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Eulogizing Renewable Energy Policy

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EULOGIZING RENEWABLE ENERGY POLICY

LINCOLN L. DAVIES*

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INTRODUCTION

The world of renewable energy policy we have long known is no more. For decades, particular types of laws encouraging the use of renewable energy have dominated. Now, all that is shifting.

Increasingly, jurisdictions are changing the laws they use to promote renewables—switching from one approach to another—as they also make their policies more sophisticated, complex, nuanced, and fluid. At the same time, renewable energy policies have begun to converge.¹ Labels that once distinguished policy types from each other no longer apply, because the boundaries between them have become too blurred.² And, both resistance to

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1. See TOBY D. COUTURE ET AL., THE NEXT GENERATION OF RENEWABLE ELECTRICITY POLICY: HOW RAPID CHANGE IS BREAKING DOWN CONVENTIONAL POLICY CATEGORIES 1 (2015).

2. *Id.*

adopting new policies and pressure to alter existing ones continues to mount.³ The very foundation of renewable energy support—or at least the historical basis for how policymakers traditionally have promoted these technologies—has begun to erode.

Perhaps it is too soon to declare the death of traditional renewable energy policy, in the United States or elsewhere. But it is clear that the situation policymakers now find themselves in is markedly different from that of even the recent past. Rather than simply offering a paean to prior renewable energy policies' success in helping remake energy markets,⁴ then, it is essential to also stop and take stock—to assess both where renewable energy policy has been and where it may be going. For, while the current form of renewable energy policy may not be (quite) dead (just) yet, it is undeniable that the status quo will not remain.⁵

This essay offers such a eulogy. Using legal support for renewables in the U.S. electricity sector as its primary lens, the essay approaches the changing nature of renewable energy policy today from three perspectives. First, it puts this change in historical context, by tracing different eras and phases of renewable energy policy support. Second, it identifies and describes key drivers of why the change is taking place. Third, it explores the scope of possible paths forward for renewable energy policy.

The essay concludes by suggesting that both policymakers and the renewable energy industry will do well to accept that change is coming—and actively seek to manage it—rather than attempting to simply entrench existing methods for promoting renewables. The importance of this lesson cannot be overstated, for the uncertain futures of renewable energy use and renewable energy policy are intrinsically interlinked. While we cannot know what the renewable energy policy of the future will be, what is already clear is that it will not be what it has been in the past. The same, no doubt, must also be true of society's overall energy path.

3. See, e.g., Steven Mufson & Tom Hamburger, *A Battle Is Looming Over Renewable Energy, and Fossil Fuel Interests Are Losing*, WASH. POST, Apr. 25, 2014, https://www.washingtonpost.com/business/economy/a-battle-is-looming-over-renewable-energy-and-fossil-fuel-interests-are-losing/2014/04/25/24ed78e2-cb23-11e3-a75e-463587891b57_story.html?utm_term=.bd7116c8feaa.

4. See, e.g., P.D. Lund, *Effects of Energy Policies on Industry Expansion in Renewable Energy*, 34 RENEWABLE ENERGY 53 (2009) (documenting the success of Germany's policies).

5. See, e.g., Lincoln L. Davies & Kirsten Allen, *Feed-in Tariffs in Turmoil*, 116 W. VA. L. REV. 937 (2013); Fernando Dias Simoes, *When Green Incentives Go Pale: Investment Arbitration and Renewable Energy Policymaking*, 45 DENV. J. INT'L L. & POL'Y 251, 283 (2017); Andrés Cala, *Renewable Energy in Spain Is Taking a Beating*, N.Y. TIMES, Oct. 8, 2013, <http://www.nytimes.com/2013/10/09/business/energy-environment/renewable-energy-in-spain-is-taking-a-beating.html>.

I. THE HISTORICAL ARC OF RENEWABLE ENERGY POLICY

Composing an accurate portrait of renewable energy policy is difficult. It is difficult for many reasons, not least among them that today's renewable energy policy is as rapidly evolving as it is expansive in scope. Complicating the picture even more, multiple legitimate perspectives exist for examining the historical arc of renewable energy policy.

Here, three perspectives take focus: *eras* of renewable energy policy according to the policies' end goals, *steps* of the policy according to its emphasis on market alteration, and *phases* of renewable energy policy in terms of the implementing mechanisms' developmental evolution. In broad strokes, these trajectories might be seen as developing along parallel tracks and on generally similar timeframes. Nonetheless, each viewpoint offers different and important insights into the overall evolution of renewable energy policy.

A. *Eras—End Goals*

Felix Mormann has offered the clearest articulation to date of how renewable energy policy has evolved over time to pursue different overarching objectives.⁶ Mormann notes that renewables policies began by emphasizing efficacy.⁷ This was necessary, because there was broad doubt about whether nascent technologies like renewables could compete in a mature industry like electricity.⁸ Once renewables began proving their merit, though, lawmakers refined their policies to place greater emphasis on economic efficiency.⁹ Achieving the same (or better) results at a lower cost was key, because price is the primary coin of the realm in electricity markets.¹⁰ Finally, and only recently and tentatively, renewable energy policies have begun to also embody normative goals of equity.¹¹ This is the holy grail: marrying all three objectives together into a new version of renewable energy policy

6. See Felix Mormann, *Clean Energy Equity*, UTAH L. REV. (forthcoming 2018) (on file with author).

7. *Id.*

8. See DAVID JACOBS, RENEWABLE ENERGY POLICY CONVERGENCE IN THE EU: THE EVOLUTION OF FEED-IN TARIFFS IN GERMANY, SPAIN AND FRANCE 176–77 (John J. Kirton & Miranda Schruers eds., Routledge 2016) (2012).

9. Mormann, *supra* note 6.

10. See *New York v. FERC*, 535 U.S. 1 (2002).

11. Mormann, *supra* note 6.

that maximizes effectiveness, efficiency, and equity all at once. It is an aspiration that echoes heavily in the idea of sustainability.¹²

The long view of U.S. renewables electricity policy broadly tracks the same historical sweep that Mormann describes from a global perspective. The United States' first real shot at promoting renewables was the Public Utility Regulatory Policies Act of 1978, or PURPA.¹³ But PURPA, as originally adopted, was a blunt tool. It focused heavily on efficacy. It told utilities that they had to buy power from eligible renewables facilities, irrespective of whether they wanted to do so or not (and certainly, they did not).¹⁴ Granted, PURPA included within it an efficiency regulator—the limit that utilities had to pay only up to their “avoided cost” to renewables facilities¹⁵—but the law left the setting of avoided costs up to states, and at least some set it high enough that PURPA had a meaningful effect on the market.¹⁶

Fast forward from the 1970s to the 1990s. The clear successor policy to PURPA is the Renewable Portfolio Standard (RPS), which individual states started adopting in that decade.¹⁷ The Renewable Portfolio Standard, while focused on bringing more renewables into the market, built its entire architecture around the idea of efficiency.¹⁸ Virtually every state-level RPS measures compliance in terms of renewable energy credits, or RECs.¹⁹ Using RECs allows utilities to comply with RPSs at the lowest cost. Rather than having to build its own renewable energy facility, a utility can simply buy what is effectively a financial instrument, created by a producer that can supply renewable power at a lower price, and achieve compliance at a minimum cost for all. RPSs, in short, aimed to usher in an era of efficiency in U.S. renewable electricity policy.²⁰

12. See, e.g., J.B. Ruhl, *Sustainable Development: A Five-Dimensional Algorithm for Environmental Law*, 18 STAN. ENVTL. L.J. 31, 39, 43 (1999).

13. Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended at 16 U.S.C. §§ 2601–2645 (2018)).

14. 18 C.F.R. § 292.303 (2012).

15. *Id.* § 292.304.

16. RICHARD F. HIRSH, POWER LOSS: THE ORIGINS OF DEREGULATION AND RESTRUCTURING IN THE AMERICAN ELECTRIC UTILITY SYSTEM 89–100 (1999).

17. See, e.g., Ronald H. Roseneberg, *Harmonious Federalism in Support of National Energy Goals—Increased Wind Renewable Energy*, 85 N.D. L. REV. 781, 812–13 (2009).

18. Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1394 (2010).

19. Karlynn S. Cory & Blair G. Swezey, *Renewable Portfolio Standards in the States: Balancing Goals and Rules*, 20 ELECTRICITY J. 21, 22 (2007).

20. See Davies, *supra* note 18, at 1360; cf. David Schraub, *Renewing Electricity Competition*, 42 FLA. ST. U. L. REV. 937 (2015) (arguing that REC markets could be leveraged to further electricity restructuring).

Likewise, as is true on the global scale, equity concerns are only beginning to emerge in U.S. renewables policy. They are, however, surfacing both increasingly and quite prominently. The fact that RPSs remained state-based rather than being nationalized swung heavily on equity concerns.²¹ Comparatively, wind- and solar-poor states complained that a national RPS would penalize them.²² The growing battles over rooftop solar are all about equity. Non-solar customers assert they are unfairly being forced to subsidize solar owners; solar users contend that changes to policy inequitably upset their reasonable expectations when they chose to buy solar.²³ At the regional scale, entire lines of cases have begun to develop around equitable notions of how system upgrade costs for moving renewables like wind power should be allocated among different users, with doctrines like “cost causation” being resurrected to help parse the dilemma.²⁴ Certainly, such equity concerns are not new. Just as certainly, they are not going away anytime soon.

B. Steps—Market Development

A parallel way of considering the developmental arc of renewable energy policy is what Elizabeth Doris has called the path toward “market saturation.”²⁵ This conceptualization aligns with the division some scholars have drawn between “technology-push” and “market-pull” policies.²⁶ Doris sees three sequential steps that policies take toward preparing renewable technologies

21. See David J. Hurlbut, *Multistate Decision Making for Renewable Energy and Transmission: An Overview*, 81 U. COLO. L. REV. 677, 681 (2010).

22. See Davies, *supra* note 18, at 1342; David B. Spence, *The Political Barriers to a National RPS*, 42 CONN. L. REV. 1451, 1470–71 (2010).

23. See Lincoln L. Davies & Sanya Carley, *Emerging Shadows in National Solar Policy? Nevada’s Net Metering Transition in Context*, 30 ELECTRICITY J. 33, 35, 40 (2017).

24. See, e.g., *Black Oak Energy, LLC v. FERC*, 725 F.3d 230, 237–39 (D.C. Cir. 2013); *Ill. Commerce Comm’n v. FERC*, 576 F.3d 470, 479–81 (7th Cir. 2009); *Midwest ISO Transmission Owners v. FERC*, 373 F.3d 1361, 1368–71 (D.C. Cir. 2004); see also Alexandra B. Klass, *The Electric Grid at a Crossroads: A Regional Approach to Siting Transmission Lines*, 48 U.C. DAVIS L. REV. 1895 (2015); Ari Peskoe, *Easing Jurisdictional Tensions by Integrating Public Policy into Wholesale Electricity Markets*, 38 ENERGY L.J. 1 (2017); David B. Spence, *Naïve Energy Markets*, 92 NOTRE DAME L. REV. 973, 1020–23 (2017).

25. ELIZABETH DORIS, U.S. DEP’T OF ENERGY, *POLICY BUILDING BLOCKS: HELPING POLICYMAKERS DETERMINE POLICY STAGING FOR THE DEVELOPMENT OF DISTRIBUTED PV MARKETS 2* (2012); see also Vitaliy A. Krasko & Elizabeth Doris, *State Distributed PV Policies: Can Low Cost (to Government) Policies Have a Market Impact?*, 59 ENERGY POL’Y, 172, 173 (2013).

26. Mary Jean Bürer & Rolf Wüstenhagen, *Which Renewable Energy Policy Is a Venture Capitalist’s Best Friend? Empirical Evidence from a Survey of International Cleantech Investors*, 37 ENERGY POL’Y 4997, 4998 (2009).

for full market saturation.²⁷ At the first step, the policy simply aims to *prepare* the market for the technology. It does so by removing institutional or market access barriers.²⁸ At the second step, the policy attempts to *create* a market for the technology. It does so by addressing investor uncertainty, educating the public, or addressing public misperceptions about the technology.²⁹ At the third step, the policy tries to *expand* the market. It does so by trying to drive down technology costs.³⁰

While different policy tools often might fit neatly into one of Doris' three steps, it is the policies themselves that also evolve over time—and in so doing, may move from one step to the next in terms of what they seek to accomplish. There is a strong argument that state RPSs in the United States, taken in the aggregate, already have spanned all three of Doris' steps. When RPSs first started out, they tended to be quite modest.³¹ One of the first RPSs in the United States, for instance, Iowa's, was remarkably meek in its aspirations. It asked for utilities in the state to install a mere 105 megawatts (MW) of combined renewables.³² Such a goal might fairly be characterized as preparing the system for a market that would more fully develop only later. By contrast, subsequent RPSs imposed more meaningful mandates, with a spate of laws targeting twenty percent renewable electricity production by 2020.³³ These policies might accurately fall into Doris' second step of market creation. Yet, more recent amendments to some RPSs go even further. California now has set a goal of fifty percent renewables,³⁴ Vermont has adopted a seventy-five percent target,³⁵ and Hawaii has said it will reach one hundred percent renewable electricity by 2045.³⁶ If such objectives are not market saturation itself, there can be no doubt they count as Doris' third step in policy evolution—market expansion.

27. DORIS, *supra* note 25, at 2.

28. *Id.* at 3.

29. *Id.* at 3–4.

30. *Id.* at 4–5.

31. See Lincoln L. Davies, *State Renewable Portfolio Standards: Is There a "Race" and Is It "To the Top"?*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 3, 59 (2012).

32. IOWA CODE §§ 476.41–.50 (2014).

33. See Davies, *supra* note 31, at 14, 57.

34. S.B. 350, 2015-2016 Leg., Reg. Sess. (Cal. 2015); see Cal Pub. Util. Code § 399.30.

35. H.B. 40, 2015-2016 Gen. Assemb., Reg. Sess. (Vt. 2015); see Vt. Stat. Ann. tit. 30, §§ 8001 *et seq.*

36. H.B. 623, 28th Leg., Reg. Sess. (Haw. 2015); see Haw. Rev. Stat. Ann. § 269-92 (2016).

C. Phases—Policy Evolution

A third way of seeing the trajectory of renewable energy policy is to look at the approach—or developmental evolution—of its implementing laws. That is, renewable energy policy tends to go through different phases over time, with each phase representing a new developmental stage in the policy's progression.

In the early years, renewable energy policies tend to expand in use. At a broad scale, this is a time, then, of policy proliferation. Different jurisdictions try different approaches and learn from each other's experiences. But even more important: more and more jurisdictions adopt the relevant renewable energy support policy.³⁷ This naturally leads to a second policy phase, wherein the implementing mechanisms become more complex, complicated, and sophisticated. This is a stage of reinvention.³⁸ Policies are refined and reformulated to address problems they did not originally foresee—and to take into account new concerns that experience has brought to light. Finally, there is a phase of policy convergence.³⁹ Policymakers borrow ideas and design features from one policy and graft them onto others. Cross-pollination is *modus operandi*. And thus, policies begin looking more like one another—reflecting each other in their scope, shape, approach, design, and effort.⁴⁰

Support for rooftop solar in the United States largely has followed this path. In addition to tax credits, the key policy for promoting U.S. rooftop solar has been net metering.⁴¹ These policies took hold at the state level following the adoption of PURPA in 1978 and have only grown since then.⁴² Jurisdiction after jurisdiction has adopted them, so that now 40 states plus Washington, D.C. have some form of statewide or utility-specific net metering rules in place.⁴³ Recently, though, states have begun revisiting their laws—sometimes keeping them in place,

37. For an example of this phenomenon, see Sanya Carley et al., *Adoption, Reinvention and Amendment of Renewable Portfolio Standards in the American States*, 37 J. PUB. POL'Y 431 (2016).

38. *See id.*

39. *See* COUTURE ET AL., *supra* note 1.

40. *See id.*

41. *See* Kevin Karges, Comment, *Net Metering: Do Non-Solar Homeowners and Utility Companies Have a Legitimate Gripe?*, 3 ARIZ. J. ENVTL. L. & POL'Y 1017, 1019 (2014).

42. Davies & Carley, *supra* note 23, at 33.

43. *See Net Metering*, N.C. CLEAN ENERGY TECH. CTR. (Nov. 2017), http://ncsolarcenterprod.s3.amazonaws.com/wp-content/uploads/2017/11/DSIRE_Net_Metering_November2017.pdf. Arguably, the rapid adoption of net metering was further spurred, in part, by the Energy Policy Act of 2005's requirement that all states consider using such rules. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1251, 119 Stat. 594, 962–63.

sometimes tweaking them just a bit, and sometimes overhauling them so significantly that they are not considered net metering at all but something else: “NEM 2.0” or “net billing.”⁴⁴ This transition away from “true” net metering to something more like “net billing” reflects a policy convergence itself—a shift to something more like what PURPA originally required for larger facilities decades ago, and that other policies, like Germany’s feed-in tariff regime, have recently moved toward as well.

II. THE ROOTS OF THE RENEWABLE ENERGY POLICY REVOLUTION

The fact that U.S. renewable energy policy, or at least core aspects of it, now exists in the final stages of its developmental trajectory—whether measured through eras, steps, or phases—says much. If renewable energy policy has an evolutionary arc, it has now arrived toward the end of that sweep. The iteration, in other words, of U.S. renewables policy that has been in place for so long is now coming to an end.

At the global scale, the trend is even starker. Jurisdictions across the world have significantly altered their approaches to supporting renewables in recent years.⁴⁵ South Korea dropped its feed-in tariff scheme for a new RPS.⁴⁶ Great Britain began with an auction mechanism (called the Non-Fossil Fuel Obligation, or NFFO), swapped in an RPS policy (its Renewables Obligation, or RO), and then added feed-in tariffs on top of its RO. Recently, Great Britain announced that it will effectively come full circle, transitioning away from that combination in favor of contracts for difference (CfD) that act basically as an auction.⁴⁷

44. Davies & Carley, *supra* note 23, 35–36. Notably, some states that are only now adopting rooftop solar support policies are also using these new, evolved versions of policy rather than traditional net metering laws. See N.C. CLEAN ENERGY TECH. CTR. & MEISTER CONSULTANTS GRP., THE 50 STATES OF SOLAR: 2015 POLICY REVIEW AND Q4 QUARTERLY REPORT 12, 17–18 (2016) [hereinafter THE 50 STATES OF SOLAR]; see also *In re* The Commission’s Investigation of Value and Cost of Distributed Generation, A.C.C. Decision No. 75859 (Jan. 1, 2017); S.B. 1050, 28th Leg., Reg. Sess. (Haw. 2015); H.B. 1139, 98th Leg., Reg. Sess. (Mich. 2016); La. Pub. Serv. Comm’n Order, Docket No. R-33929 (Dec. 8, 2016).

45. See Lincoln L. Davies et al., *Climate Regulation of the Electricity Industry: A Comparative View from Australia, Great Britain, South Korea, and the United States*, 13 S.C. J. INT’L L. & BUS. 109 (2017).

46. Davies & Allen, *supra* note 5, at 984–92; see also Jonathan Gifford, *Korea’s Cautious Comeback*, PV MAGAZINE (Mar. 1, 2013), https://www.pv-magazine.com/magazine-archive/koreas-cautious-comeback_100010400/?tx_ttnews_backCat%5D=215&cHash=77adbf15f8bed8a9ab9617cedf0f11c.

47. See Davies et al., *supra* note 45, at 135–39. For further discussion, see Catherine Mitchell & Peter Connor, *Renewable Energy Policy in the UK 1990-2003*, 32 ENERGY POL’Y 1935 (2004); Catherine Mitchell, *The England and Wales Non-Fossil Fuel Obligation: History and Lessons*, 25 ANN. REV. ENERGY & ENV’T 285 (2000); Geoffrey Wood & Stephen

Of course, Germany may be the most pronounced example. Beginning in the 1990s, that nation gained attention for propagating what became one of the most popular renewable energy support policies globally—the feed-in tariff.⁴⁸ Germany’s actions in the early stages of this policy were primarily to make its law stronger, more aggressive, and more broadly applicable.⁴⁹ As its policy success mounted, however, the nation continued to reinvent its policy, making it more nuanced, market-focused, and less like a traditional feed-in tariff in many ways.⁵⁰ Eventually, Germany replaced the very heart of its feed-in tariff scheme with a more market-oriented approach, only to turn around and swap that out for a new reverse auction, or tendering, scheme.⁵¹

Germany’s story may be the highest profile, but it hardly stands alone. Multiple other jurisdictions have not only switched out their renewable energy policies of late, but have also modified existing schemes so significantly that they effectively have become something else.⁵² In general, this is a march toward policies that rely more on market mechanisms, but it is at the same time an effort to promote a greater diversity of renewables, by involving a broader array of market players.⁵³

The result, in turn, is often new versions of longstanding policy tools that suddenly look as much like alternative devices as they do their original selves. Feed-in tariffs and RPSs, for instance, long

Dow, *What Lessons Have Been Learned in Reforming the Renewables Obligation? An Analysis of Internal and External Failures in UK Renewable Energy Policy*, 39 ENERGY POLY 2228 (2011); B. Woodman & C. Mitchell, *Learning from Experience? The Development of the Renewables Obligation in England and Wales 2002-2010*, 39 ENERGY POLY 3914 (2011). For more on the move to competitive auctions to support renewables in Europe, see Pablo del Río & Pedro Linares, *Back to the Future? Rethinking Auctions for Renewable Electricity Support*, 35 RENEWABLE & SUSTAINABLE ENERGY REV. 42 (2014); PABLO DEL RÍO ET AL., IDENTIFICATION OF ALTERNATIVE POLICY OPTIONS TO AUCTIONS FOR RES-E SUPPORT (2016), http://auresproject.eu/sites/aures.eu/files/media/documents/aures_d6_1_final.pdf.

48. See RANIER HINRICHS-RAHLWES ET AL., *Sustainable Energy Policies for Europe: Towards 100% Renewable Energy*, in 6 SUSTAINABLE ENERGY DEV. 1, 4, 30 n.12 (Jochen Bundschuh ed., 2013); see also Mischa Bechberger & Danyel Reiche, *Renewable Energy Policy in Germany: Pioneering and Exemplary Regulations*, 8 ENERGY FOR SUSTAINABLE DEV. 47, 49 (2004); Volkmar Lauber & Lutz Mez, *Three Decades of Renewable Electricity Policies in Germany*, 15 ENERGY & ENV’T 599, 602–04 (2004).

49. HINRICHS-RAHLWES ET AL., *supra* note 48, at 30.

50. See Davies & Allen, *supra* note 5, at 942–66.

51. *Erneuerbare-Energien-Gesetz* [EEG] [Renewable Energy Sources Act], Mar. 29, 2000, BGBl I, at 305, last amended by Art. I Gesetz [G], July 17, 2017, BGBl I at 2532 (Ger.); see also Matthias Lang & Annette Lang, *The 2014 German Renewable Energy Sources Act Revision – From Feed-in Tariffs to Direct Marketing to Competitive Bidding*, 33 J. ENERGY & NAT. RES. L. 131 (2015); Joshua S. Hill, *Germany Confirms End to Renewable Energy Feed-in Tariffs*, CLEAN TECHNICA (July 12, 2016), <https://cleantechnica.com/2016/07/12/germany-confirms-end-renewable-energy-feed-tariffs/>.

52. See COUTURE ET AL., *supra* note 1, at 25.

53. See *id.* at 5.

were seen as competing policy options—binary possibilities for states wanting to promote renewables.⁵⁴ Consider, however, the RPSs now in place in much of the United States. They often include “tiers” or “bands” of targets for various technologies, give different values to different kinds of RECs, and impose alternative compliance penalties that effectively act like a premium payment for renewable electricity.⁵⁵ Without expressly saying so, such laws function, in principle, much like feed-in tariffs. By the same measure, a modern feed-in tariff that gives producers a market-plus price, limits eligibility based on an overarching (or floating) end target, and spreads the program’s cost across all ratepayers arguably has as much in common with a traditional RPS as it does a standard-issue feed-in tariff. Increasingly, then, the lines between different renewable energy policy tools are being erased.⁵⁶

What is causing this phenomenon—the rapid rewriting of renewable energy support policies and their increasing convergence? To where can the roots of this new revolution in renewable energy policy be traced? At least four factors seem critical: increased use and aggressiveness of renewable energy policies, falling costs of technologies, growing equity concerns, and market and system changes required by integrating renewables facilities.

A. Policy Expansion

There is no question that renewable energy policies are far more prevalent today than in the past.⁵⁷ An observer from the 1970s—the time when the fields of energy law and policy were only beginning to emerge⁵⁸—would not even recognize the policy landscape today.

Two key effects flow from this policy expansion. First, the mere presence of more policies increases the likelihood that differences among them will emerge, particularly as different jurisdictions both learn from each other and engage in policy experimentation of

54. See, e.g., KARLYNN CORY ET AL., NAT’L RENEWABLE ENERGY LAB., FEED-IN TARIFF POLICY: DESIGN, IMPLEMENTATION, AND POLICY INTERACTIONS, 9–11 (2009); Volkmar Lauber, *REFIT and RPS: Options for a Harmonised Community Framework*, 32 ENERGY POL’Y 1405, 1405 (2004); Wilson H. Rickerson et al., *If the Shoe FITs: Using Feed-in Tariffs to Meet U.S. Renewable Electricity Targets*, 20 ELECTRICITY J. 73, 83–84 (2007).

55. Ryan Wiser et al., *Supporting Solar Power in Renewable Portfolio Standards: Experience from the United States*, 39 ENERGY POL’Y 3894, 3897 (2011).

56. See COUTURE ET AL., *supra* note 1, at 25.

57. See RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, RENEWABLES 2017 GLOBAL STATUS REPORT 186 (2017).

58. See Don Zillman, *Energy Law: Defining a Discipline*, 1 J. ENERGY L. & POL’Y 3–6 (1980).

their own. This tendency should only heighten when the use of a policy expands over geographic and political scales, which means that those policies will also encompass a greater diversity of renewable energy resources, political preferences and needs, and economic conditions.

Second, greater use of renewable energy policies should expand renewable energy deployment. The point seems obvious but may be less so than face value suggests. A large body of literature has developed assessing the effectiveness, along a variety of measures, of renewable energy policies.⁵⁹ The lessons from these studies are incredibly important, and policymakers would do well to respond to, and take into account, this new knowledge about how to make renewable energy laws more efficient, effective, and equitable as they manage, adapt, and amend their policies over time.⁶⁰ At the same time, a corollary is also plain: Many policies in fact have been effective at encouraging renewables use.⁶¹ Thus, while it would be far too crude to assert a specific linear relationship between the presence of any renewable energy policy and the deployment of the targeted technology in that area, it is also true that the growing use of renewables across the globe seems tied to the expanded use of policies to promote them.

B. Cost Reduction

The open secret of renewable energy policies is that they are not supposed to be permanent.⁶² Fancy labels can be applied to

59. See, e.g., Sanya Carley, *State Renewable Energy Electricity Policies: An Empirical Evaluation of Effectiveness*, 37 ENERGY POLY 3071 (2009); Fredric C. Menz & Stephan Vachon, *The Effectiveness of Different Policy Regimes for Promoting Wind Power: Experiences from the States*, 34 ENERGY POLY 1786 (2006); Gireesh Shrimali et al., *Evaluating Renewable Portfolio Standards for In-State Renewable Deployment: Accounting for Policy Heterogeneity*, 4 ECON. ENERGY & ENVTL. POLY 127 (2015); see also Galen Barbose et al., *A Retrospective Analysis of Benefits and Impacts of U.S. Renewable Portfolio Standards*, 96 ENERGY POLY 645 (2016); Erik Paul Johnson, *The Cost of Carbon Dioxide Abatement from State Renewable Portfolio Standards*, 36 RES. & ENERGY ECON. 332 (2014).

60. A key lesson of these studies is that policies vary in their level of successfulness, and policy design matters very much. See, e.g., C.G. Dong, *Feed-in Tariff vs. Renewable Portfolio Standard: An Empirical Test of Their Relative Effectiveness in Promoting Wind Capacity Development*, 42 ENERGY POLY 476 (2012); Reinhard Haas et al., *A Historical Review of Promotion Strategies for Electricity from Renewable Energy Sources in EU Countries*, 15 RENEWABLE & SUSTAINABLE ENERGY REV. 1003, 1026 (2011).

61. See, e.g., Haas et al., *supra* note 60.

62. See Alan Noguee et al., *The Projected Impacts of a National Renewable Portfolio Standard*, 20 ELECTRICITY J. 33, 38, 44 (2007); see also, e.g., Lincoln L. Davies, *Incentivizing Renewable Energy Deployment: Renewable Portfolio Standards and Feed-In Tariffs*, 1 KLRI J. L. & LEGIS. 39, 45–56 (2011); Jonathan A. Lesser & Xuejuan Su, *Design of an Economically Efficient Feed-In Tariff Structure for Renewable Energy Development*, 36 ENERGY POLY 981, 982 (2008).

this: for instance, *designed senescence*, the idea that renewable energy policies have a built-in shelf-life;⁶³ or *grid parity*, the concept that the policies are needed until renewables can compete on an equal footing with other generation technologies.⁶⁴ Either way, the same truth holds. The very idea of renewable energy support policies is to help scale up renewables production and deployment, in turn driving down their costs—thus making them competitive.⁶⁵ It is not to offer a perpetual subsidy.

As renewables laws have done the work they were designed to do, this message seems to have faded into the background. That should not be surprising. Energy markets hardly are truly free, with government intervention influencing their outcomes in complex and far-reaching ways. Further, given how well-documented the endowment effect is across policy contexts,⁶⁶ it should not be surprising when it takes hold for renewable energy support as well. Nonetheless, the simultaneous fall of renewable technology costs as policies to support them have risen explains much about why those policies have, in turn, become such an epicenter of political debate.⁶⁷

Indeed, recent cost reductions in renewables have been precipitous.⁶⁸ An obvious result is that policies designed to

63. The phrase is borrowed from the biological and medical fields. See, e.g., Mariavaleria Pellicanò et al., *Immune Profiling of Alzheimer Patients*, 242 J. NEUROIMMUNOLOGY 52, 55 (2012).

64. Arne Olson & Ryan Jones, *Chasing Grid Parity: Understanding the Dynamic Value of Renewable Energy*, 25 ELECTRICITY J. 17, 17 (2012); Chrissy Astbury, *How America's Solar Energy Policies Should Follow (and Stray) From Germany's Lead: Working Towards Market Parity Without Subsidies*, 27 IND. INT'L & COMP. L. REV. 209 (2017). Both the terms "grid parity" and "socket parity" are sometimes used to describe disruptive competition in the electricity sector. "Grid parity" refers to cost competitiveness at the wholesale level, while "socket parity" refers to cost competitiveness at the residential or retail level. See Shelly Hagerman et al., *Is Rooftop Solar PV at Socket Parity Without Subsidies?*, 89 ENERGY POL'Y 84, 84 (Feb. 2016).

65. E.g., David Zilberman et al., *On the Inclusion of Indirect Land Use in Biofuel Regulations*, 2011 U. ILL. L. REV. 413, 431 (2011); cf. Gershon Feder & Andrew Schmitz, *Learning by Doing and Infant Industry Protection: A Partial Equilibrium Approach*, 43 REV. ECON. STUD. 175, 175 (1976).

66. See, e.g., Brandon Hofmeister, *Bridging the Gap: Using Social Psychology to Design Market Interventions to Overcome the Energy Efficiency Gap in Residential Energy Markets*, 19 SOUTHEASTERN ENVTL. L.J. 1, 19–20 (2010); Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSP. 193, 199 (1991).

67. Davies & Allen, *supra* note 5, at 998; Adam Wilson, *The Future Looks Bright, or Does It? An Analysis of Solar Energy Law and Policy in the United States*, 22 J. ENVTL. & SUSTAINABILITY L. 333, 356–60 (2016). Another related, relevant factor is that many renewable energy technologies have become not only less expensive, but also more efficient in their operation. See *id.* at 351.

68. See INT'L RENEWABLE ENERGY AGENCY, *THE POWER TO CHANGE: SOLAR AND WIND COST REDUCTION POTENTIAL TO 2025*, 18 (2016); see also Silvio Marcacci, *Analysis: 50% Reduction in Cost of Renewable Energy Since 2008*, CLEAN TECHNICA (Sept. 11, 2013),

support renewables at one price point become obsolete when the underlying technology's costs shift downward. Adjustments, amendments, recalibrations—or entirely different approaches—are needed. This need is only further exacerbated when a policy seeks to promote different technologies, precisely because production and use costs vary by technology.⁶⁹ Meanwhile, as technology costs fall, political pressure to modify existing policies only increases, no doubt in part because the original rationale for the policy has begun to erode. Cost reductions, in short, do not just make renewable technologies more competitive. They also drive policy change in multiple ways.

C. Equity Dislocation

The policy changes spurred on by falling renewable technology costs inevitably also lead to changes in how costs and benefits are distributed across the electricity system, across electricity market participants, and across system users. Those changes, in turn, further increase pressure for policy change, albeit not necessarily in a single direction.

The phenomenon has become perhaps best recognized in the rooftop solar context, but it is hardly limited to that sphere. As new entrants—say, rooftop solar owners—enter the market, existing participants—such as investor-owned utilities—see the risk that their revenues will decline.⁷⁰ They thus press for changes to the policies that are encouraging uptake of the disrupting technology—in the United States, net metering for rooftop solar.⁷¹ Their arguments come in many forms and inevitably root themselves in equity.

For instance: Utilities say they cannot adequately serve all their customers, because they no longer are recovering all their costs of maintaining the system; they are shouldering an unfair burden.⁷² Or they assert that solar users are receiving an unfair advantage compared to other customers—a cross-subsidization—

<https://cleantechnica.com/2013/09/11/analysis-50-reduction-in-cost-of-renewable-energy-since-2008/>.

69. U.S. ENERGY INFO. ADMIN., LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2017, at 7–21 (Apr. 2017), https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf.

70. Elisabeth Graffy & Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*, 35 ENERGY L.J. 1 (2014); David Raskin, *Getting Distributed Generation Right: A Response to “Does Disruptive Competition Mean A Death Spiral for Electric Utilities?”*, 35 ENERGY L.J. 263 (2014).

71. See generally Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115 (2015).

72. *Id.* at 140.

because those users rely on the grid as a giant battery for their rooftop solar systems, without paying their full share of the value they receive from the grid.⁷³

As renewable technology costs decrease, such arguments only become more powerful. The gap between the cost of traditional and renewable generation narrows, making policy support less necessary, and exacerbating equity concerns. Predictably, different camps devise divergent labels for the trend. Utilities call the emerging threat of small-scale producers a potential “death spiral”;⁷⁴ pro-renewables and distributed generation advocates herald the possibility of a new “energy democracy.”⁷⁵ Somewhere in between, the more neutral moniker of “prosumers”—consumers who also produce energy—takes hold.⁷⁶

But the relative merits of these characterizations are beside the point. What matters is the emergence of the nomenclature in the first place and all that it represents in terms of the growing debates over how the system should evolve—debates that only stoke the flames of an already spreading wildfire of renewable energy policy change.

D. System Disruption

Just as possible equity dislocations—that is, translocations in the distribution of energy system benefits and costs—increase as the use of renewables spreads, so too do potential disruptions of the electricity system itself.⁷⁷ This is true both for the physical grid as well as the surrounding systems, such as electricity markets, that support it.⁷⁸ There is, in short, a self-perpetuating cyclical

73. *Id.* at 131. See generally Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 TEX. J. OIL, GAS, & ENERGY L. 211 (2016).

74. Raskin, *supra* note 70, at 263.

75. See, e.g., KRISTIN RALFF-DOUGLAS, CAL. PUB. UTIL. COMM’N, CUSTOMERS AS GRID PARTICIPANTS: A FUNDAMENTALLY NEW ROLE FOR CUSTOMERS 3 (2013); Joseph P. Tomain, *The Democratization of Energy*, 48 VAND. J. TRANSNAT’L L. 1125 (2015); Shelley Welton, *Grasping for Energy Democracy*, MICH. L. REV. (forthcoming 2018); AL WEINRUB & ANTHONY GIANCATARINO, TOWARD A CLIMATE JUSTICE ENERGY PLATFORM: DEMOCRATIZING OUR ENERGY FUTURE 4 (June 2015), http://www.localcleanenergy.org/files/Climate%20Justice%20Energy%20Platform_June%202015.pdf.

76. Sharon B. Jacobs, *The Energy Prosumer*, 43 ECOLOGY L.Q. 519, 519 (2016).

77. For a discussion on the issue of integrating renewables into the grid, see JURGEN WEISS & BRUCE TSUCHIDA, INTEGRATING RENEWABLE ENERGY INTO THE ELECTRICITY GRID: CASE STUDIES SHOWING HOW SYSTEM OPERATORS ARE MAINTAINING RELIABILITY 4 (2015), <http://info.aee.net/hubfs/EPA/AEEI-Renewables-Grid-Integration-Case-Studies.pdf?t=1440089933677>. See also INT’L RENEWABLE ENERGY AGENCY, RENEWABLE ENERGY INTEGRATION IN POWER GRIDS: TECHNOLOGY BRIEF 5–6 (2015).

78. See, e.g., Kenneth Rose, *Trouble in Market Paradise: Development of the Regional Transmission Operator*, 50 J. ECON. ISSUES 535 (2016).

relationship not only between renewable energy policies' success and equity concerns, but also between that success and disruption of the system with which those policies interface. The more successful renewables policies are, the more they give reason for their own alteration.

This relationship is not just hypothetical. One need not look far for its evidence. One example: Early RPSs in the United States typically did not include cost caps. But those features are relatively commonplace now, specifically because it became clear that RPSs could affect retail electricity prices, even if modestly.⁷⁹ Another: Only six years ago, the occasional presence of *negative* wholesale electricity prices—prices below zero—that some European markets saw on particularly cool, windy, sunny days seemed like the stuff of science fiction.⁸⁰ Now, similar effects occur in the United States,⁸¹ and serve as a dual-edged argument for pulling back on policies that promote some renewables, like rooftop solar, that cannot be readily controlled by system operators. Yet one more set of examples: Jurisdictions continue to experiment with how to strike the right balance in bringing facilities online under PURPA,⁸² and others, like Germany, have modified their laws to directly influence where and what kind of renewables are built.⁸³

The list goes on. The point is simple. As renewable energy policies become more and more effective, they increasingly disrupt the systems into which renewables must be integrated, which in turn further encourages resistance to the policies. In short: Renewable energy policy success destabilizes itself.

79. See Barbose et al., *supra* note 59, at 646.

80. Davies & Allen, *supra* note 5, at 963.

81. Ivan Penn, *California Invested Heavily in Solar Power: Now There's So Much That Other States Are Sometimes Paid to Take It*, L.A. TIMES, June 22, 2017, <http://www.latimes.com/projects/la-fi-electricity-solar/>.

82. Emily Hammond describes the current state-level changes taking place in PURPA implementation and use as falling into three key categories: increased reliance by renewables developers on PURPA as a support mechanism as RPS targets are met; growing efforts by utilities to reduce PURPA avoided cost rates or alter PURPA contract lengths; and shifting market dynamics as PURPA-qualifying entities gain access to further options for selling electricity. See Emily Hammond, *The Energy In-Betweens*, JURIMETRICS, (forthcoming 2018) (on file with author); see also *Portland Gen. Elec. Co. v. FERC*, 854 F.3d 692 (D.C. Cir. 2017) (addressing whether transmission constraints justify limiting PURPA purchase obligations); *Swecker v. Midland Power Coop.*, 807 F.3d 883 (8th Cir. 2015) (discussing a variety of changes in state-level PURPA implementations); *Exelon Wind 1, L.L.C. v. Nelson*, 766 F.3d 380 (5th Cir. 2014) (addressing whether PURPA purchase obligations can be confined to "firm" power production); Robert Walton, *Idaho Regulators Reduce PURPA Contracts from 20 to 2 Years*, UTILITY DIVE (Aug. 15, 2015), <https://www.utilitydive.com/news/idaho-regulators-reduce-purpa-contracts-from-20-to-2-years/404518/>.

83. See Bechberger & Reiche, *supra* note 48, at 34; Lauber & Mez, *supra* note 48, at 3.

III. THE FUTURE PATH OF RENEWABLE ENERGY POLICY

Arguably the most perilous endeavor in energy scholarship is predicting the future. That road is littered with casualties of this error.⁸⁴ The same might be said of prophesying the future of energy law and policy. Just as it was unthinkable in 2000 that natural gas would come to dominate the landscape of 2018,⁸⁵ no one would have thought in 1990 that the nation would be blanketed with RPSs by 2008. Energy policy futures often are just as uncertain as energy system futures themselves.

At the same time, it would be anomalous to eulogize the impending past life of renewable energy policy without looking, in some way, at what is yet to come. In this connection, two issues are key: where the policy may head in the short-term, given its current directions; and what its ultimate path may be in the long-run, given the many questions that surround its future.

A. Directions

Any effort to describe the overall trajectory of a body of law or policy inevitably will overlook much of the nuance, particularities, and distinctiveness that necessarily typify what happens on a jurisdiction-specific level. Still, it is clear that as a collective whole, renewable energy policies—both in the United States and beyond—have begun trending in several common directions.

The most obvious trend is change. Of course, change is always inevitable, but the change occurring today in renewable energy policy is remarkable nonetheless. For one, the rate of change is not only rapid but appears to be increasing. Certainly, the United States has already experienced this in the continuing amendment of its states' RPSs,⁸⁶ but it seems that now change is becoming more prominent in PURPA and net-metering regimes as well—not to mention U.S. jurisdictions' burgeoning experiments with feed-in tariffs.⁸⁷ The trend, moreover, is not limited to the United States. A recent report by the European Commission documented no fewer than ninety-nine changes or transitions to the renewable

84. VACLAV SMIL, *ENERGY AT THE CROSSROADS: GLOBAL PERSPECTIVES AND UNCERTAINTIES* 121 (2003).

85. See generally ROBERT W. KOLB, *THE NATURAL GAS REVOLUTION: AT THE PIVOT OF THE WORLD'S ENERGY FUTURE* (2014). For more on the historical role of natural gas in U.S. society, see Lincoln L. Davies & Victoria Luman, *The Role of Natural Gas in the Clean Power Plan*, 49 *JOHN MARSHALL L. REV.* 325, 327–51 (2015).

86. See Davies, *supra* note 31, at 64; Carley et al., *supra* note 37.

87. *THE 50 STATES OF SOLAR*, *supra* note 44, at 12, 18.

electricity support policies of E.U. member states since 1997, with roughly half of those taking place in the last ten years.⁸⁸ By itself, the rate and degree of such changes is notable. It likely portends the field's short-term future. But it is also critical because research has consistently shown that investor certainty is a key to renewable energy policy success.⁸⁹ To the extent, then, that this change is undermining that certainty, it must be managed.⁹⁰

This is particularly true given that a key direction of the ongoing change is to make renewable energy policy more market-oriented. Whether that means the future will come full circle to providing merely a bare minimum “avoided cost” level of support for renewables as PURPA originally did—forty years ago, in 1978—remains to be seen.⁹¹ What is clear, though, is that integration of market-focused features into renewable policies is growing almost unabated.⁹² These are the pushes being made in the United States for rooftop solar support. They have already taken hold internationally, in the shift of many feed-in tariffs to feed-in premiums. And they are the defining feature of many E.U. states' recent implementation of auction and tendering schemes in place of their old policies.⁹³ Even more critical, the pressure to move toward market-based policies will only continue to grow as technology costs likewise continue to fall. Given that the leveled costs of some renewables are already lower than conventional energy sources,⁹⁴ further pressure in this direction seems virtually inevitable.

Another direction of changing renewable energy policy is the increased hybridity of its tools. Indeed, it is this merging of mechanisms that has led some commentators to suggest that reliance on “conventional labels” for renewable energy policies “may no longer be appropriate.”⁹⁵ Already, the trend has

88. *European Commission Guidance for the Design of Renewables Support Schemes*, at 24, COM (2013) 439 final (May 11, 2013).

89. See Felix Mormann, *Enhancing the Investor Appeal of Renewable Energy*, 42 ENVTL. L. 681, 705, 711–713 (2012); Lincoln L. Davies, *Evaluating RPS Policy Design: Metrics, Gaps, Best Practices, and Paths to Innovation*, 4 KLRI J.L. & LEGIS. 3, 33 (2014).

90. For an innovative proposal for managing energy system changes from a property perspective (*i.e.*, in parallel and relevant contexts), see Christopher Serkin & Michael P. Vandenbergh, *Prospective Grandfathering: Anticipating the Energy Transition Problem*, 102 MINN. L. REV. 1019 (2018).

91. See COUTURE ET AL., *supra* note 1, at 18 (“Avoided cost is emerging as a cost benchmark.”).

92. See, *e.g.*, Venkatachalam Anbumozhi et al., *Market-Based Mechanisms to Promote Renewable Energy in Asia*, ERIA DISCUSSION PAPER SERIES 1 (April 2015), <http://www.eria.org/ERIA-DP-2015-30.pdf>.

93. See *supra* note 49-53, and accompanying text.

94. See U.S. ENERGY INFO. ADMIN., *supra* note 69, at 7–21.

95. See COUTURE ET AL., *supra* note 1, at 25.

permeated the policy ecosystem. Nations that long have relied on feed-in tariffs have, for years now, layered aggregate limits or aspirational targets—traditionally considered a key feature of RPSs—on top of those tariffs.⁹⁶ Jurisdictions increasingly are using RPSs and feed-in tariffs in tandem, and calls to blend these tools are growing.⁹⁷ At the same time, there is no dearth of examples of jurisdictions adopting policies that look like one thing, but calling them another (e.g., Australia’s “feed-in tariff,” which really functions like a net-metering regime)—again, only further evidence of the increasing hybridity of renewable energy policies themselves.⁹⁸ While the ways in which these combinations will evolve in future years may be far from certain, that the amalgamation will continue in some form seems almost a given.

B. Questions

As clear as the current directions of renewable energy policy are, its long-term future is equally as murky. This fog surrounding renewable energy policy’s future engulfs not just the policy’s durability—whether and how long it will remain in place—but also its extent and shape—how deeply the policy will help transform our energy systems, and the form, structure, and content of the implementing tools that will be used to do so.

One can imagine many renewable energy futures, each along a spectrum. At one end, society ultimately arrives at a clean energy economy: a truly transformed market that is different in kind from what we have today.⁹⁹ At the other end of the spectrum, an economy that looks much like the current one could persist: renewables play a role and compete in the market, but the existing focus on cost, above all else, remains.¹⁰⁰ Somewhere in between, there are a variety of altered economies: those where renewables have assumed more than a toehold and are key aspects of the market, but remain short of dominant.

The scope of future renewable energy policy itself might well align with each of these options. Expanded renewable energy

96. See Davies & Allen, *supra* note 5.

97. See, e.g., Felix Mormann, *Clean Energy Federalism*, 67 FLA. L. REV. 1621 (2015); see also Lincoln L. Davies, *Reconciling Renewable Portfolio Standards and Feed-In Tariffs*, 32 UTAH ENVTL. L. REV. 311 (2012).

98. See COUTURE ET AL., *supra* note 1, at 25.

99. See, for example, JOSEPH P. TOMAIN, *CLEAN POWER POLITICS: THE DEMOCRATIZATION OF ENERGY* (2017), for more on the transition to a clean energy economy.

100. For more on the path dependencies that may encourage this, see Joseph P. Tomain, *The Dominant Model of United States Energy Policy*, 61 U. COLO. L. REV. 355 (1990).

policy support almost certainly is necessary to arrive at a true clean energy economy, so the extent to which this policy persists—particularly in how aggressive it is¹⁰¹—may well correlate with the shape of our renewable energy future.

Likewise, the different clean energy paths have parallels in the overall shape, or “architecture,” of the future electricity grid. Jan Beermann and Kerstin Tews, for instance, have envisaged three possible formulations of that grid, based on the extent to which it integrates distributed generation and moves toward a new energy democracy: (1) a “fragmented” system where distributed resources, microgrids, and localized power parks dominate; (2) an “accommodating” system that relies on the current grid structure but allows distributed resources to be used; and, in between, (3) a “decentralized” system where some central plants continue, but utilities largely operate transmission and distribution systems while local and on-site generation grows significantly.¹⁰²

Of course, nothing suggests that any given version of our clean energy future must develop in lockstep with any specific iteration of a future grid configuration. More likely, they will be mixed and matched—and arrived at piecemeal and in fits, starts, and stops, with different jurisdictions choosing different paths, both domestically and globally. Without question, though, one key driver of both of these futures will be the type, scope, and shape of renewable energy policy that each jurisdiction chooses.

Increasingly, the literature has begun to address best practices that should be employed in designing good renewable energy policy.¹⁰³ Critically, the details of those best practices today differ, quite significantly, from what they would have been twenty years ago. Thus must be taken into account as the renewable energy policies of the future are written.

Recently, David Jacobs and his coauthors identified three key parameters under which effective renewable energy policy should be designed. It should be bankable, flexible, and offer market

101. See, e.g., Haitao Yin & Nicholas Powers, *Do State Renewable Portfolio Standards Promote in-State Renewable Generation?*, 38 ENERGY POLY 1140 (2010); Miriam Fischlein & Timothy M. Smith, *Revisiting Renewable Portfolio Standard Effectiveness: Policy Design and Outcome Specification Matter*, 46 POLY SCI. 277 (2013).

102. Jan Beermann & Kerstin Tews, *Decentralised Laboratories in the German Energy Transition: Why Local Renewable Energy Initiatives Must Reinvent Themselves*, 169 J. CLEANER PROD. 125, 130 (2017).

103. See, e.g., SADIE COX & SEAN ESTERLY, RENEWABLE ELECTRICITY STANDARDS: GOOD PRACTICES AND DESIGN CONSIDERATIONS (2016); Zeineb Abdmouleh et al., *Review of Policies Encouraging Renewable Energy Integration & Best Practices*, 45 RENEWABLE & SUSTAINABLE ENERGY REV. 249 (2015); Felix Mormann, *Requirements for a Renewable Revolution*, 38 ECOLOGY L. Q. 903, 948–57 (2011); *European Commission Guidance for the Design of Renewables Support Schemes*, *supra* note 88.

participants a long-term vision.¹⁰⁴ That is, it should allow for investors to mitigate risk, while simultaneously allowing for (ideally, planned) change over time, yet certainty to the market.¹⁰⁵

Within this frame, several other lessons have emerged through experience with existing renewable energy policies that should guide the content of such support mechanisms going forward. These might be referred to as renewable energy policy “matching principles.” Policymakers should:

- *Match policies to technology and market maturity.* For instance, feed-in tariffs might be used for more nascent technologies, but RPSs or tendering schemes might be relied on to support more mature technologies.¹⁰⁶ One-size-fits-all is not required.
- *Match policies to the scope of market change sought.* It appears that the aggressiveness of renewable energy policies can influence the amount of technology that is deployed.¹⁰⁷ Jurisdictions that want a more modest market change thus should use more modest policies, and vice versa. Further, understanding, at a very nuanced level, which design features of a policy drive its efficacy and efficiency is critical.¹⁰⁸
- *Match policies to the type of market change sought.* Often lost in the decades-long debate between renewable energy policy types is the fact that some tools are better built for different outcomes than others. RPSs, for instance, inherently rely on leveraging incumbent utilities to bring more renewables online.¹⁰⁹ Net-metering, by contrast, intrinsically aims to upset utilities’ market position. Policymakers should keep such differences front and center when choosing implementation tools, rather than blurring the distinct issues of *how much* renewable energy to promote and *who produces* that energy.

104. DAVID JACOBS ET AL., RE-TRANSITION: TRANSITIONING TO POLICY FRAMEWORKS FOR COST-COMPETITIVE RENEWABLES, at i (2016), http://iea-ret.d.org/wp-content/uploads/2016/03/IEA-RETD_RE-TRANSITION.pdf.

105. *Id.* at 26, 47, 55.

106. See Davies, *supra* note 97, at 344.

107. See *supra* note 101, and accompanying text.

108. See *supra* note 101, and accompanying text.

109. See Joel B. Eisen, *Residential Renewable Energy: By Whom?*, 31 UTAH ENVTL. L. REV. 339, 366 (2011).

- *Match policy trajectory to an aspirational end game.* At this stage of renewable energy policy development, it would be naïve, at best, to believe that any given mechanism will remain static in perpetuity. In building flexibility into their policies, then, lawmakers should plan, as best they can, for specific end games for their policies—by, for instance, building into their laws a sequence of transitions from one policy device to another as outcome benchmarks are met, or otherwise designing an express glide path forward.

No doubt, this list of matching principles is not exhaustive, and lessons about how best to promote renewables only continue to emerge. Our understanding of these laws, however, including where they have been and where they may be headed, has never been greater. It is essential we take advantage of these growing insights now, without delay.

CONCLUSION

In eulogizing past renewable energy policy, we must pause to take stock of all that it has offered so far. Without question, it has helped usher in the remaking of the United States’—and the world’s—energy systems. Without question, it has fundamentally altered the nature of electricity markets, including by changing the participants—and types of participants—in those markets. And without question, the policy has become more refined—more multifaceted and sophisticated—than ever before.

But in reaching that new level of sophistication, other lessons have been laid bare. The renewable energy policy of the past is not long for this world. It, like the energy systems it seeks to remake, is rapidly changing—and the new form of policy now emerging is as different from that of decades ago as its future is uncertain. As policymakers continue to reinvent this policy—as they continue to use it to reshape our collective energy future—the importance of drawing on the many lessons learned to date cannot be overemphasized.

Certainly, the lesson that stands out above all others is the very thing giving rise to the eulogy itself. The policy is changing. It will continue to do so. And a failure by policymakers to carefully manage that change—balancing the practical need for design innovation and evolution with the market’s need for stability and certainty—can only lead to failure of the policy itself.

