant debate surrounding the issue.[21] Currently, it is difficult to quantify these impacts with precision. As research continues in this area, it is best to recognize that this is an issue that bioenergy advocates and policymakers should consider. The unknown impacts of indirect land use change should prompt additional caution when considering the sustainability of biomass.

Another concern is the competition between crops for energy production and crops for human consumption, frequently referred to as "food vs. fuel." These concerns are frequently noted, and "food vs. fuel" is perhaps the most widely known controversy surrounding the use of bioenergy.[22] Even the BTU noted the potential effect bioenergy resources can have on food supply and food prices.[23] However, there are also questions surrounding the validity or degree of this concern.[24] As with the indirect land use change, until the issue is clearly resolved, and even more so after resolution, bioenergy policymakers must consider the latest research and findings on such issues.

There is one final concern: although bioenergy is a renewable resource, the resource can actually be unsustainable. These concerns include inefficient energy conversion, deforestation, and adverse agricultural impacts. Bioenergy can be extremely inefficient, with an en-

21. Seungdo Kim & Bruce E. Dale, *Indirect Land Use Change for Biofuels: Testing Predictions and Improving Analytical Methodologies*, BIOMASS & BIOENERGY 2011, 1 (Apr. 25, 2011), http://www.worldofcorn.com/uploads/useruploads/kim-dale.pdf. The issue is particularly prominent as some studies have shown indirect land use change to be a primary impact on lifecycle greenhouse gas emissions of biofuels. *See id.* (citing five other studies). The Kim-Dale study found that United States biofuel production through 2007 did not produce indirect land use change. *Id.* at 5.

22. Bluemel, *supra* note 11, at 680; Peter R. Hartley & Kenneth B. Medlock III, Climate Policy and Energy Security: Two Sides of the Same Coin? (May 2008) (working paper) (on file with The Baker Institute of Public Policy at Rice University), http://www.bakerinstitute.org/publications/IEEJClimatePolicy.pdf; *see Malthusiasm Returns: Is it "Food vs Fuel", or "Progress vs Same as it Ever Was"*, BIOFUELS DIGEST (Feb. 14, 2011), http://www.biofuelsdigest.com/bdigest/2011/02/14/malthusiasm-returns-is-it-food-vs-fuel-or-progress-vs-same-as-it-ever-was/ ("With the return of scarcity – whatever is driving it, weather or growing market demand or a combination thereof – the usual suspects have found their way back to the op-ed pages.").

23. BTU Report, *supra* note 5, at 25–26.

24. Philip C. Abbott et al., *What's Driving Food Prices?*, FARM FOUNDATION (July 2008), http://www.farmfoundation.org/news/articlefiles/404-ExecSum8.5x11.pdf (identifying biofuel production as a force driving food price); Philip C. Abbott et al., *What's Driving Food Prices in 2011?*, FARM FOUNDATION (July 2011), http://www.farmfoundation.org/news/articlefiles/1742-FoodPrices_web.pdf (same); John Baffes & Tassos Haniotis, *Placing the 2006/08 Commodity Price Boom in Perspective* 2 (The World Bank Development Prospects Group, Policy Research Working Paper No. 5371), *available at* http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2010/07/21/000158349_20100721110120/Rendered/PDF/WPS5371.pdf (concluding that there is a strong link between energy prices and non-energy commodity prices, i.e., food, and that the effect of biofuels on food prices is less than previously thought); Zibin Zhang et al., *Food vs. Fuel: What Do Prices Tell Us?*, 38 ENERGY POLICY 445, 445–51 (2010) (determining that there are limited short-term correlations between biofuels and agricultural commodity prices and no direct long-term relations).

ergy conversion rate as little as 10% of the total biomass.[25] Although, this problem is of less concern in developed countries, where the ratio of biomass to energy is greater.[26]

Another sustainability concern is that bioenergy can lead to deforestation.[27] While sustainable forestry certifications exist and were some of the earliest incentive structures, certification is not always an effective means of ensuring sustainability.[28] These standards are not effective for two primary reasons: (1) broad language within the standards; and (2) limited resources for the certifying organizations, leading to a negative feedback loop where the most lenient certifiers are selected.[29] Essentially, these factors create a race to the bottom for certifying organizations. Nevertheless, certifications have the potential to alleviate the deforestation concern.

Another concern relating to the unsustainability of bioenergy is the adverse impacts of agriculture: erosion, waste management, and the increased use of nutrients, local water resources, herbicides, and pesticides.[30] It has been noted that exploitation of energy crops can lead to more adverse impacts than traditional agricultural impacts.[31] However, on the whole, the impacts of energy crops should be less than or equal to traditional agricultural operations.[32] The degree of impact will largely be site specific.[33] Thus, the concern of agricultural impacts on sustainability will link back to land use change, both direct and indirect.

While the complete picture of the pros and cons of biomass has not yet developed, it is important to understand generally how biomass fits into the context of energy. This Article does not argue for a shift in the general understanding of biomass. Instead, it will argue that the understanding of biomass in an energy context must contain a degree of sustainability. This is particularly true considering the unknown impacts of energy from biomass, both positive and negative.

B. *Renewable Energy Objectives*

In an energy context, the term biomass frequently arises in discussions of renewable energy objectives. Initially, it should be noted that

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25. Bluemel, *supra* note 11, at 675–76.
26. *Id.*
27. Hartley & Medlock, *supra* note 22, at 46; MANUEL R. GUARIGUATA ET AL., CENTER FOR INT'L FORESTRY RESEARCH, A REVIEW OF ENVIRONMENTAL ISSUES IN THE CONTEXT OF BIOFUEL SUSTAINABILITY FRAMEWORKS, 1 (2011), http://www.cifor.org/publications/pdf_files/OccPapers/OP-69.pdf (stating that bioenergy will likely impact undisturbed forests).
28. Hartley & Medlock, *supra* note 22, at 46.
29. *Id.*
30. Bluemel, *supra* note 11, at 693.
31. *Id.* at 681 (noting that impacts may actually be less when factoring in the impact of bioenergy compared to the product it is replacing, i.e., fossil fuels).
32. *Id.* at 682.
33. *Id.* at 690.

the term "renewable energy objective" encompasses "renewable energy standards," "renewable energy portfolios," and "renewable energy goals." The terms differ in that a renewable energy standard or portfolio is typically binding, while a renewable energy goal is non-binding.

As used in this Article, a "renewable energy objective" is a mechanism utilized to ensure that a certain percentage of electricity is obtained from qualifying renewable energy sources.[34] Although the rationales vary by state, the general goal of these programs is to increase the amount of renewable energy generated.[35] In many cases, these mechanisms utilize a market-based approach to ensure the development of a renewable energy market.[36] With the market-based approach, parties subject to the objective must either generate renewable energy or purchase RECs from those producing renewable energy. Typically, renewable energy objectives have milestones, a minimum amount of energy that must be renewable, set for each compliance year. These milestones gradually increase over a number of years, with end targets ranging from 9.5% (Wisconsin) to 40% (Colorado and Hawaii).

These programs are relatively new. Although Iowa adopted the first renewable energy objective enacted in 1983, the number of programs has doubled since 2004.[37] With this recent emergence, it is important to understand the impacts of these programs. Of course, as this Article demonstrates, an important consideration when examining these programs is what qualifies as renewable energy.

C. *Sustainability*

Another key term discussed in this Article is "sustainability." Sustainability is not easy to define. The term is frequently used in varying contexts by those who have differing understandings of what the word entails. But contained within the hodgepodge of definitions is the interaction between economic, social, and environmental factors.[38]

As one might expect given the subjectivity of the term in other contexts, there is not a unanimous definition for "sustainability" in the bioenergy context.[39] However, a core concept for bioenergy does ex-

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34. *See Renewable Portfolio Standards*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/agstar/tools/funding/renewable.html (last updated Aug. 15, 2012).

35. Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1358 (2010) (explaining that the stated rationales for these policies have developed in recent years, expanding to wider policy aims); *see also* U.S. ENVTL. PROT. AGENCY, *supra* note 34.

36. U.S. ENVTL. PROT. AGENCY, *supra* note 34.

37. Davies, *supra* note 35, at 1357–58.

38. *Sustainability Basic Information*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/sustainability/basicinfo.htm#sustainability (last visited Aug. 25, 2011).

39. GUARIGUATA ET AL., *supra* note 27, at 1.

ist, and it embraces the three factors typically associated with the term.

The purpose of this Article is not to define sustainability. While it is important for bioenergy to embrace key concepts, sustainability is not a one-size-fits-all concept. In fact, it has been suggested that regional definitions would be much more effective, considering the regional needs and differences.[40] However, this Article does argue that sustainability must be accounted for in some way when developing, implementing, and enforcing renewable energy objectives.

III. The Many Definitions of "Biomass"

Currently there are thirty-nine states that have a renewable portfolio standard or goal. In each case, biomass is a qualifying energy source. The definitions of biomass, however, vary dramatically. Thus, the various definitions of biomass used for purposes of achieving renewable energy objectives were examined. This Section provides the results of the survey.

In all, there are four basic categories into which the definitions fall: (1) no sustainability element; (2) ambiguous language; (3) an environmental standard; and (4) those with a sustainability element. The first category includes nearly half of the states. These states use definitions that provide little more than a list of qualifying biomass resources. Adding in the second category, ambiguous definitions, nearly three-quarters of the definitions fail to explicitly account for sustainability. A few states provide some environmental goals that must be met. However, these standards sometimes cover only a single factor, hardly meeting even lax definitions of sustainability. Fortunately, a few states actually set sustainability standards for biomass. Yet even those with sustainability standards take different approaches, and it is too early to determine the efficacy of these actions. This Section provides greater detail to each of the four general categories, including which states fall within each category. Overall, this Section demonstrates the deficiency of these biomass definitions because of the failure to account for sustainability.[41]

A. *No Sustainability Language*

In total, there are nineteen states that fall into the "no sustainability language" category, three of which are renewable energy goals. The states in this category are: California,[42] Colorado,[43] District of Colum-

40. *Id.* at 15.

41. This problem, the failure to consider sustainability, is also a problem on the international level, compounding the problem. *Id.* at 17–21.

42. Cal. Energy Comm'n, Renewable Energy Overall Program Guidebook (3d ed. 2011), http://www.energy.ca.gov/2010publications/CEC-300-2010-008/CEC-300-2010-008-CMF.PDF.

bia,[44] Hawaii,[45] Illinois,[46] Iowa,[47] Kansas,[48] Maine,[49] Minnesota,[50] Missouri,[51] New Mexico,[52] North Carolina,[53] North Dakota,[54] Oklahoma,[55] Oregon,[56] South Dakota,[57] Texas,[58] Utah,[59] and Wisconsin.[60] States fall into the "no sustainability language" because the definition is often just a non-exhaustive list. Some states do not even use the term, relying instead on a list of qualifying energy sources.[61] Illinois, on the other hand, decided against putting a list together; the definition is simply extremely broad.[62]

With such broad language, at least one court has rejected a challenge to the use of specific resources. In *State of North Carolina ex rel. Utilities Commission v. Environmental Defense Fund*, the Court of Appeals of North Carolina upheld the North Carolina Utilities Commission's determination that "wood derived from whole trees in primary harvest" qualified as a biomass for the state's renewable energy

43. COLO. REV. STAT. § 40-2-124(1)(a)(I) (2011); *see also* COLO. CODE REGS. § 723-3:3652 (2012).

44. D.C. CODE § 34-1431(9) (Supp. 2011); *see also* Pub. Serv. Comm'n of the District of Columbia, Formal Case No. 945, In the Matter of the Investigation Into Electric Services Market Competition and Regulatory Practices, Order No. 14697, 11 (2008), http://www.dcpsc.org/pdf_files/commorders/orderpdf/orderno_14697_FC945.pdf.

45. HAWAII REV. STAT. § 269-91 (Supp. 2011).

46. 20 ILL. COMP. STAT. 3855/1-75(c) (West Supp. 2012); *see generally* 220 ILL. COMP. STAT. 5/16-115D (West Supp. 2012).

47. IOWA CODE § 476.42(1)–(4) (West Supp. 2011).

48. KANSAS STAT. ANN. § 66-1257(f) (Supp. 2009).

49. ME. REV. STAT. tit. 35-A § 32102A (Supp. 2011).

50. MINN. STAT. ANN. § 216B.1691 subdiv. 1 (West Supp. 2012). Minnesota had a much more stringent definition of biomass when the state required Xcel Energy to meet certain wind and biomass energy requirements by 1998 and 2002. *See* MINN. STAT. ANN. §§ 216B.2423 subdiv. 1, .2424 subdiv. 1(d) (West Supp. 2012). Some of these sources of energy may be used to meet the newer renewable portfolio standard. *See In re* Xcel Energy, No. E-002/M-08-440 (Minn. Pub. Utils. Comm'n 2010), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=Show Poup&documentId{9E0A6E8D-A56E-4B6D-B5F5-EC30A44EE7CA}&document Title=20109-54276-01.

51. MO. REV. STAT. § 393.1025(5) (West Supp. 2012).

52. N.M. STAT. ANN. §§ 62-15-37(B)(2)(b), 62-16-3(E) (Supp. 2011).

53. N.C. GEN. STAT. § 62-133.8(a)(8) (2011).

54. N.D. CENT. CODE § 49-02-25 (Supp. 2011).

55. OKLA. STAT. tit. 17, § 801.4(D)(7) (West Supp. 2012).

56. OR. REV. STAT. § 469.A025(2) (2011).

57. S.D. CODIFIED LAWS § 49-34A-94(5) (2004).

58. TEX. UTIL. CODE § 39.904(d) (West Supp. 2011).

59. UTAH CODE ANN. § 54-17-601(b) (LexisNexis 2010).

60. WIS. STAT. ANN. § 196.378(1)(ar) (West Supp. 2011).

61. IOWA CODE § 476.42(1) (West Supp. 2011) (using terms such as "refuse-derived fuel, agricultural crops or residues, or woodburning facility," instead of biomass); KAN. STAT. ANN. § 66-1257(f) (Supp. 2009) (using terms such as agricultural residues, wood, and dedicated crops).

62. 20 ILL. COMP. STAT. 3855/1-75(c) (Supp. 2009); *see generally* 220 ILL. COMP. STAT. 5/16-115D (Supp. 2012).

objective.[63] The court deferred to the ordinary meaning of the term "biomass" because the statute did not define it.[64] The court also determined that the inclusion of a non-exhaustive list indicated the legislature's intent to not limit the term.[65] In conclusion, the court stated that any resource that is organic and renewable would qualify for North Carolina's renewable energy objective.[66]

As *North Carolina Utilities* demonstrates, this category is the most problematic. Sustainable practices simply become voluntary. Therefore, biomass meeting the renewable energy objectives may not even be beneficial. Or even worse, the biomass may cause environmental, economic, or social harm. Unfortunately, in addition to being the most problematic, the category is also the most prevalent.

B. *Ambiguous Language*

The next category of policies is those states with ambiguous language relating to, or slight hints about, biomass sustainability. These policies do not explicitly list requirements, but the policies include some language that could indicate an intent that certain elements of sustainability were contemplated as necessary. Nine of the renewable energy objectives can be included in this category, three of which are non-binding goals. The states in this category are Arizona,[67] Indiana,[68] Maryland,[69] Michigan,[70] Nevada,[71] Ohio,[72] Vermont,[73] Virginia,[74] and West Virginia.[75] Although smaller than the no-sustainability category, there is some variability in the ambiguity.

The most common method of defining biomass within the ambiguity category is to include a list of qualifying methods and include the phrase "on a renewable basis." Arizona, Indiana, and Ohio all adopt that definition style.[76] Maryland and West Virginia add to the "renewable" language with the word "recurring."[77] While it is hard to

63. North Carolina *ex rel.* Util. Comm'n v. Envtl. Def. Fund, 716 S.E.2d 370, 371 (N.C. Ct. App. 2011).
64. *Id.* at 372.
65. *Id.*
66. *Id.* at 373.
67. ARIZ. ADMIN. CODE § R14-2-1802 (2012).
68. S. 251, 117th Gen. Assemb., 1st Reg. Sess. (Ind. 2011).
69. MD. CODE ANN., PUB. UTIL. COS. § 7-701(h)(1) (LexisNexis Supp. 2011).
70. MICH. COMP. LAWS § 460.1003(f) (West 2002).
71. NEV. REV. STAT. § 704.007 (LexisNexis 2009); NEV. ADMIN. CODE § 704.8835(1) (2009).
72. OHIO REV. CODE ANN. § 4928.01(A)(35) (LexisNexis Supp. 2012); OHIO ADMIN CODE 4901:1-40-01(E) (2012).
73. VT. STAT. ANN. tit. 30, § 8002(2) (West Supp. 2011).
74. VA. CODE ANN. § 56-585.2(F) (Supp. 2010).
75. W. VA. CODE § 24-2F-3(13)(F) (LexisNexis Supp. 2011).
76. ARIZ. ADMIN. CODE § R14-2-1802 (2012); S. 251, 117th Gen. Assemb., 1st Reg. Sess. (Ind. 2011).
77. W. VA. CODE § 24-2F-3(13)(F) (LexisNexis Supp. 2011); MD. CODE ANN., PUB. UTIL. COS. § 7-701(h)(1) (LexisNexis Supp. 2011).

argue these terms impose sustainability requirements, agencies and courts may be able to find more leeway than the Court of Appeals of North Carolina in *North Carolina Utilities*. Certainly it is a step beyond merely including a non-exhaustive list as a definition.[78]

Michigan, Vermont, and Virginia make the definition a little more interesting. Michigan states that biomass must "replenish[ ] over a human, not a geological, time frame."[79] Far less ambiguously, Michigan requires that trees and wood only qualify if biomass is "from sustainably managed forests or procurement systems."[80] None of the other examples of biomass include similar sustainability language. This modification strongly hints that sustainable practices are only required for the trees and wood used for renewable energy. However, the "human time frame" language does demonstrate some effort by the legislature to limit the use of biomass to more sustainable options.

Vermont requires that the biomass be "consumed . . . at or below its natural regeneration rate."[81] While the definition will clearly exclude some practices that are clearly unsustainable, the definition does not provide clear levels of sustainability. But the language does demonstrate efforts taken by the legislature, unlike the case in other states.

Virginia actually uses the word "sustainable" in its definition of qualifying biomass.[82] However, the term is not defined.[83] Thus, although Virginia is not ambiguous as to whether biomass must be sustainable, the failure to define the term leaves the term subject to a variety of interpretations.

So although the use of ambiguous terms leaves room for the interpretation of more stringent requirements for the use of bioenergy, these efforts are not enough to truly protect against the potential negative impacts that can be caused by the use of biomass to meet renewable energy objectives.

C. *Environmental Elements*

The next category includes those states that capture some of the environmental elements of sustainability within the definition of "bio-

78. *See supra* Section III.A. It could easily be argued that "on a renewable or recurring basis" does not add any sustainability criteria because renewable does not equal sustainable. That argument would be quite persuasive. On the other hand, by its nature, biomass is renewable and recurring. Therefore, if one argues that the terms add nothing statutorily, the language is superfluous. It is a canon of statutory interpretation that a "statute should be construed so that effect is given to all its provisions, so that no part will be inoperative or superfluous, void or insignificant." Corley v. United States, 506 U.S. 303, 314 (2009).

79. MICH. COMP. LAWS § 460.1003(f) (West 2002).

80. *Id.* § 460.1003(f)(iv).

81. VT. STAT. ANN. tit. 30, § 8002(2) (West Supp. 2011).

82. VA. CODE ANN. § 56-585.2(F) (Supp. 2010).

83. *See id.* § 56-585.2.

mass." Montana,[84] New Hampshire,[85] Pennsylvania,[86] Rhode Island,[87] and Washington[88] specifically include environmental standards in the definition of "biomass."

Montana requires that the biomass is non-toxic and meets emissions limits.[89] New Hampshire also utilizes emissions limits.[90] Pennsylvania's definition accounts for the possibility that biomass may come from land protected by the Federal Conservation Reserve Program ("FCRP").[91] In this case, use of the materials for electricity cannot impede the goals established for FCRP lands.[92] Rhode Island requires air permits and a specific biomass application.[93] Washington specifically excludes the use of old growth wood.[94] This provision helps resolve some concerns about deforestation, but it can hardly eliminate the concern.

While these requirements are appropriate, sustainability is not adequately captured. In many cases, the environmental standards would do little to resolve the questions surrounding the benefits of utilizing biomass as an energy resource.

D. *Sustainability Standards*

The final category of biomass definitions is the one with sustainability standards. There are five states in this category: Connecticut,[95] Delaware,[96] Massachusetts,[97] New Jersey,[98] and New York.[99]

In Connecticut, energy resources are placed into various classifications, Class I, Class II, and Class III.[100] Each class must be used to

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84. MONT. CODE ANN. § 69-3-2003(10) (2011).
85. N.H. REV. STAT. ANN. § 362-F:2(XII) (2009).
86. 73 PA. CONS. STAT. ANN. § 1648.2 (West 2008); 66 PA. CONS. STAT. § 2814(b) (West. Supp. 2012).
87. R.I. GEN. LAWS ANN. § 39-26-5(a) (West Supp. 2011).
88. WASH. ADMIN. CODE §§ 194-37-040(25)(i), 480-109-007(18)(i) (2012).
89. MONT. CODE ANN. § 69-3-2003(10)(g) (2011).
90. N.H. REV. STAT. ANN. § 362-F:2(XII).
91. 73 PA. CONS. STAT. ANN. § 1648.2(7).
92. *Id.*
93. R.I. GEN. LAWS ANN. § 39-26-5(a)(6). Rhode Island regulations require "clean wood." 90-060-015 R.I. CODE R. § 3.7 (LexisNexis 2012). However, there is not a sustainability limitation to "clean wood." 90-060-015 R.I. CODE R. § 6.9 (LexisNexis 2012).
94. WASH. ADMIN. CODE §§ 194-37-040(25)(iii), 480-109-007(18)(iii) (2012).
95. CONN. GEN. STAT. §§ 16-245n(b), 16-1(a)(26), (45) (West 2007).
96. DEL. CODE. ANN. tit. 26, § 352(6)(h) (West 2009); 7-100-106 DEL. ADMIN. CODE § 106-5.0 (2006).
97. MASS. GEN. LAWS ANN. ch. 25A, § 11F(b)(7) (West 2010).
98. N.J. STAT. ANN. § 48:3-51 (West 2009); N.J. ADMIN. CODE § 14:8-2.5(f) (2012).
99. N.Y. Pub. Serv. Comm'n, Order Regarding Retail Renewable Portfolio Standard, 41 (Sept. 24, 2004), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BB1830060-A43F-426D-8948-F60E6B754734%7D.
100. *See* CONN. GEN. STAT. § 16-1(a)(26), (27). Other states also utilize a class or tier system.

meet a certain percentage.[101] Class I comprises the largest of the requirements.[102] In many cases, biomass facilities will fall within Class I, but the facilities must be sustainable.[103] The definition of "sustainable biomass" requires sustainable cultivation and harvest.[104] The definition largely excludes construction waste, biomass from old growth timbers, and finished biomass products from paper and saw mills.[105]

Delaware also requires biomass to be sustainable for it to qualify for its RPS.[106] Like Connecticut, Delaware requires sustainable cultivation and harvest.[107] The determination is made by the Delaware Department of Natural Resource and Environmental Conservation ("DDNREC").[108] Waste-to-energy facilities and incinerators are excluded.[109] DDNREC regulations lay out in detail the biomass sustainability requirements.[110] For all biomass, the facility must comply with all federal, state, and local law.[111] For crop-derived biomass, the producer must comply with the requirements of the USDA organic program or meet alternative criteria that include best management practices, nutrient management, land management, water management, pest management, and minimal usage of herbicide.[112] Timber resources must also comply with a host of requirements: non-point source pollution measures, best management practices, maintaining ecosystem diversity, limitations on pest and weed management, protection of cultural resources, and excluding the use of old growth timber.[113]

Like Connecticut and Delaware, New Jersey requires the cultivation and harvest of biomass to be sustainable.[114] To be considered sustainable biomass, the biomass supplier or biomass facility must demonstrate compliance with New Jersey's state-of-the-art air pollution control, comply with ash-management practices, and if plant matter is used directly as fuel, an approved management plan for cultivation and harvest must be followed.[115] New Jersey does exclude some forms of biomass from the sustainability requirement: methane gas from landfills, fuel cells powered by biomass-derived fuel, and gas

101. CONN. GEN. STAT. § 16-245a(1) (West 2007).
102. *Id.*
103. *See* CONN. GEN. STAT. § 16-1(a)(26). Biomass can also be Class II, but these are pretty much existing facilities. *See id.* § 16-1(a)(27).
104. *Id.* § 16-1(a)(45).
105. *Id.*
106. DEL. CODE ANN. tit. 26, § 352(6)(h) (West 2009).
107. *Id.*
108. *Id.*
109. *Id.*
110. 7-100-106 DEL. ADMIN. CODE § 106-5.0 (2006).
111. *Id.* § 106-5.1.
112. *Id.* § 106-5.2.
113. *Id.* § 106-5.3.
114. N.J. STAT. ANN. § 48:3-51 (West 2009).
115. N.J. ADMIN. CODE § 14:8-2.5(f) (2012).

from the anaerobic digestion of food waste and sewage sludge.[116] Nevertheless, the New Jersey Department of Environmental Protection took adequate steps to define sustainability, as the legislature did not define the term.[117]

The Massachusetts RPS includes low emission advanced biomass power conversion technologies as a qualifying resource.[118] While the eligible biomass definition is essentially a list of resources,[119] Massachusetts has taken steps toward ensuring sustainability.[120] Regulatory revisions are currently under progress.[121] Also important, biofuel used to meet the RPS requirements would be required to reduce lifecycle greenhouse gas emissions by at least 50%.[122] Hopefully, Massachusetts' regulatory efforts will result in adequate measures to determine the sustainability of biomass.

New York also includes clear sustainability standards within its definition of biomass. New York includes various types of biomass in its definition, but harvested wood, waste wood, yield wood, and energy crops are required to be sustainable.[123] More precisely, harvested wood and waste wood used for energy must comply with a forest management plan and harvest plan.[124] These provisions are aimed to ensure sustainability of the resource.[125] Specific certification bodies are recognized.[126] The sustainability requirements for yield wood, or energy crops, are less precise. However, New York's efforts to ensure the sustainability of various types of wood waste are commendable.

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116. *Id.* § 14:8-2.5(b).

117. *See* N.J. BD. OF PUB. UTILS., 2012 RENEWABLE ENERGY INCENTIVE PROGRAM (REIP) BIOMASS SUSTAINABILITY DETERMINATION INFORMATION Sheet (Jan. 2012), http://www.njcleanenergy.com/files/file/Renewable_Programs/REIP/2012_Biomass_Sustain_Deter_Info_sheet_Jan_2012writeable.pdf.

118. MASS. GEN. LAWS ANN. ch. 25A, § 11F(b)(8) (West 2010) ("The department may also consider any previously operational biomass facility retrofitted with advanced conversion technologies as a renewable energy generating source.").

119. 225 MASS. CODE REGS. 14.02 (2012).

120. MASS. DEPT. OF ENERGY RES., BIOMASS ENERGY RULEMAKING SUMMARY OF PROPOSED FINAL REGULATION (2012), http://www.mass.gov/eea/docs/doer/renewables/biomass/committee-biomass-rpt-jun10-2011.pdf.

121. *Id.*

122. *Id.*

123. N.Y. Pub. Serv. Comm'n, Order Regarding Retail Renewable Portfolio Standard, app. B, 4 (Sept. 24, 2004), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BB1830060-A43F-426D-8948-F60E6B754734%7D.

124. *Id.* Suppliers of these types of biomass may only have to have a harvest plan if the supplier is in compliance with a facility's forest management plan. N.Y. Pub. Serv. Comm'n, Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program, 55 (Apr. 14, 2005), http://documents.dps.ny.gov/public/Xommon/ViewDoc.aspx?DocRefID-{601B2105-AD06-4FB0-8A7B-C4CFAF43BE9A}.

125. ANTARES GROUP, INC., NEW YORK STATE RENEWABLE PORTFOLIO STANDARD: BIOMASS GUIDEBOOK 4 (Apr. 2006), http://www.dps.ny.gov/NYS_Biomass_Guidebook_April_2006.pdf.

126. *Id.* at 10. The certification bodies are the Forest Stewardship Council, Sustainable Forestry Initiative, and Tree Farm. *Id.*

As these various definitions demonstrate, even when states take efforts to include sustainability consideration, these considerations can vary dramatically. Even with many of these states sharing borders, the requirements for sustainable biomass vary.

IV. Defining "Biomass"

This Section discusses two solutions to remedy the problem of the many deficient definitions of "biomass." One solution is the redefinition of biomass, utilizing a model approach that can be referenced by state legislatures, state agencies, and Congress. The second solution would be for Congress to pass a federal RPS. In both cases, policymakers could adopt requirements for sustainability certification. Sustainability certification is discussed in the Section on the model approach.

A. *Redefining Biomass: A Model Approach*

The survey of the various definitions of biomass demonstrates the variety of approaches that states take in pursuing renewable energy objectives. These definitions are problematic for two key reasons: (1) most of the definitions fail to properly consider the sustainability of biomass;[127] and (2) the patchwork of definitions complicates efforts of companies operating in multiple states.[128] One way to resolve the issue is for policymakers to consider a model approach when enacting or revising renewable energy objectives.

The definition of "biomass" should not simply be a list of qualifying resources.[129] While including an exemplary, non-exhaustive list of qualifying resources can be helpful, the definition should specifically state the word "sustainable." The legislature should then craft a definition that includes environmental, economic, and social elements; or the legislature should specifically direct the implementing agency to craft the required elements. However, the legislature should direct the agency to consider the most recent scientific evidence, the sustainability efforts of other states (particularly those adjacent) regarding bioenergy, and the integration of other environmental policy, such as climate change policy and specific local issues. Alternatively, the legislature may try to tackle these issues. Considering the political nature of the legislative process, it might be better left to a regulatory body with expertise on the matter that is capable of weighing the concerns of various interested parties and experts.

Policymakers have another option to consider to ensure sustainability: sustainability certification. Sustainability certifications

127. *See supra* Section III.
128. William T. Reisinger, *Federal and State Renewable Portfolio Standards: Conflict or Harmony?*, 41 U. Tol. L. Rev. 877, 880 (2010).
129. *See supra* Section III.A.

take on a variety of forms that are utilized by a number of programs. Essentially, an accreditation body oversees criteria and provides certification to applicants that meet the criteria. In particular, policymakers could utilize programs such as those developed by RSB and the Council for Sustainable Biomass Production ("CSBP").

The objective of RSB certification program is to "provide a comprehensive scheme for verification of compliance with the RSB standards for responsibly produced, processed and traded biomass/biofuels."[130] Under this certification program, RSB sets the standards, industry implements the standards, and approved third parties verify that the implementation meets RSB criteria. Unlike many other certification programs, RSB covers the entire lifecycle from farm to end use.[131]

To determine compliance with RSB standards, RSB developed twelve principles to be used as compliance indicators.[132] The twelve principles are as follows:

- Legality
- Planning, Monitoring, and Continuous Improvement
- Greenhouse Gases
- Human and Labor Rights
- Rural and Local Development
- Food Security
- Conservation
- Soil
- Water
- Air
- Use of Technology, Inputs, and Management of Waste
- Land Rights

Each principle is accompanied by indicators to help potential applicants understand how to achieve the RSB principles. The comprehensiveness of the list is apparent from merely looking at the principles. However, the indicators provide even greater depth to the program.

The CSBP, a multi-stakeholder organization, is also developing a voluntary standard for biomass producers to demonstrate sustainability. These current standards are for biomass, but CSBP hopes to develop for biofuel and biopower. In the summer of 2011, CSBP released a draft version of its provisional standards. Ultimately, the

130. Roundtable on Sustainable Biofuels, Introduction to the RSB Certification Systems 3 (June 18, 2010), http://rsb.epfl.ch/files/content/sites/rsb2/files/Biofuels/Certification/June%202010/10-06-19-Introduction%20to%20the%20RSB%20Certification%20System.pdf.

131. Guariguata et al., *supra* note 27, at 1.

132. *See* Roundtable on Sustainable Biofuels, Indicators of Compliance for the RSB Principles & Criteria (Jan. 20, 2011), http://rsb.epfl.ch/files/content/sites/rsb2/files/Biofuels/Version%202/Indicators/11-01-20%20RSB%20Indicators%202-0.pdf.

standards will serve as the basis for certification and will be verified by independent third parties.

The CSBP standards are based on nine principles:

- Adherence to an integrated resource management plan
- Soil stability
- Conservation of biological diversity
- Recognition of the vulnerability of the water supply
- Mitigation of GHG emissions
- A focus on socio-economic well-being
- Compliance with legal requirements
- Transparency
- Continuous improvement

Although the two programs categorize the principles differently, the standards and program are similar to those developed by RSB. In fact, CSBP works closely with RSB, harmonizing the two programs. A key difference between CSBP and RSB is that the CSBP standards distinguish between silver and gold certification.

Practically speaking, policymakers might consider the adoption of RSB over CSBP because the RSB standard is more developed and currently in the pilot stage. However, utilizing either standard would be a significant step beyond where many states are today.

Linking economic incentives and sustainability standards is not a new suggestion.[133] A few states have already adopted incentive programs. There are already many states with credit multipliers, providing additional credit for the achievement of various policy measures.[134] Policymakers might also consider using a sustainability standard or certification program as an REC multiplier.[135] For example, energy produced with biomass that has been certified as sustainable would be worth twice as many credits as energy from uncertified biomass. Because cost of certification is expected to be relatively nominal,[136] REC multipliers could easily entice producers and users to seek sustainable biomass. Alternatively, perhaps more in line with the end target goals of RPSs, states might adopt an approach where REC value is reduced if biomass is not certified or in compliance with other

133. *See* Bluemel, *supra* note 11, at 696–97. Bluemel suggests linking economic incentives with environmental criteria; however, Bluemel seems to focus on developing countries, but developed countries should be leading the way to developing biomass sustainably. *Id.* at 691.

134. *See* Davies, *supra* note 35, at 1339.

135. Scholars have noted that certification requirements may raise issues regarding the violation of provisions of the World Trade Organization. GUARIGUATA ET AL., *supra* note 27, at 20. Voluntary programs would be less problematic. *Id.*

136. The estimate is .001 euros per litre, or converted to dollars per gallon, approximately .005 dollars per gallon; however, regional and local differences could drastically impact that number, with a significantly greater cost expected in developing countries. *See id.* at 15.

criteria. This ensures that the end target percentages of these objectives are not skewed.

The model approach could be adopted by state legislatures during enactment or amendment of the renewable energy objective. In the southeast United States, where the enactment of renewable energy objectives has not found a foothold, it will be particularly important to adequately define "biomass" due to the resource's enormous potential in the region.[137] The approach can also be considered by implementing agencies when encountering ambiguous standards.

In the event states continue to ignore sustainability issues, there is another option: a national renewable portfolio standard.

B. *National Renewable Portfolio Standard*

A national RPS would perhaps be the best way to ensure that a definition is uniform and that it considers sustainability. Congress has considered a national RPS and bills to unify REC markets.[138] President Obama mentioned a clean energy standard in both his 2011 and 2012 State of the Union addresses.[139] A clean energy standard is similar to a renewable energy objective except that a clean energy standard is broader, including some fossil fuel use in some proposals.[140] In addition to determining the scope of the energy standard, clean or renewable, the extent to which the standard would preempt or synchronize with state standards must also be determined.

While a national renewable energy objective could help eliminate concerns about biomass sustainability, there are positives and negatives to weigh. There is much debate over the actual benefits of renewable energy objectives.[141] Yet, these programs are relatively new, and much of the current analyses of these programs rely on assumptions, not actual, real-world outcomes.[142] Essentially, the debate cen-

137. Jim Rossi, *The Limits of a National Renewable Portfolio Standard*, 42 CONN. L. REV. 1425, 1431 (2010) (noting the potential for biomass in the southeast).

138. *Id.* at 1429–30 (stating that often the mandate aspect and market unification aspect of a federal RPS are conflated and noting that the two aspects must be considered separately).

139. Barack Obama, President of the United States, State of the Union Address (Jan. 24, 2012) (transcript available at http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address); Barack Obama, President of the United States, State of the Union Address (Jan. 25, 2011) (transcript available at http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address).

140. *See* Barack Obama, President of the United States, State of the Union Address (Jan. 25, 2011) (transcript available at http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address); *see also* SENS. JEFF BRINGAMAN & LISA KURKOWSKI, COMM. ON ENERGY & NATURAL RES., WHITE PAPER ON A CLEAN ENERGY STANDARD 2 (2011), http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=D9286e01-b2ea-0c97-971a-6b9d16ef32ef.

141. Davies, *supra* note 35, at 1370–75.

142. It is not surprising, then, that one scholar noted that the "jury is out." *Id.* at 1375, 1382.

ters on the economic and environmental benefits, jurisdictional impacts, and overall impact on the energy market.[143]

Perhaps the most intuitive benefit of a national standard is the fact that a national standard can hasten the increase of renewable energy in the United States, as renewable energy objectives spur technological innovation and subject a greater portion of total energy production to the program.[144] Such energy diversity would prepare the nation for price spikes and increase our export potential within the renewable energy sector.[145]

With an increasing percentage of energy from renewable resources, a national standard can also reduce greenhouse gas emissions, helping to mitigate the effects of climate change.[146] Although the extent of climate change mitigation has been questioned, particularly in instances where larger scale reforms to the electric power systems are left unaddressed.[147] Thus, policymakers should consider how the RPS interacts with other energy policies and enact changes to ensure compatibility.[148] For example, a poorly designed RPS could lead to an increase in the use of coal for base-load requirements, whereas natural gas would be more beneficial due to its lower greenhouse gas footprint.[149] Furthermore, because a national RPS may not be a substitute solution for greenhouse gas emissions, policies directly addressing these emissions, such as a carbon tax or cap-and-trade policy, should also be considered.[150] As a national RPS can help reduce air emissions, the objective acts as a mechanism to further integrate energy and environmental policy objectives.[151]

One often cited argument against a national RPS is that a national RPS would create winners and losers because renewable resources vary by region.[152] In particular, it is argued that a national RPS severely disadvantages states with minimal renewable resources.[153] If true, this point would differ little from the current state of energy, where winners and losers are already determined based on state re-

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143. *Id.* at 1366.

144. *See* Reisinger, *supra* note 128, at 882; Rossi, *supra* note 137, at 1432; Davies, *supra* note 35, at 1396. Although, there is some concern that a national program would halt the "race to the top." *See* Davies, *supra* note 35, at 1342. Others argue that there are already significant incentives in place. *See id.* at 1367. However, the presence of current incentives does not mean that further policies to accelerate innovation are unnecessary.

145. *Id.* at 1358.

146. *Id.*

147. Rossi, *supra* note 137, at 1428–29.

148. *Id.* at 1442.

149. *Id.* at 1440–41.

150. *Id.* at 1443–44.

151. Davies, *supra* note 35, at 1391–92.

152. *Id.*; Rossi, *supra* note 137, at 1433–34.

153. *See* Davies, *supra* note 35, at 1342.

sources.[154] While it is true that renewable resources vary by state,[155] all states have some renewable resource that can be utilized.[156] If these resources pale in comparison to other states, a nationwide REC market can help alleviate concerns about regional deficiencies.[157] This is because a nationwide REC market ensures that obligated parties place renewable generation capacity in places where the technology will be economically feasible.[158] Thus, a well-designed[159] national RPS can likely avoid disadvantaging those states with, comparatively speaking, minimal renewable resources.

One clear advantage of a national RPS is uniformity.[160] There is significant variance in the way these systems are designed and in the way key terms are defined.[161] These various systems and definitions complicate compliance efforts by companies operating in multiple states.[162] These efforts can be complicated further by the numerous geographic limitations that state objectives impose, as a majority of state objectives contain geographic limitations.[163] These geographic limitations create additional compliance hurdles that limit the efficacy of the program.[164] In essence, current objectives create trade barriers.[165] The risk of this so-called "patchwork regulation," which hampers the growth of the renewable energy sector, is real.[166] With precise definitions and a creation of a nationwide REC market,[167] a

154. *Id.* at 1390.

155. Rossi, *supra* note 137, at 1431. While the potential for bioenergy in the southeast is strong, the southeast is the one region of the country where renewable energy objectives are significantly absent. *Id.*

156. Davies, *supra* note 35, at 1390.

157. *Id.*; Reisinger, *supra* note 128, at 884.

158. *See* Reisinger, *supra* note 128, at 884; Davies, *supra* note 35, at 1357. It has been noted that a national RPS policy would be regressive. *See* Rossi, *supra* note 137, at 1435.

159. Davies, *supra* note 35, at 1375. The success of current programs has varied; a national RPS should strongly consider aspects of these programs that are successful and those that are not. *Id.* at 1344.

160. *Id.* at 1342; *cf.* Rossi, *supra* note 137, at 1434 (reasoning that because of the wide range in the design of state objectives, the effects of a national RPS would vary significantly depending on the state).

161. Davies, *supra* note 35, at 1387–88; Reisinger, *supra* note 128, at 880. Davies's survey demonstrates the significant variation within these policies. *See* Davies, *supra* note 35, at 1376–79. The survey in this Article examines one of these variables, the definition of "biomass" in these varying policies.

162. Reisinger, *supra* note 128, at 880.

163. Davies, *supra* note 35, at 1379, 86.

164. *Id.* at 1379; Rossi, *supra* note 137, at 1432.

165. Davies, *supra* note 35, at 1375.

166. *Id.* at 1343.

167. *See* Reisinger, *supra* note 128, at 885 (arguing that precise definitions and the creation of a national REC market should be present in a national RPS); *but see* Rossi, *supra* note 137, at 1441 (warning against narrow definitions that discourage technological innovation). A clean energy standard would be broad enough to cover innovation for all sources. Further, this Article does not argue for narrow definitions. Various sources of biomass, if not all, can be utilized sustainably. Thus, "biomass"

national RPS can help to mitigate these patchwork problems and increase regulatory certainty, particularly for those operating in the interstate market.[168] Scholars have also noted that reducing patchwork regulation in other areas increases the potential for energy siting issues to become more regionalized.[169] All in all, a more predictable market would be created.[170]

Overall, the benefits of a national RPS would likely outweigh the potential negative aspects. The question then is whether a national RPS would preempt state efforts or harmonize with them. Scholars differ on which approach is superior.[171] However, cooperative federalism has been utilized successfully in the area of environmental law.[172] Furthermore, it is important that states with more stringent standards are able to continue on an accelerated path.[173] Thus, a cooperative approach where the federal government establishes, and states decide whether to adopt, a more stringent standard is preferred.

Under this approach, a minimum requirement would be determined and the REC market would be unified.[174] The definitions of qualifying resources, such as biomass, and other key aspects would also have to be standardized. While it may be appealing to simply utilize the broadest definition currently adopted, allowing states to maintain current efforts, this solution is not viable. Although this approach might ease implementation, it is not feasible for definitions, particularly the definition of "biomass," because the current definitions are far too inclusive.[175] The approach may be utilized in other areas such as the minimum requirement.[176] Of course, as it is important that states may impose more stringent standards,[177] the national program would allow more stringent state efforts.

V. CONCLUSION

The potential for biomass as a renewable energy resource is truly vast, capable of replacing at least 30% of the domestic petroleum consumption. But not only can biomass help provide energy security, bio-

should be defined accordingly to avoid the negative effects associated with unsustainable biomass.

168. Rossi, *supra* note 137, at 1432; Davies, *supra* note 35, at 1368.

169. Rossi, *supra* note 137, at 1448–49.

170. Reisinger, *supra* note 128, at 880.

171. *Compare* Davies, *supra* note 35, at 1397 (preferring that a national approach supersede state efforts), *with* Reisinger, *supra* note 128, at 878 (explaining that a national approach should coordinate with the current menagerie of state regulations).

172. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 103–04 (5th ed. 2006).

173. Reisinger, *supra* note 128, at 884.

174. This approach is similar to suggestions of other scholars. *Id.* at 880.

175. *See supra* Section III.A.

176. *But cf.* Reisinger, *supra* note 128, at 884–85 (arguing that an aggressive standard should be set to prevent state dilution).

177. *Id.*

mass can also produce environmental benefits such as emitting few air pollutants and mitigating climate change. However, if not carefully utilized, biomass has many potential drawbacks such as indirect land use change, interference with food production, deforestation, and adverse agricultural impacts. Carefully designed renewable energy objectives can help reduce or negate these adverse impacts. However, the vast majority of current RPSs and renewable energy goals in the United States do not properly account for sustainability when defining "biomass" as a qualifying resource.

Policymakers, whether at the state or federal level, must consider the sustainability of biomass when developing renewable energy objectives. Whether by agencies or legislatures, these decisions must be based on recent scientific evidence, the sustainability efforts of other states, and sound environmental policy. In some cases, it may be appropriate to integrate sustainability certification into these policies. Additionally, Congress should strongly consider the adoption of a non-preemptive national RPS that unifies REC markets and definitions, although some regional differences can be accounted for.

Biomass has significant potential as a long-term solution to the various energy needs of the United States. However, the resource must be developed sustainably. Policymakers, therefore, must ensure that "biomass" is adequately defined as these resources are developed to meet our energy needs for decades to come.