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When Renewable Energy Policy Objectives Conflict: A Guide for Policymakers

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Executive Summary

State-level renewable energy policies are often adopted with a range of legitimate, although sometimes conflicting, policy objectives. Always present is the desire to meet policy objectives at least cost to today's ratepayers. Many states have adopted renewable energy portfolio standards (RPS) or similar goals, which create head-to-head competition among eligible renewable suppliers and which favor the least-cost commercial technologies presently available. But in the realm of state renewable energy policies, this "best-bang-for-the-buck" objective rarely occurs alone. Typically set in opposition are what we refer to as "tilt" objectives that also seek to achieve specific benefits of particular interest to the state, such as local environmental or economic benefits, or supporting emerging technologies.

Whether embodied within a single policy or within coexisting policies adopted either simultaneously or layered upon one another, when renewable energy policy objectives span both least-cost and any additional objectives, an inevitable tension arises among those competing objectives. Seeking to maximize one objective category typically reduces success at meeting the other. This tension, and the challenges it creates for both policymakers and market participants, are both ubiquitous and persistent: Jurisdictions across the nation are experiencing common challenges in finding an appropriate balance among recurring sets of conflicting objectives.

Often policymakers and decisionmakers are left with this challenge: "How do we depart from least cost in a logical, cost-effective, effective manner in line with policy objectives?" The objective of this paper is to provide state policymakers and implementers with the background, perspective, and tools to think systematically and act effectively when seeking to balance least-cost renewable energy procurement with other competing renewable energy policy objectives.

Context: The Renewable Energy Policy Landscape

The renewable energy policy landscape is driven by policy objectives and constraints. Beyond common and familiar objectives commonly used to support the increased use of renewable energy in general, state legislators and policymakers often seek to achieve localized objectives under categories such as technology policy (support for emerging technologies), economic development, or diversity among renewable energy technologies. These objectives create conflict with the constraint of meeting many other policy objectives at least cost to today's ratepayers. The tools available to localized policy objectives also are constrained by the U.S. Constitution's limitation on state policies that block interstate trade.

The differing perspectives of players in the policymaking arena—legislators, administrative agencies, and regulators; renewable energy industry participants; policy advocates; and ratepayers—influence the state renewable energy policy landscape and contribute to the tension among policy objectives. The perspectives of legislators—who commonly prioritize securing local benefits—are sometimes not well-aligned with the just-and-reasonable rate mandate of utility rate regulators.

A review of recent experience with renewable energy policy development and implementation reveals that states regularly combine several common categories of policies with least-cost RPS policies, each designed to tilt the marketplace away from unfettered price competition among renewables and toward meeting one or more of the aforementioned other objectives. The most common of these policies include the following:

- Procurement of renewable energy or its attributes (RECs) through long-term contracts between regulated distribution utilities or regulated default service providers and RPS-eligible generators to facilitate project financing and minimize long-term price risk. Such approaches can also be used to support emerging technologies or local generation, subject to Commerce Clause constraints.

- RPS enhancements such as specific technology tiers, set-asides, REC multipliers, and geographic deliverability requirements aim to drive local economic development and technology diversity and reduce the long-term costs of emerging technologies.

- Other tilt policies designed to support emerging technologies or distributed generation can also encourage in-state renewable generation development. Examples include traditional or enhanced net metering, feed-in tariffs, grants, loans, local content requirements, or community-based programs.

The weakness of the current economy, falling electric demand, and significant shifts in fuel and electricity markets have increased pressure on policymakers and regulators implementing tilt policies. While emerging renewable energy technologies have high public approval in the abstract and legislators favor keeping ratepayer dollars in-state, these conditions have tested the public's appetite for non-least-cost excursions, signified by the increasing frequency of decision appeals.

State Experience with Conflicting Renewable Energy Policy Objectives

The most common tilt objectives observed at the state level focus on securing in-state economic benefits, supporting emerging technologies, and enhancing long-run market certainty. Three recurring state renewable energy policy approaches have arisen in recent years as means to meet these tilt objectives:

- Establishing geographic preference to drive local generation.

- Creating targeted market pull to achieve an emerging technology preference.

- Offering long-term contracts to generation that is not least cost in the present.

The paper elaborates on state experience with these three policy approaches and examines examples of state policy experiences within each. Five case studies (found in the Appendix) were selected for diverse geographic locations, market structures, technologies, and decision points. They highlight instances of how five states have addressed the task of balancing conflicting renewable energy objectives and provide lessons learned, observations that can be generalized, and universal themes.

A Policy Framework

Conflicting renewable energy policy objectives are inevitable. Confusion, unpredictability, and multiple policy changes are not inevitable. To create clarity, predictability, and accountability, decisionmakers should follow a robust analytical framework. The types of actions or decisions required to balance tradeoffs among policy objectives arise in a range of decisionmaking circumstances, including adoption, implementation, deciding among alternatives, approving actions taken for compliance, or adaptation. Regardless of the decisionmaking circumstances, key decisions on how to set and implement renewable energy policies with conflicting objectives fall into one of six stages. These include the following:

1. Defining and prioritizing objectives and constraints
2. Establishing jurisdiction and authority
3. Defining boundaries for policy evaluation
4. Defining decisionmaking standards
5. Specifying decisionmaking metrics
6. Addressing uncertainty and risk

Following good process, applied with foresight of the tensions and challenges created by their conflicting objectives, will allow policymakers to create a more direct path to successful implementation and gain the confidence of investors, stakeholders, and appellate courts.

Recommendations

The lessons learned from the experiences of states departing from least-cost to meet other policy objectives can aid future policymakers in achieving their goals cost-effectively. These lessons provide the basis for our recommendations. Some of the dynamic tensions that surround renewable energy policies are inevitable and cannot ever be fully resolved or abated. However, applying the lessons learned to date and following a clearly defined analytical framework offers the best opportunity to achieve effective, defensible policies. The benefits of such decisions are numerous. Ideally, when decisions result in stable laws, regulations, and policies, all stakeholders will experience greater certainty. This certainty creates an environment that attracts and supports the type of investment necessary for renewable policies to succeed. A high-level summary of our recommendations includes the following:

1. Policymakers and decisionmakers should articulate objectives, constraints, analytical boundaries (which, and whose, costs and benefits are to be considered), and decision standards clearly at the outset of the policymaking process.

2. States should identify and define their strategic objectives early in the process and change them only if and when necessary.

3. Analysis used for policy formation and application should consider the long-term costs and benefits, taking into account uncertainty related to future conditions.

4. Policymakers should prioritize various objectives as guidance for those making and implementing decisions.

5. Legislators should clearly and explicitly delineate the authority of decisionmakers and align that authority with applicable policy objectives.

6. In cases where regulated utilities are responsible, the parameters of prudence review should be defined in advance.

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When Renewable Energy Policy Objectives Conflict: A Guide for Policymakers

Introduction

State-level renewable energy policies are often adopted with a range of legitimate, although sometimes conflicting, policy objectives. Up close, an impressionist master's painting consists of many seemingly random brush strokes. To see the painting as its creator intends requires that the viewer maintain distance from the subject. Similarly, time provides the perspective needed to view the canvas of renewable energy policy experiences in the U.S. states. This paper explores emerging patterns of recurrent fundamental policy themes, examines tensions inherent in balancing renewable energy policy objectives, and presents approaches to finding appropriate tradeoffs.

At the federal level, the tax-credit regime has proven unpredictable and unreliable due to repeated expirations and short-term extensions, while efforts to implement a stable long-term federal renewable energy policy have stalled. In the laboratory of the states, innovation in renewable energy policy has surged over the past 15 years. As a result, state policy has stimulated an increasing proportion of new renewable energy generation and provided lessons associated with implementing state renewable energy policies in interstate power markets. While many of the policy issues discussed here also come into play at the federal level, we focus this paper on states' varied approaches to renewable energy policy.

State-level renewable energy policy objectives often fall into one of two categories. Some policies aim to meet renewable energy targets at least cost, getting the "best bang for the ratepayer buck." The prototype is the traditional renewable energy portfolio standard (RPS) with broad regional eligibility. Such policies are best aligned with the rate regulator's mandate to minimize ratepayer cost. Other policies look to "tilt" the playing field toward achieving specific benefits, such as local environmental or economic benefits, or supporting favored emerging technologies. These tilt objectives are often foremost in the mind of legislators who have passed statutes to implement the range of policies.

Our review of recent experience with state renewable electricity policy reveals a trend toward policymakers choosing both types of objectives, either within a single policy or within policies superimposed on prior policies. In the late 1990s and early 2000s, a growing number of states adopted RPS policies, with an eye toward applying competitive market principles to increase the role of renewable energy at least cost. By early 2010, many new policies had been layered onto the state RPS landscape with the aim of achieving more specific (and different) tilt-oriented objectives. Examples include RPS technology tiers, long-term contracting policies favoring certain resource types or locations, net-metering policies, in-state offshore wind or solar development or contracting policies, community-based pilot programs, and feed-in tariffs. More recently, the pendulum has started to swing back toward the least-cost perspective.

Seeking to achieve these two categories of objectives simultaneously creates tension; seeking to maximize one objective category typically reduces success at meeting the other. This tension, and the challenges it creates for both policymakers and market participants, are both ubiquitous and persistent. Jurisdictions across the nation are experiencing common challenges in finding an appropriate balance among conflicting objectives. Policies or implementation decisions often will be subject to pressure for change exerted by both stakeholders pursuing their interests and policymakers tinkering in search of elusive balance. Political, policy, or regulatory instability and uncertainty, as perceived by the marketplace, are the banes of investors in renewable energy generation. Tension among conflicting objectives and the resulting impetus for change exacerbate investors' perception of political and regulatory uncertainty, operating as a disincentive for investment in the very technologies and projects that policymakers seek to stimulate through renewable energy policy. This observation underscores the importance of policymakers' informed consideration of tradeoffs in the absence of abandoning one or another policy objective.

This paper is focused on helping regulators, legislators, state policymakers, and market participants think systematically about balancing least-cost renewable energy procurement with other competing renewable energy policy objectives. We explore how regulators can assess when least-cost is the right objective. For situations when deviation from a least-cost solution is appropriate to meet other competing policy objectives, we discuss considerations and approaches available for assessing how such tradeoffs might be weighed, and how departure from least-cost solutions might be accomplished cost-effectively. We have analyzed a number of state-level renewable energy policies, and have supplemented that review with five detailed case studies illustrating some of the common issues, tensions, analytical approaches, and resolutions.[1]

Part I summarizes the key elements of the renewable energy policy landscape: policy objectives and constraints, the perspectives of key stakeholders, and common renewable energy policies. **Part II** reviews recent industry experience with renewable energy policy development and implementation. It discusses the most common tilt objectives that policymakers have implemented in the presence of least-cost-oriented RPS policies and focuses on three of the most common policy approaches pursued to achieve those objectives, illustrated by examples including summaries of five case studies. In **Part III**, we introduce a systematic framework for approaching policymaking, analysis and decisionmaking in the presence of competing policy objectives. In **Part IV**, we present conclusions and recommend potential areas for further analysis. Finally, in the **Appendix**, we delve into case studies focusing on ***geographic preference***, ***emerging technology preferences***, and ***long-term contracting policies***.

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[1] The authors assume that the reader is familiar with renewable energy technologies, electricity markets, and policies such as renewable portfolio standards and net metering. We also assume that the reader understands policy-assessment tools such as benefit/cost, cost-effectiveness, and intergenerational analyses. For readers less familiar, we provide recommended sources in the reference section.

I. The Renewable Energy Policy Landscape

States with different endowments of renewable resources and different objectives have taken a variety of different approaches, applied them in different market structures (from vertically integrated monopolies to retail competition), and implemented them in a variety of contexts. Nonetheless, a review of the state experience to date reveals many commonalities among renewable energy policy objectives and constraints, the players and their traditional perspectives, the policies being implemented in the laboratory of the states, and the nature of the tradeoffs among policies. In reviewing this landscape, patterns become apparent, and one can see similar stories. The stories reflect the tensions between the objectives of renewable energy policy that are playing out nationwide.

A. Renewable energy policy objectives

State-level policies aimed at supporting renewable electricity generation are often adopted to capture a wide range of expected benefits or policy objectives. Common objectives for renewable energy policy in general include the following:

- Reducing reliance on finite fossil fuels (resource sustainability);
- Reducing emissions of greenhouse gases;
- Reducing emissions of other air pollutants, as well as their impacts (smog, acid rain, health impacts of toxic air emissions, et cetera);
- Reducing environmental impacts related to water use, thermal pollution, fuel-cycle impacts related to mining, nuclear waste mining and disposal, et cetera;
- Increasing fuel diversity;
- Reducing price volatility (e.g., reliance on natural gas) and exposure to increasing fuel prices;
- Increasing energy security and supply reliability, reducing reliance on foreign or imported sources of energy or those whose access is susceptible to major (transmission, pipeline or geopolitical) contingencies;
- Investing in cleaner electricity sources to ensure compliance with, or reduce the economic risk associated with, future environmental (climate) regulations; and
- Providing the long-term lowest cost of electricity for consumers, based on the assumption that renewable energy will be less costly in the long run compared to a fossil-fueled future.[2]

The above objectives correspond to the generalized benefits of increasing the use of renewable energy. As the cases examined in this paper demonstrate, many states also adopt additional objectives for their renewable energy policies that correspond to more targeted outcomes, including the following:

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[2] B. Alexander, C. Mitchell and G. Court. (2009). *Renewable Energy Mandates: An Analysis of Promises Made and Implications for Low Income Customers*. Prepared under contract with Oak Ridge National Laboratory UT-Battelle, LLC. p. 4.

- *Technology policy*: Encouraging experience with and innovation in emerging technologies that, at present, are not commercially available or economically competitive; driving scale economies to reduce the costs of emerging technologies toward economic competitiveness in the long term.

- *Economic development:* Increasing "local economic development and jobs [by] attracting 'clean' energy facilities, including research and development of new technologies; and new manufacturing centers for renewable energy components."[3] Those called upon to fund such initiatives, whether ratepayers or taxpayers, often represent a broader slice of society than the direct beneficiaries of investments driving economic development.

Finally, state policymakers sometimes articulate an objective of encouraging diversity among renewable energy resources. The underlying rationale for such diversity may be rooted in desires to capture a diversity of production profiles and technology risks, secure additional reliability benefits, support the expansion of the renewable energy industry, spread the local benefits around geographically, advance less mature technologies so that they are less costly when other lower-cost technology potential is tapped out, or respond to expressed preferences of the public.

B. Policy constraints

Policymakers aim to achieve renewable energy policy objectives that are subject to both implicit and explicit constraints. The most ubiquitous constraint, usually implicit, is achieving the policy objectives, whatever they are, at least cost. In addition, many policies incorporate explicit constraints. Examples include cost caps (often achieved through RPS alternative compliance payment mechanisms[4]), RPS rate impact caps, or quantity caps (e.g., net metering cap as a percentage of load). The desire to achieve technology-policy and economic-development objectives can create conflict with meeting many other policy objectives at least cost to today's ratepayers.

The tools available to achieve economic development policy objectives are limited by the U.S. Constitution's limitation on restraint of interstate trade. Judicial applications of the Commerce Clause prohibit state policymakers from discriminating in favor of in-state suppliers. Complying with the Commerce Clause can present a barrier to achieving (or certain approaches

[3] Ibid., p. 4.

[4] An Alternative Compliance Payment (ACP) can act as a de facto cost cap when obligated entities can elect to pay the ACP rather than a higher price for a renewable energy credit. When rate recovery is not allowed for ACP payments, the ACP may not serve as a cost cap.

to achieving) local policy objectives.[5] Several RPS policy features can trigger a Commerce Clause challenge, depending on how they are crafted, including requirements regarding location of generation and limits on out-of-state RECS.

C. The players and their perspectives

In the context of establishing and influencing renewable energy policies, a wide diversity of perspectives among the stakeholders drives renewable energy policy objectives and details. These diverse views set the stage for policy tensions.

1. Government

The different perspectives of government policymakers and implementers color their emphasis and expectations of policy purpose. As illustrated in our case studies, ***legislators*** commonly prioritize securing local benefits. Examples include RPS statutes that specify goals of achieving localized environmental or economic benefits or support favored emerging technologies with a growing local presence, and statutes establishing renewable energy "funds" often housed in economic development agencies rather than renewable expert agencies.[6] Legislators are sensitive to the implications of sending their constituents' money out-of-state, even if they value a policy's broadly shared benefits that do not recognize state borders.[7]

State ***administrative agencies or public utilities commissions*** are often made responsible for establishing policy-design details not explicitly set by statute, with or without clear direction and authority conveyed by legislators or rate regulators. If the statute allows the latitude, these subject-matter experts are more likely than legislators to balance local and broader policy objectives. When starting without clearly specified objectives, such agencies often adopt broad

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[5] See C. Elefant and E. Holt (2011), *The Commerce Clause and Implications for State RPS Programs. Clean Energy States Alliance*; and N. Rader and S. Hempling (2001), *The Renewables Portfolio Standard: A Practical Guide*. Prepared for the National Association of Regulatory Utility Commissioners.

[6] Examples include the initial placement of the Clean Energy Fund within Connecticut Innovations, the Massachusetts Renewable Energy Fund within the Massachusetts Technology Collaborative, and the Renewable Energy Development Fund within the Rhode Island Economic Development Corporation. Note that the Massachusetts and Connecticut funds have since been moved to other agencies.

[7] In October 2009,Connecticut State Senator John Fonfara, co-chairman of the General Assembly's Energy and Technology Committee, equated bringing wind and hydropower from northern New England and Canada to meet Connecticut's renewable energy goals to buying oil from Saudi Arabia, insisting that instead, "we should be developing our resources here in Connecticut" (*New Haven Register*, October 15, 2009).

sets of objectives following stakeholder input.[8] However, the mandate of public utility commissions as utility rate regulators—to assure just and reasonable (often interpreted as minimized) retail electricity rates—inclines them to view renewable policies from a ratepayer impact perspective. Unless expressly directed otherwise by statute, local benefits accruing to taxpayers or the general populace, rather than affected ratepayers, may fall outside of their purview.

Environmental regulators[9] charged with local air, water, and land mandates, as well as regional (acid rain, ozone transport) and broader (climate-change) goals, are often inclined to regional solutions when science demonstrates their effectiveness. For example, an air regulator focused on acid rain or smog may prefer a new renewable plant displacing coal upwind to an in-state renewable energy generator displacing natural gas.

2. Renewable energy industry

The policy objectives of renewable energy industry participants, including component manufacturers/suppliers, construction and engineering firms, developers, and investors, understandably align with their commercial interests. ***Renewable energy project developers, investors, and industry associations*** typically favor aggressive policy targets and advocate for technology or geographic eligibility that reduces obstacles to their market participation and increases obstacles to their competition. ***In-state manufacturers of equipment and other technologies*** typically focus on jobs in state, driven by markets both in and out of state. Depending on the scale of the state's market, in-state market demand may be trivial or of sufficiently substantial scale to justify substantial investment. They will tend to advocate for direct research and development, demonstration, or commercialization support. Unless the in-state market is sufficiently large, such as with the California Solar Initiative, manufacturers are not likely to advocate for policy objectives emphasizing local geographic eligibility for RPS or similar drivers of in-state demand.

3. Advocates

Environmental advocates and related non-governmental organizations (NGOs), as well as industry workers who stand to gain jobs through increased renewable development, often pursue renewable energy policies based on their broad societal benefits, but they also lobby legislators

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[8] Examples include the New York Public Service Commission and the Massachusetts Division of Energy Resources developing a broad set of policy objectives and design principles, respectively, at the outset of stakeholder processes designed to guide development of RPS programs.

[9] Environmental regulators do not always have a formal role in the renewable electricity policy dialogue.

emphasizing local economic benefits, thereby shaping legislators' expectations of renewable energy benefits.[10]

4. Ratepayers

The most price-sensitive customers include large commercial and industrial customers competing in national or international markets, and advocates for low-income customers. Directly or through consumer advocates or associations, these stakeholders will: 1) argue against renewable energy policies; 2) seek exemption from such policies; or 3) support best-bang-for-the-buck renewable energy policy objectives, as their focus is inevitably on the near-term cost of electricity. Conversely, local industries that stand to benefit from policies with local benefits will be supportive.

D. Renewable energy policies

States have adopted or considered a range of renewable energy policies. If a state's policy objective is to increase the share of renewable energy by relying on the least costly resources, typically the policy relies on a competitive framework. This *least-cost* or *best-bang-for-the-buck* approach can take the form of setting up a competitive market or requiring competitive procurement to meet a defined target or budget.

Alternatively, a state can craft a renewable energy policy to achieve some *specific and often localized benefit(s)* sought by the state. Such tilt policies typically aim to achieve local environmental or economic benefits, or support favored emerging technologies.[11] Emerging technologies might be favored because policymakers believe their emergence will convey benefits in the future, but often the motivation is to support an industry with an existing strong local presence. For example, Connecticut hosts two leading fuel cell manufacturers and therefore treats fuel cells using natural gas as an RPS-eligible "Class I" renewable energy source.[12] More broadly, specific objectives may seek to dictate the location, technology, scale, or ownership structures of renewable energy installations.

While there are many examples of "pure" models, hybrid approaches are increasingly prevalent. Hybrid policy approaches may:

- utilize a single policy meant to achieve multiple objectives;

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[10] Organizations advocating for wildlife or wilderness protection, as well as citizens' groups opposing nearby infrastructure, sometimes engage in the renewable policy dialogue in opposition to renewable energy or related transmission development.

[11] While most states are too small to move what are typically global markets, the California Solar Initiative is an example of a state seeking through the scale of its actions to drive innovation and scale economies.

[12] Conn. Gen. Stat. Ch. 277 §16-1 (26)

- overlay new policies upon prior policies to address perceived gaps or weaknesses; or
- simultaneously implement complementary policy suites.

1. Renewable energy portfolio standards and goals

Renewable portfolio standards typically place an obligation on retail electric suppliers to procure a minimum portion of their electric supply with eligible sources of renewable energy, although the design details vary from state to state. Renewable energy goals in monopoly markets can serve a similar purpose.[13] In its purest construction, the RPS falls squarely into the best-bang-for-the-buck category: Policymakers establish a target, and head-to-head competition among eligible suppliers on price favors the least-cost commercial renewable energy technologies presently available.

Due to head-to-head price competition, without a tilt policy there is little support for emerging technologies. Despite a variety of approaches to limiting geographic eligibility, the state implementing the RPS has limited ability to drive such construction within its borders due to the nature of the interstate electric grid and Commerce Clause constraints.[14]

2. Procurement via long-term contracting

In monopoly markets, RPS procurement is dominated by long-term "bundled" contracts for electricity and renewable energy credits (RECs) in combination.[15] Procurement usually occurs through utility solicitations or bilateral negotiations, with state commission oversight. Contracted supply for bundled supply serves as part of the utility portfolio and thus must be physically delivered, assuring a degree of proximity of renewable energy generation to the state establishing the RPS.

In competitive retail electricity markets using a pure RPS model, compliance is usually demonstrated by procurement of "unbundled" RECs (separated from the electric commodity) typically procured from thinly traded, short-term, over-the-counter markets. Long-term

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[13] RPS is the general term of art covering similar policies using a range of names, including renewable energy portfolio standards, renewable energy standards, alternative energy portfolio standards, and so on. RPS or similar requirements have been implemented across 29 states plus Washington D.C., spanning both restructured and fully regulated market structures. Seven other states have implemented similar, but non-binding, renewable energy goals. For more information, see [http://www.dsireusa.org/rpsdata/index.cfm].

[14] R. C. Grace and R. Wiser. (2002). *Transacting Generation Attributes Across Market Boundaries - Compatible Information Systems and the Treatment of Imports and Exports*. Prepared for U. S. Department of Energy and New York State Energy Research & Development Authority, published as a Lawrence Berkeley National Laboratory report.

[15] R. C. Grace. (2011). *Connecticut's RPS Policy Report: A Common Starting Point.* Prepared for The Connecticut Energy Advisory Board [Webinar]: slide 19.

contracting opportunities may be scarce due to: 1) uncertainty in future load and RPS obligations on the part of load-serving entities; 2) the inability of state regulators to require that competitive LSEs enter into contracts; and 3) the lack of credit-worthy counterparties. Without long-term contracts, new RPS-eligible generators in competitive markets often have difficulty attracting financing due to factors such as investor risk aversion, volatile price signals, and perceptions of regulatory instability. To assist generators in securing the revenue certainty required for financing, some competitive RPS states have adopted complementary policies to require or encourage regulated distribution utilities or regulated default service providers to offer long-term contracts to RPS-eligible generators. Two other states have implemented RPS central procurement models to serve a similar purpose.[16]

3. RPS enhancements

Tilt policies can exist as free-standing policies or as additional features layered onto or combined with other renewable policies. In the case of RPS policies, the RPS limitations discussed above have spawned a number of RPS design variations intended to accomplish additional policy objectives. Emerging technologies, for example, are now being supported in several states through a range of means. One common approach is establishing distinct RPS tiers or set-asides with eligibility narrowed to the technology or application type desired, including solar, existing hydroelectric, swine and poultry waste, biomass, distributed generation, and community-owned generation.[17] Several states have used REC multipliers to accomplish a similar objective.[18] The multiplier values a REC produced by a desired technology or application as worth a multiple of the least-cost renewable.[19] States have also adopted a variety of approaches to electricity delivery requirements to narrow geographic eligibility.[20] Some state RPS programs use atypical resource eligibility to favor a generation type with a strong in-state presence, such as fuel cells in Connecticut. Finally, states can establish eligibility requirements

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[16] R. Wiser and G. Barbose (2008), *Renewable Portfolio Standards in the US, A Status Report with Data through 2007*. Lawrence Berkeley National Laboratory, LBNL-154E.

[17] Ibid., Table 1.

[18] Ibid., Table 1.

[19] R. Wiser, G. Barbose and E. Holt. (2010). *Supporting Solar Power in Renewables Portfolio Standards: Experience from the United States*. Lawrence Berkeley National Laboratory, LBNL-3984E: 7-8.

[20] For a thorough discussion of the options for defining RPS geographic eligibility and their implications, see Grace and Wiser (2002). For a summary of current approaches and examples of states that use them, see Wiser and Barbose (2008), Table 3.

or evaluation criteria within RPS centralized procurement models and RPS long-term contracting policies to require or favor specific resource locations, applications, or technologies.[21]

4. Other tilt policies

Other non-RPS state-level renewable energy policies specifically support emerging technologies, distributed generation, in-state generation, or customer-sited generation. If adopted by states with RPS requirements, the resulting generation might be eligible to be counted toward meeting that requirement, although that is not always the case. These policies commonly include the following.

- ***Traditional and enhanced net metering.*** Net-metering policies, in place in most states, allow customer-sited renewable energy generation to receive retail prices for electricity generated. States have enhanced traditional net-metering practices in recent years in a range of ways. For example, states can either increase their eligible system-size thresholds or total program capacity limits, or adopt variations of *virtual* net metering (a.k.a. aggregate, municipal, or neighborhood net metering). Virtual net metering allows the aggregation of off-site loads to offset retail usage at locations other than the eligible renewable generator by assigning excess on-site generation to be credited against off-site customer bills. The effect is to free conventional net metering from the constraint of requiring the physical matching of a single large load and a productive eligible location, thereby allowing larger in-state projects to reap higher retail revenues.[22] Alone or in combination, these policies increase in-state renewable energy generation that can be supported via net metering.

- ***Feed-in tariffs or standard offers***. Feed-in tariffs (FITs) are the most common renewable energy policy in the world.[23] They require utilities to provide renewable generators with a guaranteed long-term fixed-price revenue stream, with prices most commonly set based on an estimate of the cost of the eligible renewable energy generation. Tariffs are commonly differentiated by technology type, resource quality, or project scale.[24] An increasing number of states are exploring implementing cost-

[21] See case studies provided in this report for New York's central procurement and Massachusetts's and Rhode Island's long-term contracting.

[22] Variations of virtual net metering have recently been adopted in a number of states including Massachusetts, Rhode Island, California, New York, Maine and Vermont. For more information on state net metering practices and trends, see the DSIRE web site at http://www.dsireusa.org/solar/solarpolicyguide/?id=17 (last accessed August 15, 2011).

[23] W. H. Rickerson, J. L. Sawin, and R. C. Grace. (2007). If the Shoe FITs: Using Feed-in Tariffs to Meet U.S. Renewable Electricity Targets. *The Electricity Journal*, 20(4).

[24] Ibid.

based FITs or standard offers to support targeted technologies, and because the policy approach involves the offering of a tariff by the interconnecting utility, in practice the generation must be local.[25, 26]

- ***Renewable energy funds***. As noted earlier, many states have established renewable energy funds or similar mechanisms to create and administer programs to support renewable energy generation.[27] The administrators of these funds establish and oversee programs that typically target grants, loans, or other financial support to local generation.[28]

- ***Community-based programs***. Some states have established programs that provide unique market access, favored pricing, or supplemental revenue to projects owned or hosted by municipalities. Examples include Minnesota's C-BED tariffs, which provide a framework for community wind projects to negotiate 20-year power purchase agreements (PPAs) with utilities,[29] and the Maine Community-Based

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[25] See also A. Pollock and E. McNamara (2010), *What Is an Effective Feed-In Tariff for Your State?: A Design Guide*, National Regulatory Research Institute; and S. Hempling, C. Elefant, K. Cory, K. Porter.(2010), *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, National Renewable Energy Laboratory Technical Report 6A2-47408.

[26] S. Hempling, C. Elefant, K. Cory, and K. Porter (2010) describe arguments that state-level feed-in tariffs are preempted by federal law. These arguments arise because the transaction resulting from a feed-in tariff is a wholesale sale of electricity, which triggers one of two federal statutes—the Public Utility Regulatory Policies Act of 1978 (PURPA) or the Federal Power Act of 1935 (FPA). Each of these statutes does in fact limit the discretion of state-level tariff designers. However, this technical report describes paths available to state policymakers to implement FITs, and an October 2010 Federal Energy Regulatory Commission Order in Docket Nos. EL10-64-001 and EL10-66-001 appears to provide additional avenues for states to establish a cost-based FIT without running afoul of federal law.

[27] The sources of the funds include legislatively established system benefit charges (SBC), proceeds from the sale of emission allowances, RPS alternative compliance payments, or ad-hoc regulatory actions such as merger or nuclear waste storage settlements.

[28] Clean Energy States Alliance (2009), *State Clean Energy Fund Support for Renewable Energy Projects: Key Findings from the CESA National Database*. Retrieved from: http://www.cleanenergystates.org/assets/2011-Files/cesa-databaseSummaryJan09.pdf

[29] See Database of State Incentives for Renewables &Efficiency. (2011). Minnesota Incentives/Policies for Renewables &Efficiency. Retrieved from http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MN15R&re=1&ee=1]

Renewable Energy Pilot Program, which provides either a feed-in tariff-like contract or a 150% REC multiplier to eligible projects.[30]

- ***Local Content Requirements***. Some states have implemented tilt policies that either are open only to in-state generation or provide advantageous incentives for generators using components manufactured in-state.[31]

Table 1 summarizes which policy tools can be used to support emerging technologies, in-state generation, or in-state manufacturing.

Table 1: Policy Objectives of Renewable Energy Tilt Policies

	Support Category		
Mechanisms	**Emerging Tech.**	**In-State Generation**	**In-State Manufacturing**
RPS Solar or DG Tiers	✓	✓	
RPS Credit Multipliers	✓	✓	✓
RPS Geographic Eligibility		✓	
Targeted RPS Eligibility	✓	✓	✓
Enhanced Net Metering	✓	✓	✓
Feed-in Tariffs & Standard Offers	✓	✓	✓
Renewable Energy Fund Programs	✓	✓	✓
Long-Term Contract Procurement Policies	✓	✓	✓
Community-Based Programs		✓	
Local Content Requirements		✓	✓

[30] See Maine Public Utilities Commission. 2008. Community-based Renewable Energy Pilot Program. Retrieved from http://www.maine.gov/mpuc/electricity/community_pilot.shtml]

[31] Connecticut's Project 150 long-term contracting policy provides a more attractive pricing formula to fuel cells principally manufactured in Connecticut. Ontario imposes local content requirements for its feed-in tariff eligibility. The Massachusetts Clean Energy Center's Commonwealth Solar rebate program provides higher rebates for solar systems using Massachusetts-based company components.

E. Policy tensions and the current context

Recently, friction has increasingly arisen in several states between least-cost and other renewable energy policy objectives. A number of undercurrents are exacerbating these policy tensions, including the following.

1. The advent of abundant and inexpensive shale gas has reduced electricity prices and made renewable energy appear, on a relative basis, more expensive than it did just a few years prior, despite continuing declines in renewable energy costs.[32]

2. Policymakers are adding layers of renewable energy policies designed to achieve specific benefits or outcomes in the marketplace, sometimes without thoughtful analysis of how the policy layers will interact.

3. Aggrieved generators and ratepayers have brought legal challenges to renewable energy policies anchored in policy objectives other than least cost.

4. Partly in response to the increasing adoption of tilt policies reducing the market share available to today's least-cost renewables, some renewable energy policies limiting eligibility to in-state facilities were challenged on the premise that they violated the U.S. Constitution's Commerce Clause.[33]

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[32] See discussion in the U.S. Energy Information Administration's Annual Energy Outlook 2011, available at: http://www.eia.gov/forecasts/aeo/.

[33] C. Elefant and E. Holt (2011) observe that policymakers have been aware for years of the threat of potential Commerce Clause challenges to a number of existing renewable energy policies. The first overt legal challenge came in April of 2010, when TransCanada Power Marketing (TCPM) filed a civil lawsuit in U.S. District Court (Civil Action 40070-FDS). The suit asserted that two provisions of the 2008 Massachusetts Green Communities Act—a requirement on electric-distribution companies to solicit long-term contracts from renewable energy generators located in Massachusetts; and the state's solar carve-out program, which requires load serving entities to meet solar specific RPS targets by purchasing solar RECs from in-state solar generators—violate the Commerce Clause by creating favorable terms for in-state renewable generators while discriminating against the purchase of electricity from out-of-state renewable generators. Massachusetts responded by removing the in-state requirement from the long-term contracting pilot program and entered a partial settlement regarding the terms of the solar carve-out.

Since the TCPM lawsuit, mentions of Commerce Clause issues in policymaking and regulatory arenas have increased. A recent federal lawsuit filed in Denver's U.S. District Court challenged the Colorado RPS as a whole, as well as its in-state REC multiplier, as an unconstitutional restraint of trade. See Cathy Proctor (2011, April 4), "Federal Suit Challenges Colorado Renewable Energy Standard," *Denver Business Journal*, retrieved from: http://www.bizjournals.com/denver/news/2011/04/04/federal-suit-challenges-colorado.html.

5. A recessionary economic climate that inhibits any action, no matter how justified in the long term, which is not oriented toward minimizing near-term electricity rates.

6. Budgetary pressures that limit the resources available to policymakers to conduct rigorous analyses of policy options.

7. Falling load resulting from the recent economic recession, pitting incumbent fossil-fueled generation fighting for survival against new generators.[34]

The recent financial crisis and continuing economic recession have increased pressure on policymakers and regulators implementing those policies. Emerging renewable energy technologies have high public approval in the abstract, but implementing supporting policies has tested the public's appetite for non-least-cost excursions. For example, approvals of contracts whose costs are materially in excess of the least-cost renewable energy alternatives have been appealed. At present, like other government endeavors with long-term payouts, many renewable energy policies targeting local objectives (technology, location, etc.) are experiencing backlash over whether the cost premiums associated with tilt policies are justified in a tight economy.

II. Conflicting Policy Objectives—The Laboratory of the States

A. Recurring policy approaches to achieving primary tilt objectives

The most common tilt objectives observed at the state level focus on securing in-state economic benefits, supporting emerging technologies, and enhancing long-run market certainty. Three recurring state renewable energy policy approaches have arisen in recent years as means to meet these tilt objectives. Each seeks to achieve these objectives in the presence of a least-cost renewable energy framework: an RPS designed to use competition among renewables to

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With Transcanada having laid out the detailed legal arguments for challenging renewable energy policies whose details overtly discriminate in favor of in-state generation, the barrier to similar legal action have been reduced. We have observed that, as a result, lawmakers and policymakers are proceeding more cautiously, including less overt and more indirect means to favor in-state generation.

[34] When electric demand was growing, compliance with RPS and renewable energy goals with annually increasing targets tended to satisfy much of the overall demand for new generation. As load growth retreated, the addition of new RPS generation in markets that do not currently need additional capacity for reliability purposes creates opponents of existing generators who would be displaced. As a result, incumbent generators are playing defense by exerting resistance to renewable energy policies before legislatures, regulatory agencies, and Independent System Operators.

minimize ratepayer cost. Each approach illustrates the tensions and conflicts among state renewable energy policy objectives. These policy approaches include:

- ***Establishing geographic preference to drive local generation***. The rationale behind this policy approach focuses on securing local benefits, particularly in-state economic development and jobs, while also paying attention to cost. Increasing the proportion of in-state renewable energy generation used for RPS compliance will likely decrease competition and increase the cost to today's ratepayers relative to a less constrained, least-cost approach.

- ***Creating targeted market pull to achieve an emerging technology preference***. Underlying drivers include (a) supporting more costly, less mature technologies in the present because of expectations that they may be the lower-cost resource in the future due to scale economies and technological advances; (b) encouraging diversity among renewable energy resources supported; and (c) creating local jobs in installation, operation and maintenance, and fabrication.

- ***Offering long-term contracts to generation that is not least-cost in the present***. The justifications behind these policies are rooted in risk minimization, support of project financing, support of emerging technologies, desire for technology diversity, and creation of local jobs.

The discussion below elaborates on state experience with these three policy approaches and examines examples of state policy experiences within each. In addition, the Appendix examines in detail five case studies using these approaches. We selected the cases in the Appendix to represent a diversity of geographic locations, market structures, technologies, and decision points. Collectively, the case studies provide an instructive sampling of experiences from which lessons can be learned, observations can be generalized, and universal themes can be identified.[35]

B. Establishing geographic preference

Renewable energy policy objectives often steer states toward tilt policies that ensure some portion of the generation spurred by RPS compliance be generated in-state. Policy design features to influence that tilt can be direct or indirect. States have used a variety of approaches: focusing on grid-scale generators transacting their energy at wholesale, or distributed either interconnected at the distribution level or behind a host's the retail meter; designing eligibility

[35] There is some overlap among these experiences. For example, a distributed-generation RPS tier, if focused on solar, is also a tool for supporting emerging technologies. Long-term contracts can be used either to secure in-state generation or to support emerging technologies. We have structured this discussion to address the policy approach, recognizing the overlap in both objectives and effects.

rules or evaluation features to create a tilt toward in-state generation within an RPS; and implementing tilt features within or in parallel with an RPS.

When minimizing ratepayer impacts and achieving such local benefits are simultaneously important, key questions for policymakers and ratepayers become how much in-state generation is enough, and how much are local benefits worth? One potential answer to the latter question is, perhaps, *not more than the value of the local benefits*. While we are unaware of a state in which the tradeoffs have been boiled down to explicitly valuing the economic benefits in monetary terms as a means of limiting the premium to be paid for in-state generation, one state agency, NYSERDA, has incorporated the valuation of local benefits into its decisionmaking, and others have wrestled over in-state versus out-of-state quotas.

Commonly, states' approach to influencing where generation is located is expressed in the RPS geographic eligibility and import rules. By adjusting the eligibility requirements for imported renewable generation, policymakers can either level or tilt the playing field in a variety of ways. *Unconstrained geographic* eligibility, under which unbundled RECs from any location could be used for RPS compliance, minimizes cost while resulting in the least in-state generation. Conversely, *strict energy delivery* limits eligibility to bundled REC and energy deliveries to the state's regional market that match the generator's actual production in real time. This approach imposes a variety of scheduling requirements, costs, and risks that make out-of-state (or out-of-market) generation less competitive relative to in-state generation. In between these extremes are intermediate approaches, such as *relaxed energy delivery* (which requires delivery but allows reshaping over the course of a month), *market-area geographic eligibility, and fixed limitations on the share of imports allowed for compliance*.[36]

Many states have attempted to balance least-cost objectives with in-state preferences within their RPS structure or long-term contracting approaches. One example is Illinois, which is grappling with balancing the costs and benefits of in-state and technology preferences for the Illinois Power Agency (IPA) RPS procurements. The initial RPS law established preferences, requiring that until June 1, 2011, cost-effective renewable energy resources be procured first from facilities in Illinois, then from facilities located in states adjacent to Illinois, then from facilities located elsewhere.[37] In addition, the state requires procurement of at least 75% of the RECs from wind resources. Bid-evaluation rules gave first priority to cost-effectiveness, second to wind resources, and last to location.[38] As a result, the state ranked second nationally in 2010

[36] See R. Grace and R. Wiser (2002), pp. 5–10, for a detailed discussion of definitions of the various options for allowing or limiting the flow of renewable energy generation attributes across market boundaries, and the implications of the different approaches.

[37] IL Public Act 095-0481, Section §1-75(3).

[38] Illinois Commerce Commission. (2007). Order, 07-0527, p. 51.

in new wind added.[39] As the in-state preference was set to expire, wind industry representatives, unions, and others sought legislation to extend the preference, arguing that without the extension, the boom that had brought 10,000 full-time jobs during construction periods and nearly 500 permanent jobs in rural Illinois would end. Yet the counterargument voiced by the IPA and others—that extending the policy would be an unnecessarily expensive way to meet the RPS—has so far prevailed.[40]

Another example is Ohio, where RPS rules require that at least half of the total renewable energy or RECs used by regulated entities come from resources located in Ohio. A third example, Rhode Island's Long-Term Contracting Standard for Renewable Energy, requires the Public Utilities Commission to promulgate regulations requiring as a condition of contract approval that a project, regardless of its location, provide

> *…other direct economic benefits to Rhode Island, such as job creation, increased property tax revenues or other similar revenues, deemed substantial by the commission.*[41]

In some cases, states have implemented geographic-preference policies by focusing on distributed or behind-the-meter generation. A number of states have gone this route by establishing an RPS tier for which only such generation is eligible, as discussed in Part I.D. Alternatively, states have established contracting policies limited to supporting behind-the-meter generation. A behind-the-meter focus is one way of driving local generation without directly implicating the type of Commerce Clause concerns experienced by states to encourage in-state renewable energy development in the more complex wholesale electricity environment.

To further illustrate the issues and approaches taken, we explore two in-depth case studies in the Appendix. The first examines the approach taken through New York's RPS Main Tier central procurement process to secure local benefits. The second case study reviews California's evolving treatment of out-of-state generation and RECs. Synopses of the New York and California cases follow.

1. New York: securing local benefits through centralized RPS procurement

This case examines the approach taken in New York to balancing competing objectives of least-cost RPS compliance and securing local economic benefits. Certain elements of that

[39] K. Stringer. (2011). Legislation a Moving Target for Illinois Wind Developers. *Medill Reports - Chicago*, Northwestern University. Retrieved from: http://news.medill.northwestern.edu/chicago/news.aspx?id=186201.

[40] *Id.*

[41] RI G.L. §39-26.1-5 (e). http://www.rilin.state.ri.us/Statutes/TITLE39/39-26.1/INDEX.HTM.

state's NY RPS are unique. The program was established by regulation and is administered using centralized procurement by a state authority. The New York Public Service Commission established and modified the centralized competitive procurement of renewable energy attributes to reach the growing RPS target in a cost-effective way that ensures that economic and environmental benefits accrue to New Yorkers. The Commission started with clear priorities. The procurement bid evaluation process applies a comparative standard, where winning projects have benefit/cost ratios superior to other alternatives. NYSERDA utilizes monetary metrics of costs and benefits applied in a weighted multi-attribute analysis to select bids that best meet the applicable policy objectives. Combined with the strict hourly scheduling requirements for imported energy, nearly all selected projects have been built in New York. Independent program evaluation has shown the program to be cost-effective.

2. California: RPS geographic eligibility and evolving role of tradable RECs

For a decade, California's legislature, several governors, and multiple regulators have been working to achieve a balance between reaching high renewable generation targets at lowest ratepayer cost while also promoting in-state development of renewable generating capacity. This case study demonstrates the tensions between these conflicting objectives common to many other jurisdictions. The RPS was originally crafted to balance the goals of least-cost and local benefits. California has at various junctures used analysis of expected costs and benefits to refine its policy. Over time, the state has also pursued a range of geographic-eligibility requirements to achieve its policy objectives, ranging from broad geographic eligibility to a strict delivery standard. Within the context of its RPS procurements, the state applies a least-cost, best-fit comparative standard that has elements of a multi-attribute analysis combining direct and indirect benefits.

California's experience with its Renewable Portfolio Standard and RECs illustrates many of the complexities of implementing state renewable energy policy in interstate markets, as well as tools often used by states to tilt the market outcome toward in-state generation. These tools include REC eligibility, import quotas and price caps, and deliverability requirements. In California, frequent changes related to the presence or absence of restrictions on the use of imported renewable generation to meet the RPS standard led to market instability. California's experience also highlights the challenge of implementing stable solutions that is inherent in the conflict among these types of objectives.

C. Creating market pull for emerging technology preference

Increasingly, states have established tilt policies to support emerging renewable energy technologies. Sixteen states plus Washington DC have adopted RPS with solar or distributed generation provisions.[42] This support, most commonly exercised for solar and (where available)

[42] See DSIRE web site, http://www.dsireusa.org/documents/summarymaps/Solar_DG_RPS_map.ppt

offshore wind, also raises questions of how much emerging renewable energy generation to require, and how much today's ratepayers should pay for the associated benefits. Support for emerging technologies often, but not always, explicitly or implicitly favors in-state generation.

States have used a range of mechanisms to balance or limit the rate impacts including quantity targets, rate caps, and REC multipliers. Colorado's RPS includes a solar carve-out. To limit costs, the state implemented a rate cap. Later, the rate cap was increased from 1% to 2% of the annual electric bill to reflect an increase in the RPS from 20% to 30% (with a commensurate increase in the solar provisions).[43] Colorado stakeholders continue to debate over the costs imposed by the solar carve-out relative to expectations.[44] Other examples include the following.

- Nevada's RPS has a solar target and a solar multiplier of 2.4-2.45 RECs/MWh.
- Oregon provides double credit for solar PV.
- Massachusetts has a customer-sited solar carve-out within its Class I RPS bounded by a price cap (the Solar Alternative Compliance Payment) and floor (a fixed-price Solar Credit Clearinghouse Auction[45]).

To further illustrate a variety of issues and approaches taken in support of emerging technologies, the Appendix includes an in-depth case study of the complementary policy approaches taken by New Jersey to create market pull for, first, solar, and more recently, offshore wind.

The New Jersey solar photovoltaic (PV) program was one of the first programs to combine an RPS solar set-aside (also referred to as a carve-out) with a complementary suite of policies. The state sought to achieve high solar development in the state, increase market stability, and decrease financial risk for solar project developers at the lowest possible costs for ratepayers. After experiencing substantial solar growth, New Jersey has begun to examine how

[43] C.C.R. 723-3, Part 3, §3661 http://www.dsireusa.org/documents/Incentives/CO24R.pdf.

[44] All the above-market costs of the Colorado RES are driven by solar installations, mostly in residential applications. Wind generation saves money compared to nonrenewable energy (typically gas generation) "reasonably available" in the utility's resource plan. Savings from wind generation offset the costs of solar when determining the RPS's rate impacts. Source: R. L. Lehr, email to authors, August 16, 2011.

[45] The Department of Energy Resources (DOER) established an auction mechanism to provide generators with a fixed floor price for their SRECs. Buyers with RPS obligations may purchase SRECs in the auction at a fixed price. If an auction does not clear at the fixed price, DOER can increase subsequent year targets, alter the Solar Alternative Compliance Payment level, or extend the life of the SRECs in order to increase buyers' willingness to pay. No auctions have yet been conducted, as SREC supply fell short of demand in year one of the program.

the policy could be applied to other renewable energy resources in the state. In June 2010, the state legislature passed a statute establishing the nation's first set-aside for offshore wind energy. In this case study, we examine both New Jersey's solar and offshore wind set-aside policies.

D. Long-term power-purchase-agreement procurement policies

Some states require their utilities to provide long-term power purchase agreements (PPAs) to renewable energy generators, including those whose costs are above market-based renewable prices. Long-term PPAs provide the revenue certainty that makes projects financeable. This section addresses a subset of those policies typically layered over an RPS. These underlying policy objectives include economic development, emerging technology support, risk minimization, or resource diversity. The soundness of these PPAs is judged on whether the associated costs are worth the benefits, based on some standard of comparison.

A number of states have implemented policies to encourage long-term contracts with above-market generators (as compared to the least-cost available renewables) to meet their policy objectives. As a recent example, in 2011, Connecticut enacted legislation directing its Department of Energy and Environmental Protection (DEEP) to oversee competitive utility procurement of RECs under 15-year contracts. The contracts apply to customer-sited, in-state RPS-eligible generators in two categories: zero-emission generators up to 1 MW (such as solar) and low-emission generators up to 2 MW (such as fuel cells operating on natural gas, deemed Class I RPS-eligible because the industry has a strong in-state presence). Rather than using a quantity or rate cap, the legislature instead established an annual spending target (e.g., $8 million per year) for utilities to procure zero-emission RECs (ZRECs) and low-emission RECs (LRECs) at prices capped by the statute. Furthermore, the DEEP must ensure that the utilities' procurement plans give preference to technology manufactured, researched, or developed in-state.[46]

In other states, regulators have had to rule on over-market PPAs proposed by regulated utilities and justified on the basis of tilt-policy objectives. One recent example was a PPA between Public Service of New Hampshire (PSNH) and Berlin Biomass Power, a proposed new 75 MW biomass plant, brought before the New Hampshire Public Utilities Commission (PUC) for approval. The PPA quantity exceeded for many years the scale of PSNH's RPS obligation and entailed costs exceeding the expected RPS compliance cost from other available resources. PSNH, plant developers, the local community, and others supported the PPA due to its jobs and economic development benefits, as well as the benefit of supply diversity amidst a regional RPS market dominated by wind power. Detractors pointed to the magnitude of over-market costs and asked whether any cost premium was justified in the absence of a statutory requirement requiring long-term contracts. After a hearing, the PUC approved the PPA subject to conditions. After considering the costs and benefits, they conditioned approval on reducing both contract price and

[46] CT Public Act No. 11-80, An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future. http://www.cga.ct.gov/2011/act/pa/2011PA-00080-R00SB-01243-PA.htm.

quantity to specified levels that the PUC found more appropriately balanced the costs and benefits involved.[47]

To illustrate this policy approach further, the Appendix includes in-depth case studies of two contrasting cases: Cape Wind and Deepwater Wind. Each case offers different lessons about regulatory approval of a long-term PPA with an offshore wind project to achieve economic development and emerging technology objectives within a commercially reasonable regulatory decision framework. A summary of these case studies follows here.

1. Massachusetts: Cape Wind's long-term PPA with National Grid

The Department of Public Utilities' (DPU) review and approval of the PPA between National Grid and Cape Wind had many facets. The DPU's job in this case was to determine whether the PPA between Cape Wind and National Grid was appropriately priced while considering the other potential economic and environmental benefits of the project. This examination brought to the fore trade-offs between a cost-effective approach to meeting the Green Communities Act's (GCA)[48] objectives and meeting policy objectives favoring an emerging technology, and thereby creating economic benefits in the form of a leadership role for the state in a nascent industry. This case study explores the intersection of three Massachusetts renewable energy policies: Massachusetts' RPS, the GCA's long-term contracting policy, and the state's policy objectives to advance offshore wind, an emerging renewable energy technology, to derive associated in-state economic benefits.

2. Rhode Island: National Grid–Block Island Wind Farm PPA

The case of the long-term power purchase agreement between National Grid and Deepwater Wind's Block Island Wind Farm demonstrates the conflict that can arise when a policy directive supporting in-state development of an emerging technology bumps up against a least-cost renewable energy policy framework. In Rhode Island, the initial lack of legislative clarity and objectives regarding long-term contracts left the regulatory decisionmaker to apply an analytical framework that at first resulted in a rejection of the PPA. The legislature reacted by refining the standard the PPA needed to meet and delineated the balance point between the conflicting objectives. The proposed agreement went back to the PUC to undergo a revised analysis. The second review led to regulatory approval that lined up with the objectives of the legislature.

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47 NH PUC Docket DE 10-195, see: http://www.puc.nh.gov/Regulatory/Docketbk/2010/10-195.html

48 St. 2008, c. 169. (2008). *An Act Relative to Green Communities.*

III. A Framework for Analysis and Decisionmaking

Conflicting policy objectives are inevitable. Confusion, unpredictability, and multiple policy changes are not inevitable. The challenges for policymakers include how to achieve multiple and sometimes conflicting objectives cost-effectively; how to weight benefits and costs; and how to account for the time value of money in the face of layers of uncertainty and risk. To create clarity, predictability, and accountability, decisionmakers should follow a robust analytical framework. While the case studies show that good process cannot fully inoculate against the destabilizing pressures resulting from competing stakeholder interests, the result will gain the confidence of market participants, utilities, investors, other stakeholders, and appellate courts.

The opportunity or necessity to balance tradeoffs among policy objectives and the types of actions or decisions involved may differ depending on the circumstances. The case studies touched on a range of decisionmaking circumstances:

1. Establishing or adopting policies (e.g., New Jersey's set-asides);

2. Developing programs and policy implementation details (e.g., establishing the process for weighting cost and economic benefit in New York's RPS bid evaluation);

3. Making decisions on how to apply policies, encompassing either selecting among alternatives (for instance, conducting a competitive solicitation with multi-attribute scoring, as in the New York RPS and Massachusetts long-term contracting pilot program) or considering actions taken to comply with policies brought forward for regulatory approval (e.g., long-term contract approvals in Massachusetts and Rhode Island); and

4. Considering options to alter policies to achieve objectives more fully (e.g., California's RPS refinements).

Our examination of state experience indicates that, regardless of the decisionmaking circumstances, key decisions on how to set and implement renewable energy policies with conflicting objectives fall into one of six stages. The stages include defining objectives and constraints, defining and assigning jurisdiction and authority, defining what (and who) counts, defining and applying decision standards, selecting and utilizing decisionmaking metrics, and addressing uncertainty and risk.[49] For example, some decisions establish clear objectives and signal priorities in the setting of policy, while other decisions interpret and apply the guidance of

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[49] The ability of government policymakers and implementers to produce robust analysis is often constrained by a lack of analytical staff or budget to hire outside analytical expertise (or by an inability or unwillingness to devote or secure necessary resources), although some states have succeeded in attracting outside grants (e.g., from U.S. Department of Energy (DOE) or a foundation).

legislators when making implementing decisions. The remainder of this section describes each stage, along with the associated issues.

A. Defining objectives and constraints

The experiences detailed in the case studies show that identifying clear objectives and signaling their prioritization or weight directly influences both the effectiveness of implementation and the degree of conflict during implementation. It is the job of policymakers—typically but not always legislators—to lay a clear foundation of what objectives they are attempting to achieve, their prioritization, and what constraints they intend to apply. Policy implementers, regulators, and stakeholder are left to scrutinize carefully and apply the framing objectives and constraints. While policymakers sometimes state clearly the objectives of a specific renewable energy statute or policy, objectives and their prioritization are often unclear. As our case studies show, a lack of specifically articulated objectives and priorities can contribute to tensions, perceptions that policies are not attaining goals, fears that one goal will dominate to the exclusion of others, and pressure from stakeholders to modify or do away with certain policies. Collectively, policy implementers, decisionmakers, and stakeholders can be left ill-equipped to find a direct path to a stable balance point among conflicting objectives.

For example, the New York RPS implementing order and Rhode Island RES statute contained explicit statements of policy objectives, while Connecticut and Massachusetts passed their initial RPS statutes without any statement of objectives. Comparison of the California and New York RPS experiences is instructive. In California, although both cost-based and in-state objectives were clearly articulated, a means to balance the tradeoffs was not codified at the outset. As discussed in the case study, a lot of contentious back-and-forth was required before the balance point was clearly defined: The legislature's new content requirements established a minimum level of generation that would align both least-cost and in-state objectives sufficient to assure that nether extreme would completely dominate.

In contrast, the New York Public Service Commission both defined its objectives and proposed an explicit evaluation weighting (70% least cost, 30% in-state benefits). They sought stakeholder comments on a proposal, then moved forward with clarity and little contention. The contrasting experiences suggest that states might be able to avoid the convoluted path that California inadvertently set for itself by establishing indicators of balance from the outset. Cost-effectiveness is typically a constraint on any renewable energy policy. It is, or should be, understood that whatever course is pursued, it is good public policy to do so with an eye toward minimizing the cost of achieving any particular set of objectives and benefits to whoever counts, be they ratepayers, taxpayers, or current or future generations. More generally, all the case studies demonstrate the value of policymakers' awareness of the conflicts their objectives create; such awareness creates a more direct path to finding a balance in implementation.

B. Establishing jurisdiction

Those establishing a renewable energy policy or suite of complementary, interacting policies must also establish who has the jurisdiction to execute the implementation, decisionmaking, and measurement and evaluation steps. It is typically the state legislature's responsibility to define the jurisdiction and authority for regulatory actors involved in subsequent rulemaking and implementation of renewable policies, or approval of actions taken in compliance with the policies. Ensuring clarity in renewable energy policy regarding jurisdiction and authority means answering the following key questions:

1. How do regulatory jurisdiction and authority limits shape the ability for policy implementers or decisionmakers to address tradeoffs and balance objectives?

2. How have different jurisdictions dealt with split policy objective responsibility (e.g., ratepayer direct-cost minimization versus consideration of societal and economic benefits), and what can we learn about aligning policy objectives with decisionmaking authority?

3. What jurisdiction and authority are applicable in the market structure and policy environment in question?

The case studies explored in the Appendix show how the answers to these questions can impact a policy's successful implementation. The Rhode Island General Assembly and the Governor's administration appeared to be aligned with respect to policy objectives. Yet in crafting the initial long-term contract requirement for a small offshore wind farm, the General Assembly armed the PUC with only narrow authority to consider whether the cost was reasonable, without the authority to consider costs and benefits broadly or establish a basis for cost comparison that aligned with their legislative objectives. It was only later, after the PUC reached a decision that did not align with the General Assembly's policy objectives, that the bounds of authority were widened (by passage of a revised law ordering the PUC to consider other measures). In its revisions, the General Assembly also revised agency jurisdiction by putting parts of the analysis under other agencies' jurisdiction (Economic Development Corporation and Department of Environmental Management) while requiring that the PUC give deference to the conclusions of three other agencies.

C. Defining boundaries for policy evaluation

Boundaries define the line between the costs and benefits that are to be considered when evaluating policy decisions and those that will not. Establishing analytical boundaries is essential to enable analysis of potential programs and actions taken toward meeting the policy objectives. Such boundaries should be rooted in policy objectives. Questions that typically must be answered include the following:

1. Costs or benefits as incurred by whom? Potential answers encompass choices including

    a. societal versus ratepayer costs;

b. costs incurred or benefits accruing within the state only, versus over a larger geographic area;

c. costs or benefits to current versus future generations; or

d. impacts upon humans, or more broadly to human and other natural ecosystems as well.

2. Which costs or benefits to consider? Potential answers span alternatives including consideration of:

   a. gross or net accounting of benefits;

   b. direct macroeconomic benefits only (local or broader) versus indirect macroeconomic impacts or benefits (e.g., multiplier effect); or

   c. monetary versus nonmonetary costs and benefits.

The case studies reveal some of the related issues and their impacts. For example, some of the dissent discussed in the Block Island Wind Farm PPA approval case study derived from whether gross or net economic benefits should be considered. In the New York case study, NYSERDA's RPS policy evaluation projected both direct and indirect gross macroeconomic benefits, leaving it to the PSC to determine the weight it might apply to each in consideration of possible policy refinements.

Another example of a benefit often cited is that of wholesale electricity price suppression, the reduction in wholesale rates resulting from adding low-variable-cost resources into a competitive market bid-stack.[50] The benefits of resulting lower clearing prices impact all load-serving entity wholesale purchases not already procured by self-supply or long-term purchases and accrue to ratepayers. However, some analysts have argued that when seen through a societal lens, such benefits constitute a transfer payment from generators to ratepayers with little or no net benefit.[51] From another perspective, price suppression may be viewed as a transfer of wealth among generations due to the impact of price signals that do not incorporate externalities on the level of consumption.

Which perspective is material to a policy analysis depends on the policy's objectives and perspective on whose costs and benefits should carry weight. If policymakers wish to have future generations, societal, net, or other costs or benefits considered, the case studies suggest

[50] This benefit was explicitly considered by the Massachusetts DPU in its Cape Wind-National Grid PPA approval. Price suppression studies were filed in the first Block Island Wind Farm docket.

[51] See, for one perspective, F. Felder (2011), Examining Electricity Price Suppression Due to Renewable Resources and Other Grid Investments, *The Electricity Journal* 24(4).

that being explicit as to what and who counts will be more effective (and less contentious) at yielding their sought-after balance among objectives than leaving such factors unstated.

D. Defining and applying decision standards

Policymaking and decisionmaking standards, also referred to as *standards of review* for approval of specific actions, establish the test to be met by an action or renewable energy generator. They can fall into four categories: threshold standards, comparative standards, risk minimization standards, and prudence standards. Each is discussed in turn below.

1. Threshold standards

Threshold standards consist of threshold tests for inclusion or approval under the policy: If you meet or exceed the standard, you are in; if you fail to meet the threshold, you are out. The standards can fall into several categories, including eligibility standards, some applications of benefit/cost standards, or cost-effectiveness standards.

- The simplest and perhaps most obvious threshold standard is the *eligibility standard*: Does the resource or action meet the list of those sought to be encouraged by the policy? Examples of this test could be one of generation type, emissions, location, or any number of other characteristics.

- The *benefit/cost* standard can be used as either a threshold or comparative standard. Used as a threshold standard, it can test whether the action has either positive net benefits (B/C > 1.0)[52] or no net harm (B/C >=0). Benefit/cost standards can also encompass a *materiality standard*, which often includes use of terms such as *material* or *substantial*. For example, Rhode Island's Long-Term Contracting Standard for Renewable Energy[53] requires that the project meet a condition of providing direct economic benefits to the state deemed substantial by the PUC.

- While *cost-effectiveness* is more commonly used as a comparative standard (see below), it can sometimes be applied as a threshold standard as well: Is the option being considered cost-effective (however defined)?

2. Comparative standards

Comparative standards are common in the renewable energy-policy landscape. Typically, comparative standards require substantial analysis of relevant metrics within the

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[52] As described in the Appendix, this approach is being used by the New Jersey legislature and BPU in establishing its OREC policy: Offshore wind developers must quantity net positive economic benefits.

[53] R.I, G.L. §39-26.1-5 (e).

analytical boundaries to determine whether the proposal(s) under consideration prevail over other available, or even hypothetical, alternatives. Options include the following:

- Is the proposal *least cost* compared to other available options to meet the objectives? As previously described, this standard might involve setting a target quantity of renewable energy sought via a competitive market or procurement mechanism, or alternatively, competitively procuring as much renewable energy as a defined budget can buy.[54]

- Is the proposal *cost-effective* compared to a defined standard metric? Cost-effectiveness can be applied that requires subjective judgment on the part of the decisionmaker (is it *reasonable* compared to the cost-effectiveness of other alternatives?). Is it the *most* cost-effective from among a suite of proposals in response to a solicitation? Is it cost-effective *enough*[55] to be acceptable? In the case of the MA DPU's review of the PPA between National Grid and Cape Wind, the regulator determined that the contract was cost-effective because it was lower than the marginal cost of compliance.[56]

- When applied as a comparative standard, the question might be: Does the proposal have an acceptable *benefit/cost* ratio compared to alternatives? Or, does the proposal have a higher benefit/cost ratio than alternatives? Another more subjective question might be: Is the proposal's ratio of benefits to costs *reasonable*? As discussed in the Appendix, NYSERDA's evaluation of RPS bids under New York's 70/30 price/economic benefits evaluation criteria could be considered a variation on a benefit/cost approach: Projects are ranked separately on both cost and benefits scales, with those bids with the superior benefit/cost scores selected. In the Deepwater Wind case study, the Rhode Island General Assembly revised an initial comparative net-benefits standard to a series of threshold standards.

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[54] As described in the case studies, the California RPS applies a least-cost, best-fit standard that takes into account the higher value of resources with more peak-aligned production, greater reliability characteristics, superior location on the electric system, etc.

[55] Such a standard of review may require a speculative basis, such as *what might have occurred* in a competitive solicitation (see for example, the case study considering approval of the Cape Wind-National Grid PPA), or *what other resources might have been available* in the Deepwater Wind PPA case study, in the first PUC approval docket).

[56] As described in the Case Study Appendix, the DPU interpreted a duel standard of cost-effective (a threshold) as well as "in the public interest," as a comparative benefit/cost C/E standard, concluding that any cost below the GCA's marginal compliance cost threshold was least-cost.

3. Risk-minimization standards

A decision standard could focus on completely avoiding or reducing the probability of an undesirable outcome that might occur in the future. Examples of risk minimization include ensuring reliability, considering impacts associated with climate change, or hedging against fuel-price volatility. Given an understanding of risks, this standard asks: Is a policy, program, decision, or action a good insurance investment? Some of the challenges in applying this standard include determining how much risk avoidance is enough or appropriate, addressing the uncertainty involved in making such an assessment, and identifying any mismatches between those who bear the costs and enjoy the benefits of risk minimization.

4. Prudence standards

Application of a prudence standard to utility decisions typically occurs on a backward-looking basis during an approval or measurement/evaluation stage by a rate regulator when responding to actions taken by regulated utilities under a program or policy. In forward-looking prudence reviews, a utility might bring a negotiated PPA with an RPS-eligible generator forward for approval. During this stage, the regulator asks: Was the action taken or decision made one that a reasonable utility decisionmaker would have made?

A utility, knowing that such a standard would be applied, would consider a number of factors in making the decision in response to a policy or regulatory requirement. These factors include ratepayer impacts, benefits, and risks, as well as shareholder benefits and risks. A prudence review requires application of a regulator's judgment to evaluate a specific action compared to the range of real and hypothetical actions not taken. The implication of a prudence review is one of risk to the utility and its shareholders (disapproval of rate recovery for some of the costs of an action) without commensurate reward.

E. Specifying decisionmaking metrics

In addition to identifying what can be considered and the standard of review, another stage of policy analysis includes defining what metrics are to be used, i.e., what to measure and how to measure it. Metrics can be monetary or nonmonetary.

Common monetary metrics include converting costs and benefits (generally, impacts) into a single metric that quantifies total expenditures over time. Net present value (NPV) analysis discounts future monetary impacts to a common year's dollars. NPV analysis requires selecting an appropriate time frame and discount rate consistent with the analytical boundaries (e.g., an investor-, ratepayer-, or societally appropriate discount rate).[57] Other monetary metrics

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[57] When policy objectives and the boundaries of analysis incorporate and value benefits accruing to future generations, exclusive reliance on NPV metrics effectively discounts any benefits accruing to future generations. The Cape Wind decision took into account impacts on future generations by explicitly considering the long-term cost of compliance with the Global Warming Solutions Act, but in our case-study analysis and review of state renewable energy

include average rate or bill impacts on an absolute or percentage basis. The analysis can include all costs, benefits, and impacts in monetary terms, for instance, by converting economic benefits or environmental externalities into dollar terms.

Nonmonetary metrics can include the full range of measurable effects that relate to the factors policymakers identify. They can take into account the magnitudes of impacts, such as number of jobs, tons of avoided emissions of various types, gallons of reduced water use, tons of nuclear waste reduced, and acres of land impacted. For example, in instances in which renewable energy policies focus on creating in-state economic development, the applicable metrics can encompass the direct creation of jobs and other benefits, as in the case of the New York RPS. Alternatively, the analysis could consider net impacts that might also include (for example) jobs lost in the fossil-fuel industry or the deleterious effect of loss of ratepayer spending power resulting from increased rates to pay for the renewable energy policy.

Many impacts and benefits may be difficult to quantity. Because not everything that counts can be counted, nonmonetary metrics can also be qualitative. For example, a policymaker might evaluate whether, or the degree to which, a specific decision or action achieves objectives using a directional indictor (e.g., an increase or decrease in a cost or benefit), a relative indicator (e.g., one action achieves more or less of a cost or benefit than another), or an indication of the degree of significance.

Lastly, monetary and nonmonetary metrics can be utilized together in a multi-attribute, multi-criteria decision analysis that may take a variety of forms, including the following:

1. A multi-attribute matrix, applying weights (which are ultimately subjective policy decisions themselves) to convert the various metrics into points yielding a single score for each alternative considered.
2. Separating each category of measurable costs and impacts and allowing the decisionmaker to draw more subjective conclusions by deciding which factors to give greater weight.
3. A combined approach, considering quantitatively those elements that are susceptible to quantification, and separately considering and subjectively weighing those deemed too difficult to quantify.

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policy experience, we found little other evidence that such issues were quantitatively considered. There is a growing body of research on how to include intergenerational costs and benefits into the social discount rate.

See, for example: H. Scarborough (2011), Intergenerational Equity and the Social Discount Rate. *Australian Journal of Agricultural and Resource Economics*, 55(2): 145-158; or U. R. Sumaila and C. J. Walters (2005), Intergenerational Discounting: A New Intuitive Approach. *Ecological Economics*, 52: 135–142.

F. Addressing uncertainty and risk

Many of the objectives driving renewable energy policy are entwined with uncertainties including the following:

1. future costs of emerging renewable energy technologies (and the effect of today's policies on driving down those future costs);
2. future costs of other renewable energy alternatives;
3. future costs of non-renewable energy alternatives (particularly natural gas);
4. the degree and location of future economic benefits; and
5. the magnitude, timing, and cost of climate change and other environmental and geopolitical risks that a renewable energy policy is aimed at mitigating.

Because of these uncertainties, an analysis of the costs or benefits of a policy, procurement program, or specific action under a policy under a single set of assumptions may be misleading. There are two dimensions to these uncertainties: estimating future costs and benefits based only on information available today, and attributing probability to those futures. These are inherently challenging topics.

Scenario analysis can be used to analyze costs and benefits under alternative futures defined as realistic, internally consistent sets of assumptions regarding the economic, geopolitical and policy landscape.[58] Alternatively, sensitivity analysis—the testing of how results vary when a specific assumption is changed—can yield insight into how sensitive conclusions may be to a specific assumption in which uncertainty is material, as well as into whether a conclusion holds over a wide range of assumptions. Some of the common sensitivities in analysis of state renewable energy policy include varying assumptions on future energy prices, rates of technological advance, future availability of federal incentives, costs of capital, or discount rates. Considering some of the above uncertainties and risks using one or both of these approaches may provide decisionmakers with a more reliable conclusion.

IV. Conclusions, Recommendations, and Areas for Future Study

Our analysis of state-level renewable energy policy experience identified a number of insights. The case studies draw out common features of the issues, problems, challenges, and potential approaches that legislators, regulators, and other stakeholders and market participants can draw from. Many of the issues that arise require the balancing of tradeoffs over time. Whether in the context of a single policy or multiple policies operating in parallel, we have found that the need to reconcile competing or conflicting policy objectives is a ubiquitous experience across many states facing similar issues.

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[58] Such futures often use broad labels such as *business as usual*, *carbon-constrained future*, etc.

Our examination of the canvas of states' experiences serves to illustrate the variety of ways in which these challenges can be addressed. The objectives, analyses, decisionmaking circumstances, and outcomes of the cases we have examined differed, yet our review has yielded some common themes:

1. Insight into the nature of conflicting objectives and the environment into which renewable energy policies are cast;
2. The presence of recurring policy approaches applied to the most common sets of conflicting policy objectives;
3. Discrete stages at which key policy setting, implementation or evaluation decisions are made;
4. The value of raising policymaker awareness of the common challenges inherent in achieving conflicting renewable energy policy objectives, and the impact that certain actions or inactions can have on achieving desired objectives; and
5. The value of clarity throughout the policymaking and implementation process.

The lessons learned from the experiences of states departing from least-cost to meet other policy objectives can aid future policymakers in achieving their goals in an efficacious and cost-effective manner. These lessons provide the basis for our recommendations. While the development of formal best practices would require a more comprehensive exploration, we are hopeful that the effort helps create a foundation for establishing what may be identified as a best-practices framework.

A. Recommendations

Our major recommendations and observations include the following.

1. Policymakers and decisionmakers should articulate both objectives and constraints clearly at the outset of the policymaking process. In particular, policymakers should specify which costs and benefits, and whose costs and benefits, are to be considered. They should also consider which decision standard or standards will be most effective at yielding a desired outcome. Whatever course is pursued, providing this clarity will help achieve their objectives while gaining the confidence of utilities, investors, other stakeholders, and appellate courts.

2. States should identify and define their strategic objectives early in the process and change them only if and when necessary. The objectives and constraints of a state and its populace do not tend to change quickly. When change is contemplated, if it is recognized as a forward-looking course correction to better achieve objectives rather than a fundamental change of direction, a more attractive environment for investment in renewable energy businesses will ensue.

3. Renewable energy policy objectives can create a tension between minimizing the costs to today's ratepayers versus future ratepayers or society as a whole. Decisions made to minimize cost to ratepayers today can trump decisions that may be least-cost over a longer time frame under two sets of circumstances, each yielding its own recommendation for analysis:

- Such an outcome can occur in the face of future fuel price changes, carbon regulation, or cost reductions associated with today's emerging technologies. For this reason, policymakers should consider the impact and risk (probability) and risk exposure (magnitude) to such uncertainties.

- Alternatively, this outcome could be driven by exclusive reliance on NPV analysis. As noted in Part III.E, when policy objectives and the boundaries of analysis incorporate and value benefits accruing to future generations, exclusive reliance on NPV metrics effectively discounts any benefits accruing to future generations. At times, such considerations are implicit. We recommend that policymakers either explore the use of analytic approaches that better value intergenerational transfers or make more explicit that such considerations are central to the establishment of the policy.

4. Those making policy regarding renewable energy should also prioritize various objectives as guidance for those making implementing decisions. As was the case with establishing relative weightings for price and local benefits factors in New York's RPS solicitation evaluation criteria, clearly prioritized objectives reduce the changes and uncertainty that can result. Helpful aspects of prioritization include the following:

- ***Rank.*** Identify the relative importance of the objectives.
- ***Weight.*** Apply relative weighting factors to the objectives.
- ***Identify absolutes.*** Indicate whether meeting a particular objective is *necessary* or an undesirable outcome is *intolerable* (to be avoided in any circumstances); or identify whether objectives fall between the two extremes.

5. Those establishing renewable policy objectives must also provide decisionmakers with the authority to consider fully the objectives and constraints. The Block Island Wind Farm PPA approval case study shows what can happen when authority is not well-aligned with objectives. The legislature's use of the term "commercially reasonable" was not sufficiently clear to achieve the desired objectives, and it became necessary to re-legislate. Legislators should take care that, if steps in the policy cycle include rate regulators, they expressly give regulators the authority and direction to consider the relevant factors (perhaps outside their traditional scope) as they relate to the policy objectives.

Policymakers can choose either to delineate limits and constraints on authority between policymaking and program implementation explicitly or to allow implementers and decisionmakers to consider policy tradeoffs over the full spectrum of possibilities. Examples of delineating limits include establishing rate-impact caps (used in the New Jersey Solar carve-out case, for example); requiring development of benchmark prices;[59] or capping the percentage of supply that may come from out-of-state (as in the California RPS policy).

6. When policymakers are looking to encourage regulated utilities to take action, such as procurement of RPS-eligible generation under a long-term PPA (particularly if seeking outcomes to meet objectives other than least-cost), they should identify if/when a prudence standard will apply and how it would be applied. They should also be clear on the conditions under which utilities can rely on rate recovery.

B. Areas for further study

The goal of this paper was to examine the issues associated with competing renewable energy policy objectives, providing insight into the fundamental characteristics of the issues and challenges, conveying lessons learned, and providing a framework for policymakers and implementers to pursue in developing and implementing such policies. Potential areas for furthering this effort include the following:

- Studying renewable energy policy development and implementation experience in search of the best practices for accomplishing different tilt objectives;

- Developing a template to guide renewable energy policy development and implementation. Such an effort could include developing a tool kit for approaching the challenges in a comprehensive, logical, well-organized, and defensible manner;

- As noted throughout, objectives and analytical boundaries in the realm of renewable energy policy often dictate that costs and benefits accruing to future generations should be counted. Yet our research has revealed little explicit use of analysis and metrics geared toward such considerations. This observation suggests the value of exploring the available tools best able to consider the costs and benefits accruing to future generations and to provide practical guidance to policymakers on how to apply them.

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[59] The RPS central procurement agents in New York established confidential benchmark prices prior to each procurement. These benchmarks estimate reasonable bid-price expectations and serve as a price above which the procurement agents may forego a purchase. Similarly, according to the Com Ed 2010 RFP for Illinois RPS procurement, prior to any selection of RECs based on priority, all bids that fail to meet the benchmarks established by the Procurement Administrator, the Procurement Monitor, and the IPA are eliminated.

Appendix−Case Studies

In this Appendix, we present the results of five case studies exploring renewable energy policy implementation in the presence of conflicting objectives. These include:

- New York: Securing Local Benefits through Centralized RPS Procurement.
- California: RPS Geographic Eligibility and Evolving Role of Tradable RECs.
- New Jersey: RPS Technology Set-Aside Policies.
- Massachusetts: Cape Wind's Long-term PPA with National Grid.
- Rhode Island: National Grid–Block Island Wind Farm PPA.[60]

A. New York: securing local benefits through centralized RPS procurement

This case examines the approach taken in New York to balancing competing objectives of least-cost RPS compliance and securing local economic benefits. Certain elements of the NY RPS are unique. The program was established by regulation and is administered using centralized procurement by a state authority. The New York Public Service Commission established and modified the centralized competitive procurement of renewable energy attributes to reach the growing RPS target in a cost-effective way that ensures that economic and environmental benefits accrue to New Yorkers. The Commission started with clear priorities. The procurement bid evaluation process applies a comparative standard, where winning projects have a benefit/cost ratio superior to other alternatives. NYSERDA utilizes monetary metrics of costs and benefits applied in a weighted multi-attribute analysis to select bids that best meet the applicable policy objectives. Combined with the strict hourly scheduling requirements for imported energy, nearly all selected projects have been built in New York. Independent program evaluation has shown the program to be cost-effective.

[60] Mr. Grace, the primary author, has played a modest role in establishing some of the policies or related market infrastructure discussed in some of the case studies presented herein. He served as technical consultant to the Massachusetts RPS stakeholder advisory process, supporting both clarifying of policy objectives and applying them to program implementation details. He helped the New York State Energy Research and Development Authority develop their approach to achieving balance among its RPS objectives. He served as part of a team creating the Western Regional Generation Information System to enable California's access to renewable energy credits. He also advised the developer of the Block Island Wind Farm in demonstrating its compliance with Rhode Island's standard of review to qualify for a long-term contract.

1. Policy context and objectives

The New York Public Service Commission implemented by regulation a competitive retail choice marketplace between 1996 and 1998 within the service areas of its investor-owned utilities. In 2004 the Commission established the state's RPS with an eye toward preserving and increasing the contribution of renewable energy serving state retail electric load. The Commission set a goal for renewable energy use of 25% by 2013, to be reached incrementally from the 19.3% 2004 baseline. Meeting the gap between the goal and the target is allocated between RPS compliance (the majority), voluntary green power, state facilities purchases, and procurement by the state's power authorities.[61] This goal was later increased to 30% by 2015.[62] New York is unusual among the states in adopting RPS regulations without the presence of RPS legislation. This approach drives many features of the RPS approach, including the collection mechanism of ratepayer funds and the long-term contracting approach to support project financing.

This case study focuses on the Main Tier[63] of the NY RPS program, through which 98% of the RPS target is met by procurement of renewable energy attributes[64] from renewable energy generators delivering their output to the NYISO wholesale market.[65]

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[61] NY P.S.C. Case 03-E-0188. (2004). Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard. Order Regarding Retail Renewable Portfolio Standard. Accessed at: http://documents.dps.state.ny.us/public/Common/ViewDoc.aspx?DocRefId=%7BB1830060-A43F-426D-8948-F60E6B754734%7D.

[62] NY P.S.C. Case 03-E-0188. (2010). Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard. Order Establishing New RPS Goal and Resolving Main Tier Issues. Accessed at: http://documents.dps.state.ny.us/public/Common/ViewDoc.aspx?DocRefId=%7B30CFE590-E7E1-473B-A648-450A39E80F48%7D.

[63] A separate Customer-Sited Tier was established to stimulate smaller, behind-the-meter renewable energy resources.

[64] RPS Attributes are analogous to RECs. New York has yet to establish a REC trading system or authorize the use of RECs for RPS compliance, although plans have been in the works to establish such a system. If such a system is established, NYSERDA would procure RECs.

[65] NYSERDA and DPS. (2009). New York Renewable Portfolio Standard Program Evaluation Report, 2009 Review – Draft Report. http://www.nyserda.org/Energy_Information/NY%20Renewable%20Portfolio%20Standard%20Program%20Evaluation%20Report%20%282009%20Review%29-FINAL.pdf

The Commission started the process of selecting RPS design options by establishing explicit objectives that considered costs, benefits, reliability, and other factors. Of the seven categories of objectives identified, the top five, listed in priority order, are:

1. Increasing New York State's supply of renewable resources with the ultimate aim of establishing a viable, self-sustaining competitive renewable generation market;

2. Diversifying the generation resource mix of energy sold in New York State to improve energy security and independence while ensuring protection of system reliability;

3. Creating economic benefits by developing renewable resources and advancing renewable resource technologies in, and attracting renewable resource generators, manufacturers, and installers to, New York State;[66]

4. Improving New York's environment by reducing air emissions, including greenhouse gas emissions, and other adverse environmental impacts on New York State; and

5. Developing an economically efficient RPS requirement that minimizes adverse impacts on energy costs.[67]

In addition, one of the explicit objectives of the program was to ensure that program benefits accrue to New York ratepayers funding the program.[68]

The Commission established a *central procurement process* to be administered by the New York State Energy Research and Development Authority (NYSERDA). The central-procurement approach differs from the conventional RPS approach under which RPS obligations are placed upon load-serving entities (LSEs). Instead, NYSERDA uses a competitive solicitation process to offer long-term (up to 10-year) contracts for RPS attributes to eligible generators who deliver the associated energy to NY end users. The competitive process, run as a sealed-bid RFP with pay-as-bid pricing, achieves program goals cost-effectively. Eligible generators might be located within NY or outside NY, but those outside of NY must deliver their energy to NY. The Commission saw this as an effective structure to make renewable energy generation projects financeable in the state's competitive retail market. Long-term contracts contribute to the cost-

[66] NY P.S.C. (2004) at 10 pointed out that implementation of "the RPS is also expected to create greater regional benefits in New York State through economic development. Manufacturing of renewable energy equipment, procurement of fuels such as biomass, and construction and operation of generating facilities will create direct and indirect jobs, purchases of local products, which add revenues to local economies, and additional tax payments."

[67] NY P.S.C. (2004) at 22-24.

[68] NY P.S.C. (2004) at 61.

effectiveness of the program by supporting developers' ability to get projects financed, thereby reducing generators' development costs.[69]

2. Balancing objectives—least cost versus local economic benefits

The Commission charged NYSERDA with creating, subject to its approval, a means of capturing the in-state benefits of the RPS policy, balanced with minimizing adverse cost impacts. Since 2005, NYSERDA has conducted six solicitations. Following the initial solicitation,[70] the Commission solicited public comment on whether to include economic development criteria in the evaluation of bids submitted in subsequent solicitations. Based on the comments received, the Commission adopted a two-pronged approach to promote in-state generation and in-state economic benefits by 1) altering the delivery requirement; and 2) attributing weight in the evaluation process toward expected economic benefits.

The 2004 RPS Order allowed bid facilities importing energy into New York to meet a relaxed delivery requirement to meet RPS requirements, meaning energy deliveries could match generator production on a monthly basis. In comments received by the Commission, stakeholders expressed concern that monthly matching provided advantages to out-of-state generators because they did not have to bear the costs of transmission, congestion, and losses. In the new order the Commission required intermittent resources to meet a strict hourly matching delivery schedule in order to "eliminate undue advantages enjoyed by out-of-state intermittent resources."[71] This requirement is considered among the most stringent in the region.[72] The strict delivery approach is costlier and more challenging for an importing generator to meet.

The 2006 Order also required that NYSERDA incorporate economic benefits into scoring bids under subsequent solicitations. The Commission authorized the use of bid evaluation criteria giving a weight of up to 30% for economic benefits to New York, with the remaining 70% (or more) of the weight attributed to the bid price. According to the Order, it is appropriate

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[69] NYSERDA, DPS. (2009).

[70] NYSERDA. (2006). New York State Renewable Portfolio Standard Program Performance Report (Program Period Ending December 2005). Retrieved from: http://www.nyserda.org/rps/2005RPSPerformanceReport.pdf. Also see: NYSERDA. (2008, June). New York State Renewable Portfolio Standard Performance Report Program Period ending June 2008). Retrieved from: http://www.nyserda.org/rps/RPSPerformanceReportWEB.pdf .

[71] NY P.S.C. Case 03-E-0188. (2006). Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard. Order Authorizing Solicitation Methods and Consideration of Bid Evaluation Criteria and Denying Request for Clarification.

[72] Clean Energy States Alliance. (2008). Progress Report: Review of State Renewable Portfolio Standard Programs in the Northeast & Mid-Atlantic Regions.

to use this weighting system because New York ratepayers are funding the RPS program.[73] This weighting meets the Commission's desire to balance the objectives of minimizing the costs of the program while also considering local economic development benefits. The Order notes that the evaluation criteria should be applied so that any project, regardless of location, would have the same opportunity to verify quantitatively its economic benefits to New York.[74]

NYSERDA implemented this requirement at the maximum 30% weight by requiring bidders to file with their bids an Economic Benefits Report detailing the monetary benefits associated with the activities necessary to plan, develop, construct, and operate new or upgraded renewable energy projects. Benefit categories include long-term New York State jobs, payments to New York State and its municipalities, payments for fuel and resource access, in-state purchases or consumption of goods, and short-term employment of New York workers. NYSERDA converted each factor into a monetary value. To implement this system, NYSERDA attributes 30% of the evaluation points to the bid providing the highest per-unit economic benefits, 0% to the lowest, with bids in between receiving proportional points along the scale. NYSERDA takes a similar approach to ranking price bids, with points from the cost and benefit bid components combined to determine the winning bids.

Post-award, contracted projects must demonstrate actual economic benefits. If the generator does not demonstrate at least 85% of the claimed expected total dollars of benefits over the first three years, the contract price is be reduced annually by the percentage shortfall in each remaining year of the contract. This novel approach serves to make the claimed benefits conservative and reliable, as project financiers would be averse to risking such a revenue reduction.

3. Results

Through six solicitations, New York has contracted with enough supply to achieve nearly 40% of the 2015 target. Wind power is the predominant generating technology, making up 89% of the capacity under contract. The remaining generation is from hydroelectric upgrades and biomass (direct and co-fired) facilities.[75] To date, NYSERDA has contracted with fifty-three large-scale electricity generators, including one Pennsylvania wind farm whose contract has now expired. Of the 52 remaining facilities, one is located in Quebec, with the remainder located in New York. When all reach commercial operation, these 52 facilities will add approximately

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[73] NY P.S.C. (2006) at 16.

[74] *Id.* at 16.

[75] NYSERDA. (2011). New York State RPS Performance Report. Program Period December 31, 2010. Retrieved from: http://www.nyserda.org/rps/2011%20RPS%20Annual%20Report.pdf.

1,848 MW of new renewable capacity. New York has more in-state renewable energy capacity additions attributable to its state RPS policy than any other state in the Northeast.[76]

4. Summary

In establishing the NY RPS by regulation, the Commission started with clear priorities and explicit objectives, including ensuring that NY ratepayers enjoyed economic benefits from the development of wind projects built to meet the RPS targets. One advantage of an RPS program authorized by regulation rather than legislation is that it avoids the possibility of conflict that might otherwise occur when legislative language lacks explicit objectives for regulators to follow.

The program allows qualified renewable generators from any location, but they are explicitly evaluated and selected according to both their costs and benefits and must meet strict delivery requirements into the New York control area. The transparent centralized procurement approach uses quantitative analysis of bidders to balance the competing objectives of achieving least-cost RPS compliance and stimulating local economic benefits.

Program evaluation has shown the program to be relatively cost-effective and to produce gross direct and indirect economic benefits (not accounting for net economic losses) in excess of program direct costs, even with the dominance of in-state renewable generation for RPS compliance. The approach taken aimed to avoid violating the Commerce Clause by emphasizing that the state would accept generators located anywhere provided there were local benefits.

Having received reliable monetary estimates of economic benefits from the bidders, NYSERDA could have taken the final step and combined these values directly with price bids in a single monetary-evaluation metric. For instance, by subtracting the economic benefits from the price bid for evaluation purposes, a bid providing $20/MWh of economic benefits could beat out a bid with no economic benefits but a $19/MWh lower price. Such an evaluation approach would provide a transparent and logical means to make tradeoffs among objectives.

B. California: RPS geographic eligibility and the evolving role of tradable RECs

For a decade, California's legislature, several governors, and multiple regulators have been working to achieve a balance between reaching high renewable generation targets at lowest ratepayer cost while also promoting in-state development of renewable generating capacity. This case study demonstrates the tensions between these conflicting objectives common to many other jurisdictions. The RPS was originally crafted to balance the goals of least-cost and local benefits. California has at various junctures used analysis of expected costs and benefits to refine its policy. Over time, the state has also pursued a range of geographic eligibility requirements to achieve its policy objectives, ranging from broad geographic eligibility to a strict delivery standard. Within the context of its RPS procurements, the state applies a least-cost,

[76] Clean Energy States Alliance (2008).

best-fit comparative standard that has elements of a multi-attribute analysis combining direct and indirect benefits.

California's experience with its Renewable Portfolio Standard and RECs illustrates many of the complexities of implementing state renewable energy policy in interstate markets, as well as tools often used by states to tilt the market outcome toward in-state generation. These tools included REC eligibility, import quotas and price caps, and deliverability requirements. In California, frequent changes related to the presence or absence of restrictions on the use of imported renewable generation to meet the RPS standard led to market instability. California's experience also highlights the challenge of implementing stable solutions that is inherent in the conflict among these types of objectives.

1. Policy context and objectives

Since the original enactment of California's RPS in 2002, three interconnected mechanisms have been the subject of ample attention:

- Eligibility and energy-delivery requirements for imported renewable generation;
- Caps on the amount and cost of imported renewable energy allowed for compliance; and
- Tradability of renewable energy credits separately from the underlying electricity.

As RPS targets were originally set and then increased, some policy decisions were influenced by the concern that without statutory or regulatory limits the majority of renewable energy for RPS compliance would come from outside the state. Other design decisions were driven by concerns that limitations on imported renewable generation would drive up program costs.

The California RPS enacted by the state legislature in 2002[77] required retail sellers of energy to increase their procurement of renewable energy by 1% per year so that by 2017 20% of their electricity would come from renewable sources. The RPS target, which initially applied to the state's three investor-owned utilities (IOUs), was later changed to 20% by 2010. The California PUC (CPUC) is responsible for overseeing RPS procurement and compliance, while the California Energy Commission (CEC) is responsible for certifying generators' eligibility. The RPS encourages the use of renewable resources and promotes environmental improvement while limiting the effect of the RPS on electricity rates, reliability, and financial resources.[78]

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[77] CA Public Utilities Code §399.11 et seq. (subsequently amended)

[78] California Senate Bill 107 (2006). Accessed at: http://www.energy.ca.gov/portfolio/documents/documents/sb_107_bill_20060926_chaptered.pdf

Because the CPUC was concerned that allowing utilities to rely on unbundled RECs [79] would drive up program costs, the program started with a requirement that the energy and the attributes of renewable generation be bundled together. These concerns also influenced the initial formation of the system for tracking compliance. The state was a key player in developing the WREGIS[80] accounting system for tracking RECs. Eventually, the state allowed some unbundled attributes to enter the compliance system; these attributes are known in California as *tradable* RECs, or TRECs.

2. Balancing and rebalancing objectives

The follow-up 2006 RPS law detailed further goals, including increased use of green energy technology, greater system reliability, lower system costs, and greater quantities of California electricity generated by in-state renewable generation facilities. The long-term goal of the program is to achieve a fully competitive and self-sustaining supply of electricity for California generated from renewable sources.

The original RPS statute also called for utilities to develop and apply criteria for rank ordering renewable projects based on least-cost, best-fit analyses. The analyses consider the indirect costs associated with transmission investment and ongoing utility expenses incurred from integrating and operating renewable energy generation facilities. To encourage local benefits, electric companies may give preference to projects that provide tangible, demonstrable benefits to communities with a plurality of minority or low-income populations. The RPS called for balancing goals of least-cost compliance and creating local benefits.[81]

As originally implemented, electricity generated by renewable sources outside the state was RPS-eligible if the generator was connected to the WECC transmission system. Additionally, the CEC only awarded RECs to out-of-state projects that entered into power

[79] An unbundled REC is one in which the energy is sold to one entity while the REC is sold to another. Thus the credit for the renewable energy generation is unbundled from the energy itself.

[80] Western Renewable Energy Generation Information System. While the footprint of WREGIS covers the entire Western Electricity Coordinating Council (WECC), California funded its development and assured that the system would support its needs, whether or not it ultimately allowed purchases of unbundled RECs to be used for RPS compliance. California utilizes WREGIS to assure that no renewable energy generation used for compliance in California was also counted toward purposes elsewhere.

[81] California ultimately adopted additional goals to drive solar energy as an emerging technology, but pursued it through separate initiatives, culminating in the California Solar Initiative (CSI). We have not treated CSI as part of this case study.

purchase agreements with a retail seller, procurement entity, or third party in the state, who was then responsible for securing transmission into California.[82]

Starting in 2008 through the present, a series of executive, legislative, and regulatory actions have demonstrated the state of the conflict between least-cost and local-benefit objectives. In 2005, the CEC and CPUC updated the state Energy Action Plan to establish a 33% renewable energy goal by 2020.[83] In a 2008 executive order, Governor Schwarzenegger directed state agencies to establish in regulatory proceedings a 33% RPS target by 2020 for all retail sellers of electricity.[84] In response, the legislature passed two bills to increase the RPS to 33%, including provisions for TRECs, but limiting the eligibility of out-of-state generation. Governor Schwarzenegger vetoed the bills because of concerns that restrictions on out-of-state resources would be too costly for California ratepayers.[85] In response to a second executive order in 2010, the California Air Resources Board (CARB) adopted the Renewable Electricity Standard (RES) to require 33% of energy procured by retail sellers of electricity in California to come from renewable sources by 2020.[86]

In its March 2010 decision, the CPUC created the framework for a tradable REC trading regime.[87] Prior to this decision, utilities were allowed to purchase "shaped" renewable energy contracts from out-of-state suppliers, a form of relaxed delivery standard. The TREC decision provides more options and flexibility for RPS-obligated LSEs to meet their compliance targets. The CPUC defined a bundled REC as one in which the renewable generator's first point of interconnection with the California transmission system is within California, or where control is transferred to a California balancing authority. All other RPS-eligible transactions would be considered unbundled TREC transactions.

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[82] J. Mack, N. Gianvecchio, M. T. Campopiano, S.M. Logan. (2011). All RECs Are Local: How In-State Generation Requirements Adversely Affect Development of a Robust REC Market. *The Electricity Journal, 24(4), 8-25.*

[83] Final 2005 Energy Action Plan, accessed at: http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF

[84] Executive Order S-14-08, accessed at http://gov38.ca.gov/index.php?/executive-order/11072/.

[85] U. Wang. (2009). Gov. Schwarzenegger Set to Veto Expanding Renewable Energy Mandate. Retrieved from Green Light: http://www.greentechmedia.com/green-light/post/govt.-schwarzenegger-set-to-veto-expanding-renewable-energy-mandate/

[86] Mack et al. (2011).

[87] Decision 10-03-021, California Public Utility Commission (2010, March). Rulemaking 06-02-012, Decision 10-03-021. http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/115056.pdf

Through its 2010 decision and a subsequent January 2011 decision,[88] the CPUC limited the state's three largest investor-owned utilities (IOUs), Pacific Gas & Electric Company (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric Company (SDG&E), to using no more than 25% of their compliance obligation through TRECs through 2013. The IOUs must meet the remaining obligation through bundled REC transactions, the definition of which precludes most imports. The CPUC order also establishes a $50/TREC price cap.

In contrast, the CARB's RES resulting from the 2009 Executive Order differed markedly from the CPUC's RPS in its treatment of out-of-state resources. The RES eliminated delivery requirements and allowed unlimited use of TRECs for compliance, along with REC banking and trading. The decision to allow the unrestricted use of unbundled TRECs made it possible for the sellers of electricity with compliance obligations to access less expensive renewable energy from outside of California. The 2009 Executive Order had directed CARB to

> …establish the highest priority for those resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health that can be developed most quickly and that support reliable, efficient, cost-effective electricity system operations including resources and facilities *located throughout the Western Interconnection*.[89]

The state was left with dueling RPS and RES regimes under different agencies, reflecting strong support from both the legislature and governor for increasing targets to 33% but dissent on the desired balance between local benefits and least-cost objectives.

On April 12, 2011, Governor Brown signed a law amending the RPS to require all retail sellers of electricity (not just the IOUs) to procure 33% of their electricity from renewable sources by the end of 2020.[90] This law also served to resolve the balance point between the state's conflicting policy objectives. It did so first by articulating clearly the state's policy objectives. It affirmed a process requiring the rank ordering and selection of least-cost and best-fit eligible renewable energy resources.[91] It amended the section delineating its remaining objectives, stating that that the RPS "…is intended to provide unique benefits to California, including all of the following, each of which independently justifies the program:

1. Displacing fossil-fuel consumption within the state.

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88 CPUC (2011). Rulemaking 06-02-012, Decision 11-01-025. http://docs.cpuc.ca.gov/published/Final_decision/129517.htm

89 California Office of the Governor. (2009). Executive Order S-21-09

90 California Renewable Energy Resources Act, SB X1-2. (2011). http://info.sen.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.html.

91 California Public Utilities Code §399.13(a)(4).

2. Adding new electrical generating facilities in the transmission network within the WECC service area.
3. Reducing air pollution in the state.
4. Meeting the state's climate-change goals by reducing emissions of greenhouse gases associated with electrical generation.
5. Promoting stable retail rates for electric service.
6. Meeting the state's need for a diversified and balanced energy generation portfolio.
7. Assistance with meeting the state's resource-adequacy requirements.
8. Contributing to the safe and reliable operation of the electrical grid, including providing predictable electrical supply, voltage support, lower line losses, and congestion relief.
9. Implementing the state's transmission and land-use planning activities related to development of eligible renewable energy resources."[92]

Finally, the law institutes a *content requirement* establishing a "balanced portfolio of eligible renewable energy resources" that both:

1. Caps the use of TRECs to 25% through 2013, ratcheting down to 15% from 2014-2016 and to 10% for 2017 and thereafter; and
2. Specifies the minimum percentage of the RPS requirement that must be met with resources that either have their first point of interconnection in CA or are dynamically scheduled into CA. The percentage increases as follows: 50% through 2013, 65% from 2014-2016, and 75% thereafter.[93]

While a portion of the remaining compliance may be met by firmed and shaped bundled imports meeting relaxed delivery requirements, for practical purposes the law sharply limits the proportion of compliance that may come from out-of-state generators.[94]

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[92] California Public Utilities Code §399.11(b).

[93] California Public Utilities Code §399.16(b) states:

Consistent with the goals of procuring the least-cost and best-fit electricity products from eligible renewable energy resources that meet project viability principles adopted by the commission pursuant to paragraph (4) of subdivision (a) of Section 399.13 and that provide the benefits set forth in Section 399.11, a balanced portfolio of eligible renewable energy resources shall be procured consisting of the following portfolio content categories…

[94] Mack et al. (2011).

3. Summary

Over the last decade in California, the interplay of legislation, regulation, and executive orders created tension among the multiple objectives of meeting a high renewable energy target, receiving benefits by spurring local development, and keeping costs (in the form of customer rates) low. Over time, a changing set of requirements, limits, and policy tools resulted in instability for the program and for market participants. Ultimately, a set of clearly articulated objectives became the law of the land and codified the balance between least cost and local benefits. At present, the RPS contains a mix of tools to meet the program's competing objectives, including an import quota and deliverability requirement. This combination of mechanisms works to prevent drastic imbalance between program costs and local economic development.

For retail sellers of electricity, procuring 33% of their energy from renewable sources is challenging. Concerns persist that the ratepayer costs may be large due to the combination of a high renewable energy target and a requirement that the energy come from within California. With the recent establishment of the TREC trading system with price caps and limited ability to rely on out-of-state generation, the challenge may be lessened. The main question is whether the CPUC's decision to limit the use of TRECs for RPS compliance over time will bring economic development benefits to California and its electricity customers in excess of the potential costs that the geographic limitation will impose on those customers.

C. New Jersey: RPS technology set-aside policies

The New Jersey solar photovoltaic (PV) program was one of the first programs to combine an RPS solar set-aside (also referred to as a "carve-out") with a complementary suite of policies. The state sought to achieve high solar development in the state, increase market stability, and decrease financial risk for solar project developers at the lowest possible costs for ratepayers. After experiencing substantial solar growth, New Jersey has begun to examine how the policy could be applied to other renewable energy resources in the state. In June 2010, the state legislature passed a statute establishing the nation's first set-aside for offshore wind energy. In this case study, we examine both New Jersey's solar and offshore wind set-aside policies.

1. Introduction

The New Jersey state legislature first enacted an RPS in 1999 as a part of the state's introduction of retail competition in the electricity sector, requiring all retail load-serving entities[95] to supply 4% of sales from new renewable generation by 2012.[96] The New Jersey Board of Public Utilities (BPU) administers the program. The stated purpose of the RPS is to

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[95] Including both competitive retail electric suppliers and regulated utilities providing basic generation service (BGS) to those customers not served by retail suppliers.

[96] N.J. Stat. §48:3-49 et seq. (2009).

> …encourage the development of renewable sources of electricity and new, cleaner generation technology; minimize the environmental impact of air pollutant emissions from electric generation; reduce possible transport of emissions and minimize any adverse environmental impact from deregulation of energy generation; and support the reliability of the supply of electricity in New Jersey.[97]

The RPS was revised in 2004, adding a solar tier as a means for financing solar development, and again in 2006 to increase the Class I RPS target to 20.38%, with a solar set-aside of 2.12%. The Solar Advancement Act of 2010 passed in January 2010 changed the solar set-aside from a percentage-based target to a fixed quantity of energy.[98] The BPU recognized that the benefits alone did not provide enough incentives to allow for financing; thus they created programs to assist with solar project financing.

2. Implementation of the solar set-aside policy

a. Solar rebates

In 2001, the BPU implemented a rebate program called CORE (Customer On-site Renewable Energy) to encourage solar project development and support project financing. Money for the rebate program came from the New Jersey Clean Energy Fund, a ratepayer-funded program administered by the Office of Clean Energy (OCE). The CORE rebate program, along with net metering provisions, stimulated growth in the New Jersey solar market. From May 2001 to November 2007, 45 MW of solar energy capacity was installed in New Jersey at a total cost of $178 million in rebates. As the rebate funds quickly dwindled, it became apparent that the state could not afford to continue the program.[99] The BPU began searching for a new policy that relied on creating market demand rather than direct funding to sustain the state's solar industry.[100]

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97 New Jersey Administrative Code §14:8-2.1 (2010)

98 For more information on the NJ RPS history, see Database of State Incentives for Renewables &Efficiency (DSIRE) (2011), New Jersey Incentives/Policies for Renewables & Efficiencies, available at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NJ41F&re=1&ee=1.

99 D. M. Hart. (2009). Making, Breaking, and (Partially) Remaking Markets: State Regulation and Photovoltaic Electricity in New Jersey. MIT IPC Energy Innovation Working Paper Series.

100 Clean Energy States Alliance. (2008) Progress Report: Review of State Renewable Portfolio Standard Programs in the Northeast & Mid-Atlantic Regions.

b. From rebates to SRECs and increased revenue certainty

The BPU, the OCE, and stakeholders from the Clean Energy Council began the process of defining and evaluating alternative approaches to providing support to the solar market. The OCE developed Guiding Principles for the Solar Market Transition that included:

- Achieve the rapid growth that is needed to meet the RPS goals. Facilitate project development and sales of systems. Ensure that closing a sale is simple and quick. Ensure that projects can be financed. Allow growth to be accelerated or slowed when needed.
- Achieve the lowest possible cost to ratepayers for a given amount of effective capacity and the lowest possible transaction costs.
- Ensure an efficient, transparent, and auditable process that can provide tools for policy goals, such as opportunity for different sizes and types of projects (large and small, private and public, etc.).
- For utilities, suppliers, and other market participants, minimize regulatory risk as appropriate, minimize the administrative burden, and maximize investor confidence in the marketplace.[101]

In 2007 the BPU revised the state RPS and the solar set-aside provision. Based on the results of the stakeholder process, the BPU decided to move away from the rebate program and rely on solar renewable energy certificates (SRECs).[102] Doing so would establish a market-based framework for encouraging solar-energy development while bypassing the rebate budget constraint. The new approach established a rate cap limiting ratepayer exposure to solar-program compliance costs to 2% of the retail rate. This provision was later removed in 2010, signifying both a willingness to accept higher rates in order to support continued solar growth[103] and sole reliance on the ACP to limit costs to ratepayers. New Jersey's RPS rules state that only those solar systems interconnected with a distribution system that supplies the state can create eligible SRECs,[104] indicating a preference for local economic benefits.

Over the years New Jersey has made several adjustments to the SREC program to ensure its success, as well as to send a stable market signal to solar-project developers. In the first year of the program, investors were concerned about the uncertainty in the market value of SRECs and in the market's ability to balance supply with demand. This uncertainty slowed solar project

[101] NJ Clean Energy Programs. (2006). White Paper Series: New Jersey's Solar Market Transition to a Market-based REC Financing System, at 5.

[102] SRECs are renewable energy certificates associated with 1 MWh of production from certified solar projects.

[103] DSIRE (2011). New Jersey Incentives/Policies for Renewables & Efficiencies.

[104] New Jersey RPS Rules: N.J.A.C. 14:8-2.9 (d).

investment and led to utilities' reliance on solar alternative compliance payment (SACP) payments in the face of SREC shortages.

To boost investor confidence and strengthen the SREC market, the state extended the life of an SREC to two years, which gave the market greater flexibility to adjust to an oversupply or undersupply of SRECs.[105] The BPU also increased the solar alternative compliance payment from $300 to $711.[106] The adjustment in the policy sent a long-term price signal to financial institutions, and project investment quickly picked up. The price of SRECs rose, making solar developments more attractive.

To further promote investor confidence, in 2008 the BPU approved a Public Service Electric and Gas (PSE&G) program to offer 10- or 15-year loans to facilitate solar project financing for up to 40 to 60% of the costs of the system. The loan is repaid through cash payments or through assigning the SRECs back to PSE&G at established market rates over the period of the loan (which effectively sets a price floor on SRECs). The BPU also directed the remaining three electric distribution utilities, Atlantic City Electric (ACE), Jersey Central Power & Light (JCP&L), and Rockland Electric Company (RECO), to propose their own programs for developing 10- to 15-year long-term contracts to provide financing for solar energy projects.[107]

c. Solar set-aside program results

As a result of the state's solar set-aside policy, New Jersey was, through 2009, second behind California in cumulative installed solar capacity.[108] By the end of 2010, over 8,000 solar projects have been developed in the state, with a capacity of over 259 MW_{DC}. In 2010 the state had the greatest additions of projects, with 132 MW_{DC} in solar developments added, an amount that was greater than the capacity of all previous projects developed in the state since 2001.[109]

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105 New Jersey. (2010). Assembly Bill 3520. An Act concerning solar energy development and amending P.L.1999, c.23. http://www.njleg.state.nj.us/2008/Bills/PL09/289_.PDF

106 While SRECs had been in use since 2004, in the presence of the rebate program, an alternative compliance payment (ACP) served as a SREC price cap at $300/MWh. In shifting away from the rebate program, ACP rates were increased to $711/MWh for 2009, gradually declining annually thereafter to $594 over 8 years.

107 DSIRE. (2011). New Jersey Incentives/Policies for Renewables & Efficiencies.

108 Interstate Renewable Energy Council. (2010). U.S. Solar Market Trends 2009, Table 3.

109 For detailed statistical breakdown of program performance and cost, see: New Jersey Board of Public Utilities, Office of Clean Energy. (2011). *New Jersey's Renewable Portfolio Standard Rules 2010 Annual Report*, Draft for Public Comment.

3. Offshore Wind Economic Development Act

New Jersey policymakers have begun taking steps to create a new set-aside program for offshore wind projects, with a goal of becoming a leader in American offshore wind development and attracting new offshore wind-related jobs in technology, manufacturing, construction, and operations.

The Offshore Wind Economic Development Act (OWEDA) was signed into law in 2010.[110] It directed the BPU to create an offshore renewable energy certificate (OREC) program and require a certain percentage of the state's electricity from offshore wind energy to promote economic development goals of the state. Other features of the act include financial incentives and tax credits aimed at supporting businesses that are involved in the development of offshore wind.[111]

Under OWEDA, the BPU is to establish an RPS set-aside to support the development of 1,100 MW of qualified offshore wind energy projects. Offshore renewable energy certificates, or ORECs, will serve the same purpose as SRECs: to encourage the financing and development of offshore wind resources.

In early 2011, the BPU adopted rules for the development of qualified offshore wind energy projects.[112] In its rulemaking, the BPU defined qualified offshore wind energy projects as those located in the Atlantic Ocean and connected to the transmission system of New Jersey. The regulations specify that offshore wind projects must have positive net economic and environment benefits. In order for projects to qualify, developers must submit a comprehensive cost-benefit analysis that demonstrates the positive economic and environmental benefits for the state. The analysis must include three types of information:

- the potential electricity-rate impacts on residential and industrial customers over the life of the project;

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http://www.njcleanenergy.com/files/file/Renewable_Programs/Draft_2010_Annual_Report_for_New_Jersey_041311_version.pdf.

[110] New Jersey Senate Bill 2036. (2010). The Offshore Wind Economic Development Act.

[111] The State of New Jersey. (2010). Governor Christie Signs Offshore Wind Economic Development Act to Spur Economic Growth, Encourage Energy as Industry. [Press Release]

[112] New Jersey Board of Public Utilities. (2011). Special Adopted New Rules: N.J.A.C. 14:8-6. http://www.nj.gov/bpu/pdf/rules/oswregs1.pdf

- impacts on local income, employment, wages, and indirect business taxes, with an emphasis on in-state manufacturing employment; and
- net environmental benefits.[113]

These rules demonstrate the state's willingness to encourage offshore wind development so long as new offshore projects provide positive economic and environmental benefits to local communities.

4. Summary

The New Jersey BPU added a market-based solar tier to its RPS program after concluding that the solar-rebate approach was unaffordable. The BPU established a strong role for solar in the state's renewable portfolio, which supported the in-state solar industry in a more sustainable manner than using direct government funding. In part because New Jersey is poor in other renewable resources (particularly on-shore wind energy potential), the legislature's emphasis on a largely behind-the-meter solar strategy not only drove support for an emerging technology but also kept a substantial portion of ratepayer dollars in-state.

The explicit objectives primarily focused on driving in-state economic benefits and spurring emerging technologies, subject to a standard of doing so cost-effectively. State policymakers frequently evaluated the effectiveness of a suite of solar policies in achieving policy objectives. Over time, they refined both the objectives and the suite of policies to better meet their goals while maintaining regulatory stability necessary to finance new renewable energy projects. The BPU used a number of threshold standards and monetary metrics to evaluate the cost-effectiveness of the program, as well as the growth of solar in the state.

Building on the experience of the SREC program in meeting its policy objectives effectively, state policymakers are developing the new OREC policy. For offshore wind, the legislature and BPU have crafted a threshold cost-benefit standard by requiring developers to quantify net positive economic benefits. The BPU is also providing a degree of clarity in defining the analysis and metrics to be used in considering projects in its OREC rules, by explicitly identifying what should be counted in the analysis.

D. Massachusetts: Cape Wind's long-term PPA with National Grid

The Department of Public Utilities' (DPU) review and approval of the PPA between National Grid and Cape Wind had many facets. The DPU's job in this case was to determine whether the PPA between Cape Wind and National Grid was appropriately priced while considering the other potential economic and environmental benefits of the project. This examination brought to the fore trade-offs between a cost-effective approach to meeting the

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[113] New Jersey Board of Public Utilities. (2011). New Jersey Board of Public Utilities Adopts Offshore Wind Renewable Energy Certificate Rules. [Press Release]

Green Communities Act's (GCA)[114] objectives and meeting policy objectives favoring an emerging technology, and thereby creating economic benefits in the form of a leadership role for the state in a nascent industry. This case study explores the intersection of three Massachusetts renewable energy policies: Massachusetts' RPS, the GCA's long-term contracting policy, and the state's policy objectives to advance offshore wind, an emerging renewable energy technology, to derive associated in-state economic benefits.

1. Policy context and objectives: RPS law and administration policy

As part of its introduction of retail electricity choice in 1997, the Massachusetts legislature required that the Division of Energy Resources (DOER) implement an RPS with a new renewable energy target increase from 1% of sales in 2003 to 4% of sales by 2009,[115] (as subsequently amended) increasing at 1% per year thereafter. The enabling legislation lacked an explicit statement of purpose for the RPS, other than the broader Restructuring Act[116] findings and objectives of 1) full and fair competition in electric generation and 2) enhanced environmental protection. A core objective as a best-bang-for-the-buck policy was apparent in the RPS's design, which encourages cost-based competition among renewable energy generators developed in or delivered to the New England Power Pool.[117] In developing implementing regulations, the DOER defined its objectives as achieving environmental and economic benefits for Massachusetts customers, increasing the diversity of electricity supply, and implementing the RPS in a cost-effective and efficient manner.[118]

Prior to the passage of the GCA, eligible RECs had been in short supply and REC prices approached the level of the Alterative Compliance Payment. Policymakers and renewable energy generators had expressed concerns associated with creating a sufficiently reliable long-term revenue stream for financing new projects in the absence of creditworthy competitive power suppliers, as well as lack of interest on behalf of the state's utilities (in the role as providers of last resort) in entering long-term PPAs. Other stakeholders were concerned because utilities achieved RPS compliance during the years prior to GCA passage almost entirely from

[114] St. 2008, c. 169. (2008). *An Act Relative to Green Communities.*

[115] Mass. G.L. c. 25A §11F (1997), as subsequently amended. The RPS compliance obligation falls on both competitive retail electricity suppliers and the state's investor-owned utilities in their role as provider of last resort.

[116] Mass. G.L. c. 164. (1997). *An Act Relative to Restructuring the Electric Utility Industry in the Commonwealth, Regulating the Provision of Electricity and Other Services, and Promoting Enhanced Consumer Protections Therein*.

[117] The New England Power Pool is the six-state electric market control area that includes Massachusetts.

[118] Division of Energy Resources. (1999). DOER Mission Statement for Renewable Portfolio Standard Design, revised 12/20/99.

out-of-state generators.[119] The AIM Foundation,[120] representing the state's large industrial end users, objected to this funding of out-of-state renewable energy facilities, which they articulated as a transfer of jobs and property-tax revenue from Massachusetts customers.

In parallel, Governor Patrick's administration expressed strong support for in-state wind, offshore wind, and in particular Cape Wind. The Administration articulated a policy goal of 2000 MW of wind (on-shore and offshore) in Massachusetts by 2020[121] to help meet the RPS mandate, achieve the state's new greenhouse-gas-reduction goals,[122] create in-state jobs, and catalyze a domestic offshore wind industry.

2. The Green Communities Act and long-term contracts

In July 2008 the Massachusetts Legislature passed the GCA to strengthen the state's commitment to reducing carbon dioxide emissions through the promotion of renewable energy generation and energy-efficiency programs. The GCA requires the state's utilities to solicit cost-effective long-term contract proposals from renewable energy developers to support renewable energy generation in the state. Shortly following the passage of the GCA, National Grid, a regional electric distribution company, negotiated and sought DPU approval of a long-term PPA for 50% of the power and RECs produced by the Cape Wind project, a proposed 468 MW offshore wind project to be sited in nearby federal waters in Nantucket Sound.

Section 83 of the GCA created a requirement to implement a Renewable Energy Long-Term Contract Pilot Program (Long-Term Contract Program), as well as several other tilt policies encouraging in-state renewables.[123] The Long-Term Contract Program required the

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[119] See: MA Department of Energy Resources. (2008). *MA RPS Annual Compliance Report for 2007*. Pg 3. http://www.mass.gov/Eoeea/docs/doer/rps/rps-2007annual-rpt.pdf

[120] The AIM Foundation, *The Massachusetts Renewable Portfolio Standard: Context and Considerations*, October 2004, at 8. The Associated Industries of Massachusetts Foundation, Inc. is an educational and economic research organization established by Associated Industries of Massachusetts.

[121] Governor Deval Patrick. (2009). *Governor Patrick Sets New Goals for Wind Power*. [Press Release]. Retrieved from: http://www.mass.gov/?pageID=gov3pressrelease&L=1&L0=Home&sid=Agov3&b=pressrelease&f=090113_Goals_Wind_Power&csid=Agov3

[122] Mass. St.2008, c. 298. (2008). *An Act Establishing the Global Warming Solution Act*. This act requires that by 2050 statewide greenhouse gas emissions must be at least 80% below the 1990 level.

[123] These included aggregate net metering; an on-site distributed solar RPS carve-out; and a provision designed to limit the role of imports not committing the capacity long-term to the Massachusetts market.

state's four regulated distribution utilities to enter into cost-effective long-term contracts of 10 to 15 years to facilitate the financing of renewable energy generation "within the jurisdictional boundaries of the Commonwealth, including state waters, or in adjacent federal waters."[124] The utilities must solicit proposals from renewable energy developers at least twice during the 2009–2014 period, in quantities representing at least 3% of the annual energy used by all distribution customers in their service territory.[125] The GCA also allows utilities to negotiate contracts outside the formal RFP process. The standard of review for contract approval by the DPU is a determination that a contract is cost-effective and in the public interest, specifically that it: 1) is cost-effective to ratepayers over the full term of the contract; 2) provides enhanced reliability to the grid; 3) serves to moderate system peak load; and 4) provides added employment, where feasible.[126]

Energy or RECs not used by the utility will be resold into spot markets. If the PPA price exceeds the spot market revenue, the over-market cost would be passed on to *all* distribution customers through a non-bypassable distribution charge, in addition to the cost of RPS compliance embedded in the cost of their generation service supply.

As compensation to utility shareholders for the financial cost of leveraging their balance sheets to finance renewable energy projects beyond their own needs, the GCA allows shareholders to earn a premium equal to 4% of the PPA price. This approach creates an incentive for utilities to contract with a project highly likely to be successful (thus allowing them to earn a premium), as well as a potentially perverse incentive for a utility to propose a contract that is not least-cost (as shareholder earnings would increase).

3. The Cape Wind–National Grid PPA

In December 2009, National Grid announced a Memorandum of Understanding (MOU) with Cape Wind to negotiate and potentially enter into a long-term contract under GCA §83, outside of the competitive solicitation process. National Grid sought and received DPU approval, allowing the two companies to enter into contract negotiations.[127]

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[124] Mass. St.2008, c. 169, §83.

[125] Setting the target as 3% of total utility *distribution* load (rather than the amount of generation service sold by the utility in its role as provider of last resort), the amount purchased exceeds the utilities' own RPS compliance obligation. This approach utilizes the distribution utilities' balance sheets (creditworthiness) to get projects financed, in order to help assure adequate supply for RPS compliance for the market as a whole.

[126] MA DPU. 220 C.M.R. §§17.00 et seq.

[127] See Order in DPU 09-138: http://www.env.state.ma.us/dpu/docs/electric/09-138/122909dpuord.pdf. This can be read as seeking pre-clearance as to whether the DPU would oppose entering into a contact with an emerging technology project understood not to be least cost.

In May 2010, the parties announced an agreement for a long-term PPA price. Under the agreement National Grid would purchase 50% of the Cape Wind project's electricity, RECs, and capacity for 15 years. Following settlement negotiations with the Attorney General, who had expressed concern about cost impacts on ratepayers from an original PPA, an amended PPA was filed for DPU approval. The amended PPA was priced at 18.7¢/kWh beginning in 2013 and increasing by 3.5% annually for 15 years, with various adjustment factors. The proposed contract price fell within the 17-21¢/kWh range deemed to be competitive by the Administration's Executive Office of Energy and Environmental Affairs (under which the DPU resides).[128]

4. Balancing objectives—least cost versus in-state benefits and support for emerging technologies

The National Grid–Cape Wind PPA docket before the DPU quickly became complicated and contentious as a dozen interveners filed thousands of pages of testimony and briefs.[129] Opponents argued against the PPA, appealing to the DPU to reject the agreement on grounds it was not "cost-effective" to ratepayers and because the project was not solicited on a competitive basis. Interveners also argued that National Grid discriminated against out-of-state resources and was thus in violation of the Commerce Clause of the Constitution.[130] National Grid maintained that it chose to enter into the long-term PPA with Cape Wind based on the unique factors that made the project favorable,[131] not because of any geographical restrictions. In addition, National Grid asserted that it commenced with individual negotiations with Cape Wind because the timing

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[128] E. Ailworth. (2010). Cape Wind Project Could Boost Prices. *The Boston Globe.*

[129] See MA DPU Docket 10-54.

[130] When National Grid filed its initial petition for approval of the Cape Wind PPA, §83 of the Green Communities Act contained an in-state limitation for renewable energy projects; however, the geographic restriction was removed through a regulatory change in June 2009 following a lawsuit that was filed by TransCanada challenging the GCA Long-Term Contract Program as unconstitutional on the grounds that it violated the Commerce Clause.

[131] National Grid argued that the Cape Wind project, by far the largest proposed renewable energy project announced in the region at that time, "makes a material difference in assuring the adequacy of supply to meet the Commonwealth's renewable energy goals" (DPU Order Docket 10-54 at 54), and its package of benefits and attributes in terms of: 1) its advanced status of project development and permitting; 2) its ability to enhance electric system reliability and moderate system peak loads; 3) its location in the heart of southern New England's load center; 4) its price, which includes all related transmission costs; 5) its jobs and other economic benefits; 6) its ability to help stimulate the development of a new renewable energy technology in the United States; and 7) its status as the only large-scale offshore wind project in the United States that is ready to begin construction, which means that its benefits will be available relatively soon (Exh. NG-SFT at 117; National Grid Brief at 25).

of the statewide solicitation period was uncertain, Cape Wind had begun the permitting process, and federal tax and financing incentives were due to expire.

In its analysis of whether the PPA was in the public's interest, the DPU considered the following:

- the appropriateness of National Grid's purchasing energy through this PPA regardless of the availability of lower costs alternatives;
- whether it was reasonable for National Grid to purchase 3.5% of the company's electric load, and
- whether the customer bill impacts are acceptable.

In its order, the DPU cited several factors that influenced its approval of the PPA, including whether the PPA was cost-effective to rate payers and whether the project was in the public interest. In approving the PPA, the DPU found that §83 does not require a contract to be "least-cost" in order to be "cost-effective." The DPU argued that by requiring utilities to enter into contracts based on the least-cost measure they would neglect to take into account the many positive, non-price factors of potential renewable generation projects.

The DPU assessed the cost-effectiveness of the PPA through calculating the likely net above-market costs of the PPA by: 1) deducting the market value and electricity market price suppression benefits from the contract costs; 2) identifying the remaining non-quantified benefits; and 3) comparing the net above-market costs to the non-quantified benefits to determine whether the total benefits exceeded the total costs.[132]

The DPU further supported its finding that the PPA was cost-effective by describing how the contract would avoid future costs. The DPU stated: "The marginal cost of achieving a particular objective represents the cost that will be avoided by any measure that achieves that objective, and all measures that cost less than this avoided cost will be considered cost-effective." The DPU found it reasonable to anticipate that the emissions reductions from the Cape Wind project will be needed to meet the Global Warming Solutions Act targets, and that the cost of the Cape Wind power purchase agreement was likely to fall within the marginal cost of compliance for the Global Warming Solutions Act; thus, the department found the contract to be cost-effective. [133]

The DPU found that the Cape Wind facility's net costs and unique attributes would provide benefit to the ratepayers beyond other potential §83 contracts.[134] Through this analysis,

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[132] Mass. D.P.U. (2010). Final Order Docket 10-54. Available at: http://www.env.state.ma.us/dpu/docs/electric/10-54/112210dpufnord.pdf

[133] *Id*. at 180.

[134] *Id.* at 283.

despite the lower cost of available alternatives, the DPU determined that the PPA was in the public's interest. The DPU also recognized that the statute allowed for both competitive solicitation and individual negotiations and believed that by allowing both methods the statute provided an appropriate level of flexibility so that the policy goals of encouraging long-term contracts for renewables could be met.[135]

5. Summary

Deliberations over the National Grid-Cape Wind PPA demonstrate the tensions, arguments, and analytical approaches that arise when regulators consider approval of contracts that are not currently least-cost in the presence of conflicting policy objectives. The policy objectives in this case combined explicit and implicit legislative objectives with the administration's targeted goals for off-shore wind development implemented through a variety of layered policies designed to meet a desired outcome. The case illustrates the struggles common in many states over how to achieve in-state benefits and advance emerging technologies in the face of commerce-clause constraints and ratepayer impacts. It also sheds light on how diverging from least cost to today's ratepayers for technology policy and economic development objectives might be justified by policymakers in the absence of metrics determined in advance by legislation or regulation.

The GCA's explicit preference for utilities' long-term arrangements with in-state renewable generators triggered a challenge of the provision's legality under the commerce clause. As a result, the geographic preference language was eliminated from the program, but that change did not impact the evaluation of the National Grid–Cape Wind PPA. However, the GCA was crafted in such a way as to leave it to the DPU to develop and apply a unique set of metrics to evaluate the PPA's cost-effectiveness without the guidance or application of explicit weightings.

Because National Grid did not elect to use a competitive procurement process, the DPU did not make a relative comparison of the PPA to similar alternatives. Rather, the Department applied a threshold cost-effectiveness standard and determined that the PPA's costs are below the threshold of the GWSA's marginal compliance cost and therefore are acceptable. The GCA's construction allowed the DPU to consider a range of non-price factors in a multi-attribute analysis such as the creation of a new industry, and to analyze the facts in the case from a risk-minimization standpoint and rule that the National Grid-Cape Wind PPA was in the public interest.

[135] Following the approval, several interveners filed appeals challenging the DPU's decision before the Supreme Judicial Court. The appellants argued that 1) the DPU failed to consider evidence of less expensive renewable projects with similar attributes to Cape Wind; 2) the DPU did not properly consider the GCA limitation of the long-term contracts to 3% of the utilities' load; and 3) the cost recovery mechanism was not in accordance with the two cost recovery methods in §83, as well as in violation of the Electric Restructuring Act of 1997. At the time of publication, the appeal decision is still pending.

E. Rhode Island: National Grid–Block Island Wind Farm PPA

The case of the long-term power purchase agreement between National Grid and Deepwater Wind's Block Island Wind Farm demonstrates the conflict that can arise when a policy directive supporting in-state development of an emerging technology bumps up against a least-cost renewable energy policy framework. In Rhode Island, the initial lack of legislative clarity and objectives regarding long-term contracts left the regulatory decisionmaker to apply an analytical framework that at first resulted in a rejection of the PPA. The legislature reacted by refining the standard the PPA needed to meet and delineated the balance point between the conflicting objectives. The proposed agreement went back to the PUC to undergo a revised analysis. The second review lead to regulatory approval that lined up with the objectives of the legislature.

1. RES policy context and objectives

Rhode Island's 2004 Renewable Energy Standard (RES) requires the state's retail electricity providers[136] to supply 16 % of their electric sales from eligible renewable energy resources by 2020, with no more than 2% sourced from existing renewable energy resources.[137] The enabling legislation contained the policy objectives of the RES, including having electricity supplied in the state come from a diversity of energy sources including renewable resources, lowering and stabilizing future energy costs, reducing air pollutants and CO_2 emissions that adversely affect public health and contribute to global warming, and encouraging the development of renewable energy resources.[138] The Public Utilities Commission (PUC) adopted the statutory-purpose language directly in the accompanying regulations. Economic benefits to the state were not mentioned as a RES objective.

In 2006, Governor Carcieri initiated the RIWINDS program (later renamed Rhode Island Energy Independence I) to stimulate development of wind power. The Carcieri administration envisioned the state becoming a leader in the emergent offshore wind energy sector by powering a portion of RI's load with offshore wind, capturing the economic benefits from developing its ample resources, and becoming a leader in the industry. The program established a goal of approximately 450 MW of wind energy capacity to supply the state with 15% of its annual

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[136] Rhode Island's RES applies to all competitive retail suppliers as well as National Grid subsidiary Narragansett Electric, which serves both as a distribution company to roughly 99% of customers in the state and as a generation service provider of standard-offer service to those customers not served by a competitive supplier. Two small distribution companies, Pascoag Utility Direct and Block Island Power Company, are exempt from retail choice and the RES.

[137] RI G.L. §39-26-1 et seq. (2004), referred to as the "Renewable Energy Act."

[138] RI G.L. §39-26-1 Legislative findings.

average electricity demand.[139] The governor's plan had several components, including conducting a site-feasibility and zoning study, a solicitation to select a preferred developing partner, streamlining of permitting[140], and a mechanism to create a creditworthy buyer of the offshore wind output to make the project financeable. The plan's architects hoped this strategy would yield the first offshore wind project in the United States.[141]

The RIWINDS siting study evaluated the state's most viable areas for onshore and offshore wind energy development. Results showed the financial and technical feasibility of the RIWINDS program and that 95% of the wind energy development opportunities were offshore,[142] resulting in a priority shift to implementing Rhode Island's offshore wind strategy.

The high cost and emissions associated with Block Island Power Company's aging diesel fleet has stimulated repeated exploration of interconnecting the island to the state's mainland transmission grid, but no viable plan had materialized. Because the RIWINDS study identified offshore wind opportunities near Block Island, the administration saw in its offshore wind strategy a potential solution to the Block Island problem.

After the release of the RIWINDS study, the state had two distinct but related major renewable energy initiatives with conflicting objectives. The legislature had established a conventional RES, an approach designed to allow intra-source competition to increase renewable energy generation at least cost, to achieve a set of common renewable energy-related objectives. The administration committed to support of an emerging renewable energy technology to drive economic development.

2. Balancing objectives—least cost versus emerging technology support and economic development

In April of 2008, the Office of Energy Resources issued a Request for Proposal seeking a private company to construct and operate an offshore wind farm in an area south of Block Island. State regulatory agencies would give priority to and expedite the permitting process of the

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[139] Applied Technology and Management, Inc. (2007). *Final Report: RIWINDS Phase I Wind Energy Siting Study*. Retrieved from: http://www.crmc.ri.gov/samp_ocean/RIWINDSReport.pdf

[140] The state's Coastal Resources Management Council led a stakeholder effort to zone the state waters for offshore wind as part of developing an Ocean Special Area Management Plan. For more information see: http://seagrant.gso.uri.edu/oceansamp/index.html.

[141] For more information on the administration's strategy, see the August 2008 New England Wind Forum interview with then-Commissioner of the Office of Energy Resources Andrew Dzykewicz, available at http://www.windpoweringamerica.gov/filter_detail.asp?itemid=1658.

[142] *Id.* at 4.

winning project proposal.[143] A few months later, Deepwater Wind, LLC won the bid for its proposal for a pilot project off of Block Island as well as a larger project in nearby federal waters. The pilot Block Island project's interconnection offered a means also to replace the island's diesel generators with power delivered over a new transmission link to the mainland ISO-New England grid. Deepwater Wind entered into a Memorandum of Understanding, and later a Joint Development Agreement, with the state, which included commitments to establish local manufacturing and construction operations.

To create a means for a financeable power purchase agreement with the utility, National Grid, the governor's administration eventually worked with legislators to pass a Long-Term Contracting Standard for Renewable Energy law.[144] This law has three provisions for long-term contracting:

- A general long-term contracting requirement with a minimum capacity of 90 average MW (aMW)[145] of new renewable generation, of which 3 aMW must be solar;
- Solicitation of one renewable energy project of up to 10 aMW that would enhance electric reliability and environmental quality for the Block Island town of New Shoreham, including constructing a transmission line link to the mainland grid; and
- Solicitation of a utility-scale offshore wind project between 100 and 150 aMW[146] by the developer selected by the state, already identified as Deepwater Wind.

The Long-Term Contracting Standard triggered concerns among some ratepayers because under the law, National Grid is allowed to resell energy, capacity, and RECs on the short-term markets, passing any net costs (or benefits) to all distribution customers. By establishing a Long-Term Contract requirement with offshore wind and solar, two emerging technologies unlikely to be least-cost, the law created the likelihood that customers already paying for RPS compliance as part of their generation service would also be exposed to over-market renewable energy costs added to the electric distribution portion of their bill.

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[143] Rhode Island PUC. (2008). RFP No. 7067847. Retrieved from: http://www.purchasing.ri.gov/RIVIP/StateAgencyBids/7067847.PDF

[144] RI Gen. Laws 39-26.1-1 to 8. The law was subsequently amended as discussed below.

[145] An average megawatt (aMW) is defined as the equivalent of one megawatt of capacity produced continuously over a period of one year. A 270 MW wind project with a capacity factor of 33.3% would produce 90 aMW.

[146] Equivalent to about 300 to 450 MW.

National Grid solicited proposals for a 10 aMW Renewable Energy Project for the town of New Shoreham, RI and received a single proposal from Deepwater Wind. The proposed project included a five- to six-turbine, 30 MW demonstration-scale offshore wind farm southeast of Block Island. In December of 2009 National Grid and Deepwater Wind Block Island LLC submitted a PPA to the PUC for approval.

The fundamental question before the PUC became whether the PPA between Deepwater Wind and National Grid was commercially reasonable,[147] and if so, whether there were other direct economic benefits to the state. The Division[148] and opponents argued that the project would evoke high distribution-rate increases, while advocates argued that the project would increase energy independence and create new jobs. Legislative leaders asserted that the benefits of the project—greenhouse gas mitigation, increased energy independence, and new jobs stemming from both the pilot project and the larger project to follow—justified the cost. The PUC noted that the definition of "commercially reasonable" in the statute did not consider economic benefits to the state. The determination of whether the project was commercially reasonable would rely solely on the pricing of the PPA. Determining whether the project was commercially reasonable was arduous because there were no competing bids, and because of differing positions on the appropriate cost-comparison benchmark.

In order to determine the proposed PPA's commercial reasonableness, Deepwater Wind, National Grid, the Division, and intervening parties filed calculations of the projected cost to ratepayers with the PUC. All parties predicted that costs associated with the pilot project would exceed the cost of the lowest-cost RES-eligible renewable energy sources available by varying degrees. Deepwater Wind's filing included a comparison to other offshore wind projects that adjusted for project size (to account for the pilot-scale project). The PUC chose not to adopt any of the parties' calculation methods, instead relying on a two-pronged analysis, comparing the PPA pricing with other renewable energy projects and comparing the project's internal rate of return to those expected from other renewable energy projects. The PUC rejected the PPA in April 2010 based on its determination that the project pricing was higher than any technology except solar, concluding that the PPA was commercially unreasonable. Furthermore, the PUC

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[147] "Commercially reasonable" was defined in the initial Long-Term Contracting Standard for Renewable Energy law as "terms and pricing that are reasonably consistent with what an experienced power market analyst would expect to see in transitions involving newly developed renewable energy resources."

[148] The Public Utilities Commission comprises two distinct regulatory bodies: a three-member Commission and the Division of Public Utilities and Carriers (Division). The Division is a party in all Commission proceedings, playing a role similar to commission staff in many other states.

found that there was insufficient evidence to conclude that the project would lead to other economic benefits in the state such as net job creation.[149]

Finding the PUC's rejection of the original PPA out of line with their objectives, the General Assembly immediately passed an amendment to the long-term contracting statute[150] which was quickly signed into law by the governor. The new law was explicit about the General Assembly's policy objectives:

> The [C]ommission shall review the amended power purchase agreement taking into account the state's policy intention to facilitate the development of a small offshore wind project in Rhode Island waters, while at the same time interconnecting Block Island to the mainland.[151]

The new law authorized National Grid to establish a new PPA with Deepwater Wind, and substantially modified the PUC's original standard of review. The PUC was directed to approve the PPA if the agreement: 1) contained terms and conditions that were commercially reasonable; 2) contained provisions to reduce the PPA price if cost savings could be achieved; 3) was "likely to provide economic development benefits, including: facilitating new and existing business expansion and the creation of new renewable energy jobs; the further development of Quonset Business Park; and, increasing the training and preparedness of the Rhode Island workforce to support renewable energy projects;" and 4) was likely to provide environmental benefits, including the reduction of carbon emissions.

The law required that two state agencies—the Economic Development Corporation (EDC) and the Department of Environmental Management (DEM)—file advisory opinions on economic and environmental benefits, and that the PUC should give "substantial deference" to their factual and policy conclusions. Finally, the revised law redefined *commercially reasonable* to mean:

> "terms and pricing that are reasonably consistent with what an experienced power market analyst would expect to see for a project of similar size, technology and location."[152]

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[149] Rhode Island PUC. (2010). Report & Order No.19941 Rejecting the Purchase Power Agreement between National Grid and Deepwater Wind Block Island. Docket No. 4111. Accessed at: http://www.ripuc.org/eventsactions/docket/4111-NGrid-Ord19941(4-2-10).pdf

[150] Senate Bill 2819, amending RI Gen. Laws §39-26.1-7.

[151] RI Gen. Laws §39-26.1-7(c).

[152] *Id*.

This last change essentially eliminated the first prong of the PUC's original analysis, a comparative analysis, and ensured the project would be analyzed in line with legislative objectives.

In June 2010, National Grid filed an amended PPA with Deepwater Wind supported by EDC and DEM advisory opinions with similar pricing terms but complying with the new law's requirements. To assess the new PPA, the PUC compared the project to similar European projects adjusted for size, location, and technology. The commission announced that they could not conclude that the terms and conditions of the Amended PPA should be deemed commercially unreasonable and approved the PPA in a split decision with one dissent.[153] In a dissenting opinion, the PUC Chair noted that the revised statute talked only of economic benefits and did not allow consideration of costs.[154]

The PPA approval was promptly appealed to the Rhode Island Supreme Court, highlighting the nature of the conflict among policy objectives. Two large industrial customers, driven by concerns over the cost, argued that the PUC applied a deferential review standard excessively weighted in favor of approval and that the standard was flawed in finding the PPA commercially reasonable and likely to provide economic development and environmental benefits. The outgoing attorney general joined in the appeal,[155] challenging the cost and raising constitutional and jurisdictional challenges to the statutory revisions and administrative proceedings. Meanwhile, then-governor Carcieri, the Senate president, and the Speaker of the House intervened in support. In mid-2011, the Supreme Court affirmed the decision but highlighted its trepidation regarding the General Assembly's "unwavering quest" to support the demonstration wind farm.[156]

3. Summary

In Rhode Island, the initial lack of legislative clarity over what constituted commercial reasonableness lead to a regulatory outcome inconsistent with the intended objectives and priorities of the Administration and the General Assembly. As a result, the RI PUC twice examined the question of whether the long-term PPA between National Grid and Deepwater Wind complied with the long-term contract standard policy even though it would be costly to ratepayers. In hindsight, the General Assembly's initial efforts to delineate clearly its objectives and their prioritization in the original long-term contracting law proved inadequate to convey

[153] Rhode Island PUC. "Division" Brief. Docket No. 4185.

[154] "The General Assembly was well aware of the costs associated with the proposed project when it passed the [new law]… If it had meant for the Commission to compare economic benefits to the costs, it would have included specific language requiring the Commission to do so." (Order in RI PUC Docket 4185, at 143).

[155] Subsequently the newly elected AG withdrew from the case.

[156] RI Supreme Court Opinion No. 2010-273-M.P.

their full and prioritized objectives. The General Assembly had not provided its chosen arbiter, the PUC, with the clear authority to consider what turned out to be the legislative intent. The initial law provided for a comparative net benefit standard; however, the analytical boundaries were ambiguous. The solution required a statutory amendment. This case demonstrates the importance of arming decisionmakers with the appropriate standard that aligns with objectives and sets the stage for an analysis based on that standard.

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The authors provide interdisciplinary renewable energy policy, market, and financial analysis to a range of public- and private-sector clients. They have helped a number of state and federal government agencies and multi-stakeholder groups analyze, design, and implement renewable energy policies nationwide and created tools for implementing renewable energy policies. Their policy analysis has spanned policy coordination between renewable energy and environmental policies; establishment of renewable energy credit systems; exploring the movement of generation attributes across market boundaries; establishing, evolving, and implementing renewable energy portfolio standards; exploring the role of feed-in tariffs in the U.S. market; and working to create an environment for better decisionmaking in wind-power siting.