THE
RENEWABLES PORTFOLIO STANDARD

A Practical Guide

Nancy Rader
Scott Hempling

Prepared for the National Association of Regulatory Utility Commissioners

February 2001

DISCLAIMER

The report was authored by Nancy Rader and Scott Hempling. Throughout the preparation process, the members of NARUC Committee/Staff Subcommittee on Energy Resources and the Environment provided the authors with editorial comments and suggestions. However, the views and opinions expressed herein are strictly those of the author and may not necessarily agree with positions of NARUC or those of the U.S. Department of Energy. Written comments are encouraged

Table of Contents

Acknowledgments viii

Executive Summary ix

Chapter One: Introduction 1

I. The Renewable Portfolio Standard: A Brief Description 1

II. The Goals of the Renewables Portfolio Standard 2

A. The Market-Based Nature of the RPS Maximizes Efficiency 3

B. Various Benefits Are Associated with Renewable Energy 3

III. Overview of The Report 5

Chapter Two: Shaping the Statewide Renewable Energy Goal 7

I. How Large Should The Goal Be? 7

II. Should The Goal Be For Renewable Energy or Capacity? 9

III. Should The Goal Be a Fixed Amount or a Percentage Of Sales? 9

IV. What Schedule Will Best Achieve The Goal? 10

A. Ensuring Competition at the Outset 10

B. Ensuring Certainty in the Amount of Current Supply 11

C. Rate of Interim Increases in the Target 11

V. How Long Should The RPS Last? 12

VI. What Provisions for Mid-course Adjustments in the Goal Might States Make? 14

Chapter Three: Selecting the Eligible Resources 15

I. Selection Principles 15

A. What are the State's Policy Goals? 15

1. Environmental benefits 15
2. Resource diversity 16
3. Promoting technologies 16
4. In-state economic development 17
5. Respond to public support for renewables 17

B. Does the Resource Need Financial Support? 17

II. Issues That Arise in Applying The Principles 18

A. Should Existing Renewables Be Included? 19

1. Existence is an insufficient characteristic upon which to include or exclude resources 19
2. Practical problems with including existing resources 19
3. Terminology issues associated with "existing" 21

B. Should Projects Already Receiving Benefits from Other Policies Also Receive Benefits from an RPS? 23

1. Policies benefitting existing projects: stranded cost recovery and PURPA contracts 24

a. Projects with existing PURPA contracts 24
b. Projects with future PURPA contracts 25
c. Projects affected by stranded cost treatment 25
d. For projects with financial need, who gets the benefits from the RPS premium? 26

2. Policies benefitting new or existing projects: public goods charges and others 28

a. Relationship of other policies to the RPS 28
b. Projects benefitting from public goods charge policies 29
c. Projects benefitting from other types of policies 31

C. Should Generators Have to Meet Location Requirements? 32

D. How Can Policy Makers Resolve Competing Policy Goals? 36

1. Structure the RPS with a resource tier 36
2. Adopt companion policies to the RPS 37
3. Reconsider the RPS approach 37

E. What Special Issues Are Associated with Specific Technologies and Fuels? 38

1. Unique characteristics of hydropower 38
2. Facilities using eligible and ineligible fuels 40
3. Problems of terminology 41

Chapter Four: Translating the Statewide Renewables Goal Into Retail Seller Obligations 43

I. Who Should Have The Obligation to Buy Renewables? 43

A. States Must Place the Obligation on Retail Sellers 43

B. Default Suppliers Should Not Be Exempted 45

C. Self-Generators Should Also Carry the Obligation 46

II. How Does One Allocate The Statewide Goal to Those Having The Obligation? 47

A. Method of Apportionment 47

B. Factoring in Line Losses 48

III. Product V. Portfolio Obligation: Should The Retail Seller Include The Obligated Amount in Sales Overall or in Each Product Sold? 48

A. The Product Approach Protects Consumers From Confusion and Fraud 49

B. The Product Approach Promotes Market Competition and Investment in Renewable Energy 50

C. Example: Maine 51

Chapter Five: The Interdependency of Statewide Goals, Eligible Resources and Retail Seller Obligations in Achieving Policy Effectiveness 52

Chapter Six: Designing Mechanisms for Retail Seller Compliance 55

I. Should Retailers Meet Their Obligation Through Ownership of Tradable Credits? 55

A. How Would an Obligation Based on Tradable Credits Work? 55

B. What Are the Advantages of Tradable Credits? 57

II. What Methods Are Available to Verify Compliance With The Renewables Obligation? 58

A. Verifying Compliance Using a Credit Accounting System 58

B. Verifying Compliance Using a Contract-Path Accounting System 59

C. Comparing the Credit and Contract Path Accounting Approaches 62

1. Credibility of approach 62
2. Cost and complexity 63
3. Compatibility with tradable RPS 64
4. Ability of retailers to shape and deliver products 65
5. Ability to handle small generation resources 66
6. Institutional demands 66

7. Ability to scale up system for regional or national use 66

D. Coordinating Attribute Accounting Systems Within a Region 66

III. How Does The State Make Compliance Flexible? 67

A. Measures for Achieving Flexibility 68

1. True-up period 68
2. Credit banking 68
3. Credit borrowing 69
4. Force majeure penalty exceptions 70

B. Coordinating Flexibility Measures with the Disclosure of Generation Attributes 70

Chapter Seven: Enforcing the RPS -- Generator Eligibility and Retail Seller Obligations 72

I. Why Are Effective Penalties Important? 72

II What Penalties Should Apply to Noncomplying Retail Sellers? 74

III. What Penalties Should Apply to Renewable Energy Generators Who Violate The Rules? 76

IV. How Should Penalty Revenues Be Used? 77

V. How Does The Cost Cap Relate to The Noncompliance Penalty? 78

Chapter Eight: Administering the RPS 79

I. To Which Regulatory Agencies And Other Institutions Should The State Delegate Administrative Responsibilities? 79

A. State Public Utility Commission 79

B. State Energy and Environmental Offices 80

C. Independent System Operator 81

D. Local Distribution Utility 81

E. Private Third Party 82

II. How Can The State Recover Implementation Costs? 83

III. What Is Involved in The Ongoing Administration of an RPS? 84

A. Administrative Tasks Not Directly Associated With the Credit System 85

1. Certify generators that are eligible under the RPS 85
2. Verify generation by certified facilities 85

a. ISO-metered facilities 85
b. Non-ISO-metered facilities 85

i. Electric facilities 86
ii Non-electric facilities 87

3. Provide information to the public 87

4. Adjust the RPS obligation as necessary 87

5. Impose penalties on retailers that do not meet their RPS obligation 88

6. Establish and manage any "cost cap" 88

B. Administrative Tasks Associated with the Credit System 89

Appendix A: Legal Issues Associated With Location Requirements A-1

I. In-State and In-Region Requirements A-1

A. Excluding Out-of-State Generation A-1

1. In General A-1

2. The Texas Approach A-2

B. Restricting Eligibility to Generation, Wherever Located, Which Produces Benefits for the State A-3

C. In-State Consumption Requirements A-4

D. In-State Sales Requirements A-6

II. U.S. Domestic Content Requirement A-7

III. Reciprocity Requirement A-8

Appendix B: Items to Include in RPS Legislation B-1

I. Define the Obligation B-1

II. Define Renewable Energy Credits and Related Rules B-2

III. Define Eligible Renewable Energy Resources B-3

IV. Identify the Implementing Agency and Set Forth Additional Implementation Tasks B-4

V. Require Other Institutions to Cooperate B-5

Appendix C: Relationship Between Federal and State RPS Policies C-1

I. Create a National Credit Accounting System C-1

II. Allow States to Add State RPS Requirements to Any National RPS C-4

III. Authorize States to Use State-Based Location Requirements As Part of Their RPS Renewable Energy Eligibility Criteria C-4

IV. Place Any National RPS Requirement on Retailers C-6

Bibliography D-1

Acknowledgments

This report was prepared under a grant from the Department of Energy. The authors wish to thank the Committee on Energy Resources and the Environment for the opportunity to prepare this report. Special thanks to those who reviewed and commented on the initial outline and/or the draft version of this report: Nancy Brockway, Roger Hamilton, Larry Mansueti, Kevin Porter, Alison Silverstein, Andrew Spahn, Ann Thompson, and Ryan Wiser. We also wish to recognize David Lapp for contributing to various sections of this report.

Any errors are the responsibility of the authors.

Executive Summary

As part of electricity restructuring efforts, eight states have adopted a new renewable energy policy. Called the Renewables Portfolio Standard (RPS), the policy promotes renewable energy in a way that is compatible with competitive electricity markets, whether wholesale or retail. The RPS promises to contribute to a renaissance of renewable energy markets. Effectively implemented, the RPS policies already adopted will support the development of several thousand megawatts of new renewable energy capacity over the next decade, and help maintain renewable facilities that are already on line. The success of the RPS in some states, particularly Texas, is likely to spur additional interest in the policy in other states and in Congress. By contrast, different results in other RPS states will illustrate the importance of careful policy design.

This report will assist state policy makers and policy analysts in defining the particular goals they seek to achieve with an RPS, and in designing each aspect of the policy so that it efficiently and effectively meets those goals. The table on the next page depicts all of the major decisions that policy makers must make in this process. With many of these decisions, there is no single "right" approach; rather, the option chosen will depend on the circumstances in each state and the intended goals of policymakers. The rest of this summary explains what the RPS is and provides a synopsis of the report.

WHAT IS THE RPS?

The RPS is a policy that obligates each retail seller of electricity to include in its resource portfolio (that is, the resources procured by the retail seller to supply its retail load) a certain amount of electricity from renewable energy resources, such as wind, solar, geothermal, hydro, and various forms of biomass and ocean energy. The retailer can satisfy this obligation by either (a) owning a renewable energy facility and producing its own power, or (b) purchasing power from someone else's facility. RPS statutes or rules can allow retailers to "trade" their obligation. Under this trading approach, the retailer, rather than maintaining renewable energy in its own energy portfolio, instead purchases tradable credits that demonstrate that someone else has generated the required amount of renewable energy.

In fashioning a state's RPS, policy makers make several key decisions. They define the overall renewable energy goal, define the types of renewable energy resources that will qualify for meeting the obligation, and translate the overall goal into the specific obligations of each retail seller. Once the RPS statute and implementing regulations are adopted, the government's role is limited to the administrative aspects of the policy: certifying that renewable energy generators meet the eligibility criteria established in the RPS law, managing a tradable credit accounting system, verifying retailers' compliance, and imposing noncompliance penalties if necessary.

Steps in Designing an RPS

1. Shape the Goal (Chapter Two)

What size?

Apply cost containment measures?

- Contingent increases
- Cost cap

Energy or capacity?

Fixed amount or percentage of sales?

What schedule?

- Begin date
- Rate of increase
- End date

2. Select Eligible Resources (Chapter Three)

Which resources advance the state's policy goals?

- Environmental improvement
- Increase resource diversity
- Promote technological advancement
- Promote economic development
- Respond to public preferences

Which resources need financial support?

- Existing resources
- Resources benefitting from other policies

Add location requirement?

- Develop in-state benefits test

Adopt measures to achieve competing policy goals?

- Resource tier for a subset of eligible resources
- Companion policy for subset of eligible resources

Consider the unique characteristics of hydropower

Adopt eligibility rules for multi-fuel facilities

Avoid the use of vague terms

3. Translate the Goal into Retail Seller Obligations (Chapter Four)

Who has the obligation?

- Retail sellers
- Default suppliers
- Self-generators above X MW

Provide for recovery of RPS costs in default service rates

Apportion goal among those obligated

Account for line losses

Require retailers to include renewables in company-wide portfolio or in each product?

4. Consider Interdependency of Policy Elements (Chapter Five)

Consider relationship among:

- Statewide goal
- Eligible resources
- Obligated entities

Consider the effect of changing one element on the achievement of overall policy results

5. Design Compliance Mechanisms (Chapter Six)

Should retailers meet their obligation with tradable renewable energy credits?

Which verification accounting method?

- Tradable credits
- Contract path

Coordinate accounting regionally

Add compliance flexibility measures

- True-up period
- Credit banking
- Credit borrowing
- Force majeure penalty exceptions

Coordinate flexibility measures with fuel source disclosure policies

6. Include Enforcement Provisions (Chapter Seven)

What penalties for noncomplying retailers?

What penalties for generators who violate the rules?

How to use penalty revenues?

7. Assign Administrative Duties (Chapter Eight)

Which agency should implement the RPS?

What roles should other agencies play?

- Public utility commission
- State energy and environmental offices
- Independent system operator
- Local distribution utilities
- Private third parties

How should the state recover implementation costs?

- ISO fees
- Fees on credit system users
- Public goods charge fund
- State agency's existing budget

The essence of an RPS, properly structured, is captured by three characteristics: First, the RPS advances renewable energy resources in the most efficient way possible by maximizing reliance on the market. This efficiency is enhanced if the obligation is tradable. Second, the RPS maintains and increases the quantity of renewables in the system over a long period of time. Third, noncompliance penalties ensure that retail sellers will act to meet the state's renewable energy goal. These characteristics distinguish the RPS from other types of renewable energy policies, such as government subsidy programs and tax credits.

The broader goal of the RPS is to achieve various benefits associated with renewable energy. These benefits relate to the environment, resource diversity, technology advancement, and in-state economic development.

SHAPING THE STATEWIDE RENEWABLE ENERGY GOAL

The first step for policy makers in designing an RPS requirement is to establish the contours of the renewable energy goal that they seek to achieve for the state. Six elements are involved in that contour.

How large should the goal be? In selecting the quantity of renewables that the RPS should produce, policy makers will balance the benefits sought against the costs of achieving a particular quantity. As with any cost/benefit balance, there are no "right answers."

A key advantage of the RPS policy is that it relies on the market to deliver a given quantity of renewable energy to the electric system at the lowest possible cost. A disadvantage is that the cost of the policy is difficult to predict precisely, although analysts can predict the costs of differently sized renewable energy goals within a reasonable range.

Two policy design options are available, however, to maintain costs below a defined level. One method is to make interim increases toward the goal contingent upon meeting certain cost targets. Another method is to impose carefully a cost cap on the goal.

Should the goal be for renewable energy or capacity? An energy-based requirement has two important advantages: it rewards more productive facilities, and it ensures the delivery of environmental and fuel diversity benefits, which occur only when renewable energy displaces nonrenewable energy in the system.

Should the goal be a fixed amount or a percentage of sales? The main difference between the two approaches is that, with a percentage requirement, the absolute amount of renewable energy produced will increase (or decrease) automatically as growth in end-use sales occurs (or doesn't occur).

What schedule will best achieve the goal? A casualty of improperly scheduling the RPS requirement could be the degree of competition in the renewable energy market that a state's RPS policy stimulates. The initial RPS requirement must take effect far enough in the future to allow for competition among all types of eligible renewable resources that are reasonably considered to be in competition with one another. If existing facilities are eligible for the RPS, the state also must have confidence in its estimate of the amount of current renewable energy supply to ensure that the initial market will be competitive.

The RPS requirement should then ramp up from the initial level on a predictable, fixed schedule. Such a schedule will provide a steadily growing market for renewable energy which, in turn, will promote industry development, technology advancement, and cost reductions.

How long should the RPS last? To reduce renewable energy costs, the policy should allow for long-term contracts and lower-cost financing. A policy sunset that occurs at least 10 years after the addition of the last increment of renewables will allow these cost reductions.

What provisions for mid-course adjustments in the goal might states make? A critical guiding principle in designing an RPS is that policy makers need to provide investors in renewable energy projects with certainty that the market created by the RPS will remain stable over time. Absent this condition, the policy will cost more (because investors demand higher rewards for higher risks), or will not achieve the intended goals (because investors won't make sufficient investments), or both. Any adjustments should apply prospectively only, and in a way that does not affect any prior investments.

SELECTING THE ELIGIBLE RESOURCES

In designing an RPS, policy makers must decide which types of renewable resources will be eligible to satisfy the RPS requirement. The principles that should apply are: (a) eligible resources should promote the particular policy goals that policy makers seek to achieve with the RPS; and (b) eligible resources should need financial support to enter or remain in the market. In applying thee principles, several practical issues arise.

Does each type of resource promote the state's policy goals? If the primary goal is to obtain environmental benefits, for example, the fact that all renewables have significant benefits in several environmental categories could argue for extending eligibility to every renewable type. Environmental benefits and costs among renewables vary significantly, however, which may warrant selectivity.

If policy makers are interested in renewable energy to obtain related resource diversity benefits, they should define eligibility broadly. All types of renewables will diversify the existing electricity system in most parts of the country. An exception to this principle is that, where a state is served by large

existing quantities of hydropower and where the policy goal is to diversify the resource base, hydropower should be excluded from eligibility.

Does each type of resource require financial support? Some relevant questions to ask when making this determination are: Are energy companies building renewable energy facilities of each type now in the desired quantity? Is the continued operation of existing facilities likely? What other sources of income do resources have? And, do discriminatory market rules increase the costs of certain renewable resources?

What issues arise in applying the principles? The report discusses each of the following issues:

- **Should existing renewables be included?**

The relevant question to ask here is: without RPS support, will the facility continue to operate? Past success, even success built on pre-existing government programs, does not guarantee future viability. An important objective of the RPS is to allow the market to identify which projects and resources are the most cost-effective sources of renewable power. If existing facilities are in jeopardy, it would be most economically efficient to allow the market to decide whether supporting their continued operation is less costly than developing a new facility.

Practical considerations complicate the situation, however. Frequently, for example, not every existing facility of a particular resource or technology type will need support to continue operating. In this situation, policy makers can make eligibility decisions on a plant-by-plant basis, they can exclude the entire group from eligibility, or they can make the entire group eligible.

- **Should projects already receiving benefits from other policies also receive benefits from an RPS?**

PURPA and stranded cost policies. Assuming that PURPA and stranded cost policies have been properly implemented, and assuming that RPS benefits would increase the operation or add to the economic life of facilities that also benefit from these other policies, then these facilities should be eligible to compete with other facilities for RPS benefits.

Public goods charges and other policies. There are two distinct ways in which policy makers might view a project that benefits simultaneously from the RPS and at least one other renewable energy policy: (a) the project is "double-dipping" -- i.e., the project is receiving more benefits than are necessary or deserved, or (b) the project is receiving as many benefits as were necessary to cause the project's development.

In distinguishing between the two effects, some questions to ask are: Would the developer have built the project absent the RPS or the other policy? Will the benefits from the other policy(ies) give a particular project, or certain types of projects, an unfair competitive advantage in the RPS market? Will allowing simultaneous benefits from the RPS and another policy increase total benefits, and are public costs and benefits commensurate? Or will simultaneous benefits result in the RPS producing windfall profits and insufficient public gain?

In the case of programs funded by public goods charges (PGCs), which many states have adopted, there is a significant chance that PGC-supported renewables projects will find their way into the RPS market in another state if RPS states do not take some type of preventative action. Without action, the state risks creating unfair competitive advantages, inefficiency, and a diminished total quantity of renewables.

- **Should generators have to meet location requirements?**

Hoping to maximize the benefits for their home state, state policy makers may consider geographic location restrictions as part of their eligibility requirements. Eligibility may be restricted to: resources located within the state or region; resources that can demonstrate that their output is physically delivered to the state or region; or resources that can demonstrate that their output is sold to consumers by documenting a contract path between the generator and consumers within the state or region.

Each of these options invites questions of efficacy, constitutionality or both. The efficacy of in-state restrictions is uncertain because key facets of RPS policy -- electricity flow, pollution reduction, economic development, and technological development -- have externalities that do not honor political boundaries. Thus it is hard to tell whether resources located outside of the state will produce the same, fewer, or greater benefits for in-state consumers than in-state resources. Location requirements raise questions of constitutionality under the Commerce Clause of the U.S. Constitution.

Another option -- one both efficacious and less vulnerable to constitutional challenge -- is to restrict eligibility to renewable generators, wherever located, that ?produce benefits? for the RPS state. Under this approach, the state would, for example, condition the eligibility of renewable energy generators upon a showing that the generator provides environmental and fuel diversity benefits to the state. Conditioning RPS eligibility on the generator providing benefits to the state is less risky constitutionally than conditioning eligibility on location. This approach also avoids the need to demonstrate a contract-path between the generator and in-state consumers, thus preserving one of the benefits of an RPS obligation that can be satisfied by purchasing tradable credits.

- **How can policy makers resolve competing policy goals?**

The different possible RPS policy objectives -- resource diversity, environmental benefits, technology advancement, economic development -- sometimes can compete with one another. In some cases, policy makers can accommodate different objectives by designing the RPS with a resource "tier." In other cases, they may prefer to adopt a complementary policy measure or reconsider the RPS approach altogether.

- **What special issues are associated with specific technologies and fuels?**

The unique characteristics of **hydropower**, such as its technological maturity and extensive development, might provide a strong rationale for excluding these resources from eligibility under the RPS, or for restricting eligibility based on specific characteristics. If hydro is included, states must take particular care to ensure that the definition of eligible resources is sufficiently strict.

There are several ways in which policy makers can address the eligibility **of mixed-fuel facilities**, such as coal facilities that also burn biomass fuels. Allowing only the energy generated by qualifying fuels to benefit under the RPS permits efficient combinations of fuel usage while providing benefits for the use of eligible fuels.

Policy makers should be careful in their use of **terminology**. Vague terms, such as "existing," "advanced," and "sustainable," should not be used in the definition of eligible (or ineligible) resources and/or technologies. Their use can produce results that are inconsistent with the intended policy objectives and can reduce policy effectiveness or increase costs compared to what policy makers anticipated. In addition, investors must have confidence that definitions of eligibility are sufficiently strict that the universe of possible competitors is certain.

TRANSLATING THE STATEWIDE RENEWABLES GOAL INTO RETAIL SELLER OBLIGATIONS

After the state determines the type of renewable energy resources it seeks and defines its renewable energy goal, the next steps are to determine: which entities the state will oblige to fulfill its goal; how it will divide the goal among these entities; and whether it will require each obligated retail seller to divide the required amount of renewable energy equally into each of its products, or instead meet the obligation on a portfolio-wide basis without regard to product content.

Who should have the obligation to buy renewables? States should place the RPS obligation on all retail sellers, including default suppliers, and to most self-generators. To exempt one of these retail competitors would be to remove cost responsibility for renewables from those who benefit;

to create entry barriers in the competitive market; and to reduce economic efficiency in retail customer shopping decisions. Exempting the default supplier magnifies these effects.

How does one allocate the statewide goal to those having the obligation? The state must apportion responsibility for meeting its overall renewable energy goal among all of the entities that it obligates to help meet the goal. The method of apportionment will differ depending on whether the state establishes a percentage or a fixed renewable energy goal, and whether all or only a subset of entities have an obligation to help meet the goal. In addition, the state might need to factor line losses into the obligation.

Product v. portfolio obligation: Should the retail seller include the obligated amount in sales overall or in each product sold? The fundamental difference between these approaches is that the first approach would allow a retailer to sell, for example, a 100 percent renewable product and a product that contains no renewables so long as, on a companywide basis, the retailer complies with the RPS. If the retailer charges a premium price for the renewable product, the practice would shift the company's RPS compliance costs to consumers who buy the renewable product. The product-based approach is superior because it ensures that consumers will not be misled about the effect of purchasing products with renewable energy content and it could result in a higher level of investment in renewable energy.

THE INTERDEPENDENCY OF STATEWIDE GOALS, ELIGIBLE RESOURCES AND RETAIL SELLER OBLIGATIONS IN ACHIEVING POLICY EFFECTIVENESS

It is important to consider how shaping the statewide renewable energy goal, selecting eligible resources, and translating the statewide goal into retail seller obligations will relate to each other, because it is their combination that will produce the outcome. Adjusting any one of the factors will often require adjusting one or more of the others in order to achieve the intended benefits within the anticipated range of costs. Failing to make the necessary mutual adjustments can result in unanticipated and undesirable consequences.

Such consequences have been encountered in many states as regulators have moved to implement RPS statutes. The confusion in these states: (a) suggests that policy makers did not explicitly deliberate their goals, let alone agree upon them; (b) created a situation where different interpretations of the law will produce very different outcomes; (c) significantly increased implementation costs, as the implementing agency and stakeholders were forced to expend considerable resources grappling with vague or conflicting terminology; and (d) could invite court challenge.

DESIGNING MECHANISMS FOR RETAIL SELLER COMPLIANCE

Having translated the statewide renewable energy goal into individual retail seller obligations, the state next must establish (a) whether the retailer's obligation to support renewable energy should be tradable, (b) how the state would verify compliance under tradable and non-tradable regimes, and (c) ways in which it will make the retailer's obligation flexible.

Should retailers meet their obligation through ownership of tradable credits? Rather than requiring each retail seller to generate electricity from its own renewable energy facilities or purchase electricity from a renewable facility owned by others, the state could require each retailer to acquire tradable renewable energy credits that represent the production of electricity from renewable facilities.

Under this approach, renewable electricity generators apply for certification as RPS-eligible generators and receive electronic, counterfeit-proof "renewable energy credits" (RECs) for the energy they produce. This gives them two products: generic power, which they sell into the power market, and RECs, which they sell into the RECs market. REC prices are determined in the REC market. The payment the generator receives for its RECs serves to recognize (and pay for) the desirable attributes of the source of the electricity, e.g., its renewable, emission-free fuel.

Retail electricity sellers are obligated, under the state RPS law, to purchase RECs. Compliance verification under this approach is straightforward: the administrator need only ensure that each retailer turns in and retires the requisite number of credits.

Establishing an RPS obligation based on tradable credits has numerous benefits that provide a strong rationale for this approach. Among other benefits, credit trading promotes a competitive renewables market, increases the efficiency of renewable energy development, and reduces retailers' compliance risks and compliance costs because trading credits is easier than trading power.

What methods are available to verify compliance with the renewables obligation? States can verify compliance with an RPS law under either a tradable-credits-based regime or a non-tradable "contract-path" regime. Either method also can verify retailers' claims regarding the attributes of the power they sell to consumers. We discuss each method in the context of both uses. After comparing the credits and contract-path models to serve both attribute verification purposes, we conclude that the credits model has important advantages, and we discuss the importance of coordinating attribute tracking methods on a regional level.

- **Verifying Compliance Using a Credit Accounting System**

Under the tradable credits approach, as described above, retail sellers purchase generic power and match it with purchased credits. The credits serve as prima facie verification of each retail

seller's claims regarding the attributes of the power it sells and compliance with the RPS. The tradable credits approach permits a retailer to make claims about the attributes of its retail products without regard to which generators the retailer pays to deliver power to its customers.

Under a credits model, a single program administrator maintains these credits in a centralized, electronic database. All legal owners of credits establish a credit account. On a regular schedule, the administrator reconciles a retail seller's credits with its marketing claims and RPS obligations and retires the used credits.

- **Verifying Compliance Using a Contract-Path Accounting System**

The theory behind contract-path verification is that the attributes of power remain bundled with the power, so that only the purchaser of the financial contract covering the energy may claim the attributes. Market participants may sell power several times before it eventually reaches the ultimate consumer, but the generation attribute travels with the energy in every transaction. A central administrator must have access to all of the information that is necessary to track generation attributes. The only realistic candidate for the central-administrator job is the regional independent system operator (ISO), or its equivalent.

Complete bundled tracking is not possible, however, because of the physical reality of electricity: an electron generated by a wind turbine is indistinguishable from an electron generated by a coal plant. In addition, electrons cannot be directed to flow to particular customers. Dollars are likewise fungible. These characteristics result in the effective unbundling of generation attributes from the generation itself in important instances, including: (a) bilateral transactions that are not associated with particular generating units ("system sales"); and (b) spot market sales, in which there is no contractual link between production from a generating unit and its final point of purchase. In addition, contract-path attribute tracking stops with the retail seller's purchase of energy, which allows the seller to use its discretion in assigning the attributes of the power they buy at wholesale to their retail products.

- **Comparing the Credit and Contract Path Accounting Approaches**

The primary advantage of the contract-path approach is that some view it as more credible because there is a stronger connection between the generation of power and the retail sale of attributes. The attributes assigned to purchasers of system and spot market power, for example, reflect the average attributes of the system mix or sales into the spot market during a particular hour, rather than the overall system mix during some longer time period.

In our view, this connection is not so strong as to outweigh the advantages of a credits system. These advantages include: an acceptable level of credibility and the comparable cost of a credits system compared with the contract-path approach; its compatibility with tradable RPS

requirements; the enhanced ability of retailers to shape and deliver products under a credits approach; the ability of a credits system to accommodate small generation resources; fewer institutional requirements of the credits approach; and the ability of a credits system to scale up easily for regional and national use.

- **Coordinating Attribute Accounting Systems Within a Region**

The integrity of every state's RPS depends on whether states in the same region coordinate their compliance efforts. Coordination is necessary because, in most cases, the market for electric generation is regional, and generators and retailers operate in more than one state. Without coordination, the RPS will be vulnerable to double-counting, both intentional and unintentional. For the same reasons, regional -- if not national -- coordination is necessary to verify retailers' claims regarding the attributes of their power products.

Regional coordination will also promote competition by establishing a uniform system of rules for retailers to follow when complying with the RPS requirements of different states in the same region.

How Does the State Make Compliance Flexible? In addition to making the RPS obligation tradable, states can use other measures to provide retailers with flexibility in complying with an RPS. RPS rules can mitigate noncompliance risks by providing true-up periods, credit banking, credit borrowing, and force majeure penalty exceptions. Providing retailers some flexibility in complying with their RPS obligations will reduce retailers' noncompliance risks, particularly those risks that remain despite good faith compliance efforts. Reducing retailers' risk of noncompliance is particularly important since the noncompliance penalty should be high.

ENFORCING THE RPS: GENERATOR ELIGIBILITY AND RETAIL SELLER OBLIGATIONS

The RPS relies on market participants, rather than the government, to take actions to promote renewables. Those participants must therefore be motivated to act. To provide the necessary encouragement, lawmakers must ensure that retail sellers failing to fulfill their obligations will incur penalties that exceed the cost of full compliance. Lawmakers must also impose adequate penalties on renewable energy generators who provide false information regarding their production or their eligibility status.

ADMINISTERING THE RPS

To ensure that the state effectively implements the RPS, the legislature must assign clear implementation tasks to one or more of its regulatory agencies. The legislature will need to vest one agency with primary authority to implement the RPS policy. This agency will be responsible for adopting implementing regulations and performing all ongoing administrative functions (described in the report) that are not assigned to other agencies. The legislature will also need to instruct other agencies and institutions to play specific supporting roles (also described). Finally, the state will need to consider ways in which it can recover RPS implementation costs.

APPENDICES

In Appendix A, we describe in greater detail the legal issues associated with attaching location requirements to RPS resource eligibility criteria. We also address two additional types of location restrictions: a U.S. domestic content requirement, and limiting eligibility to resources located in a state that has opened its markets to retail competition. Appendix B sets forth the RPS design details that state legislatures should establish, rather than leave to the agency level. In Appendix C, we describe various ways in which federal legislation could facilitate state RPS laws.

Chapter One:
Introduction

The large-scale production of electricity from renewable energy sources began in the 1980s, when several states aggressively pursued the implementation of the federal Public Utility Regulatory Policies Act (Hamrin and Rader 1993). Comparatively little progress was made during decade of the 1990s, due in part to impending restructuring of the electric utility industry and the perceived incompatibility of PURPA and regulatory resource planning techniques with competitive electricity markets (Rader and Wiser 1999). As part of electricity restructuring efforts in the last few years, however, eight states have adopted a new renewable energy policy -- the Renewables Portfolio Standard (RPS) -- that promotes renewable energy in a way that is consistent and compatible with competitive electricity markets.

The RPS promises to contribute to a renaissance of renewable energy markets in the first decade of the new millennium. Effectively implemented, the RPS policies already adopted will support the development of some 3,800 megawatts of new renewable energy capacity over the next decade, and help maintain another 3,600 megawatts of existing capacity that might otherwise go off line (Wiser, Porter and Clemmer 2000). More than half of the new development will occur in Texas, where development of several hundred megawatts of new renewables capacity was underway less than 18 months after the legislature adopted the policy. The success of the RPS in Texas is likely to spur additional interest in the policy in other states and in Congress. Likewise, the lack of results in some RPS states will illustrate the importance of careful policy design.

This report is intended to assist state policy makers and policy analysts in defining the particular goals they seek to achieve with an RPS, and in designing each aspect of the policy so that it efficiently and effectively meets those goals. With many design details, there is no single "right" approach; rather, the option chosen will depend on the circumstances in each state and the intended goals of policymakers. In most instances, therefore, we avoid making recommendations in this report. Where we see clear advantages and disadvantages to particular approaches, however, we make our views clear.

The balance of this introduction describes the RPS and the goals policy makers would seek to achieve with it, and then provides an overview of the report.

I. THE RENEWABLE PORTFOLIO STANDARD: A BRIEF DESCRIPTION

The Renewables Portfolio Standard (RPS) is a policy that obligates each retail seller of electricity to include in its resource portfolio a certain amount of electricity from renewable energy resources, such as wind, solar, geothermal, hydro, and various forms of biomass and ocean energy.

(The word "portfolio" refers to the mix of power supply resources that a retail seller assembles to serve its customers.) The retailer can satisfy this obligation by either owning a renewable energy facility and producing its own power or by purchasing power from someone else's facility. RPS statutes or rules can allow retailers to "trade" their obligation; that is, instead of maintaining renewable energy in their own energy portfolios, retailers are allowed to purchase tradable credits that demonstrate that someone else has generated the required amount of renewable energy.

Policy makers define the overall renewable energy goal, define the types of renewable energy resources that will qualify for meeting the obligation, and translate the overall goal into the specific obligations of each retail seller. Like other market standards, such as fuel economy requirements placed on the automobile industry, the cost of the RPS policy becomes a cost of doing business by private industry, in this case electricity retailers.

The essence of an RPS, properly structured, is captured by three characteristics: First, particularly if the obligation is tradable, the RPS achieves renewable energy policy goals through a market-based approach (we describe the market-based nature of the policy below). Second, the RPS maintains and/or increases the quantity of renewables in the system over a long period of time. And third, noncompliance penalties ensure that the renewable energy goal will be satisfied. These characteristics distinguish the RPS from other types of renewable energy policies, such as government subsidy programs and tax credits.

Once the RPS statute and implementing regulations are adopted, the government's role is limited to the administrative aspects of the policy: certifying that renewable energy generators meet the eligibility criteria established in the RPS law, managing a tradable credit accounting system, verifying retailers' compliance, and imposing noncompliance penalties if necessary.

The RPS can work in a market structure with or without retail competition and with or without vertically integrated utilities.[1] As importantly, the policy can be structured to evolve as market structure evolves.

II. THE GOALS OF THE RENEWABLES PORTFOLIO STANDARD

The goal of the RPS *as a policy tool* is to advance renewable energy resources in the most efficient way possible by maximizing reliance on the market. More broadly, the goals of the RPS relate to the various *benefits associated with renewable energy*.

[1] Though the report usually refers to "retail sellers," this term can include vertically integrated utilities.

A. The Market-Based Nature of the RPS Maximizes Efficiency

Efficiency is maximized because:

- the RPS policy allows *each retail seller* to meet its renewable energy obligation as efficiently as possible. Efficiency is assured because the RPS does not prescribe the particular technologies, resources or projects that the retailer must use to meet its obligation (though retailers must select from among a group of eligible technology and/or resource types), or provide particular levels of support to particular projects; and

- if based on tradable credits, the policy allows *the market as a whole* to meet the overall obligation as efficiently as possible. Overall efficiency is achieved because each retailer is not required to procure the same amount of renewable energy itself; rather, retailers are free to purchase tradable credits if others can procure renewables more cheaply.

The RPS creates a market for renewable energy in which private investors make decisions about which projects and technologies are the most promising in terms of cost, location, timeliness of development, and reliability.[2] In a tradable-credits-based RPS market, renewable energy projects will compete against each other continuously with price signals drawing the most efficient renewable energy competitors into the market. Retailers demonstrate that they have supported the required amount of renewable energy generation through whatever ownership or contracting arrangements they deem to be most economical and least risky, or by purchasing tradable credits.

B. Various Benefits Are Associated with Renewable Energy

Policy makers might be interested in obtaining some or all of the following types of benefits for their state.

Environmental benefits. Renewable energy resources are often favored chiefly because of their relatively low impacts on the environment. Compared with fossil fuel and nuclear plants, most renewable energy resources have modest environmental impacts in many or all of the following areas: air pollution, climate change, degradation of land and water, water use, wildlife impacts, and radioactive wastes. (See, e.g., Serchuck, 2000).

[2] These decisions will, of course, be influenced by other federal, state, and local laws on the books, e.g., federal tax credits and local siting restrictions,

Resource diversity benefits. If added in significant quantity, renewables will increase the diversity of energy resources supplying electricity to the electric system. Increased diversity, in turn, contributes to price stability, improves system reliability, and promotes competition:

- Renewables contribute to price stability because of the tempering effect of fixed-cost resources in an electric system that relies heavily on variable-cost fuels.

- Renewables improve system reliability by reducing the number of power plants that a single event will affect similarly. Examples:

  -- Renewable energy plants are generally smaller in size and greater in number compared with fossil fuel and nuclear plants. An outage at a renewable energy plant will therefore affect a smaller amount of capacity than will an outage at a multi-hundred megawatt gas, coal or nuclear plant.

  -- A shortage in gas storage capacity or a gas pipeline rupture will similarly affect many natural gas plants;

  -- A coal miners' strike may affect a number of coal plants;

  -- An environment-related court or agency ruling requiring higher water flows to protect fish may reduce production at a number of large hydro plants.

- Renewables promote competition among different types of fuels, and among retailers that utilize different types of fuels. For example, if some retailers have a significant fraction of renewable energy under contract at fixed prices, it will add competitive pressure on retailers who rely on gas and coal, and their fuel suppliers, to keep their prices down.

Technology advancement benefits. Another possible RPS policy objective is improving renewable energy technologies in order to lower their costs and increase their energy-conversion efficiencies, The ultimate goal is to advance technologies to the point where society can cost-effectively tap into new sources of energy on a large scale.

In-state economic development benefits. Policymakers may be interested the in-state economic activity that would result from building power plants that tap domestic renewable energy resources. For example, though a diverse array of renewable resources are widely distributed across the country, states in the U.S. Southwest have particularly abundant solar resources, the Great Plains states have rich wind resources, Southern and New England states have considerable biomass resources, and Western states have accessible geothermal resources.

Political benefits of responding to public support for renewables. In adopting an RPS, policy makers may simply want to respond to their constituents' expressed support for renewable energy. All of the above specific renewable energy benefits underlie that public support.

Policymakers may be interested in achieving goals related to one or more of these benefits. Elsewhere in the report, we explain how each particular goal will suggest different ways of designing the RPS. For example, different goals will suggest that different groups of renewables should be eligible for meeting the RPS requirement and will imply different location requirements for those eligible resources.

III. OVERVIEW OF THE REPORT

The balance of the report is organized as follows:

Chapter Two discusses the elements involved in shaping the statewide renewable energy goal that the RPS will achieve, including size, form and timing.

Chapter Three reviews the principles that should govern the selection of eligible resources and then discusses many questions that arise in applying those principles. These issues include whether existing renewables and renewables receiving other policy benefits should be eligible for RPS benefits; whether eligibility should entail meeting certain location requirements; how policy makers can resolve competing policy goals; and some special issues associated with specific technologies and fuels.

Chapter Four explains how to translate the statewide renewables goal into specific retail seller obligations.

Chapter Five discusses the interdependency of the issues covered in chapters two, three, and four in achieving policy effectiveness, and explains why it is essential to consider all of these elements at once.

Chapter Six describes the issues related to retail seller compliance, including: whether the retailer's obligation to support renewable energy should be tradable; mechanisms for verifying compliance under tradable and non-tradable regimes; and ways in which states can make the retailer's obligation flexible without harming the renewables market.

Chapter Seven discusses enforcement issues, stressing the importance of effective penalties on both noncomplying retailers and renewable energy generators who violate the rules.

Chapter Eight addresses issues related to RPS administration. It reviews the implementation responsibilities that the state might delegate to its regulatory agencies and other institutions, the ways in

which the state can recover implementation costs, and the ongoing functions involved in administering an RPS.

In three **appendices**, we provide a discussion of the legal issues associated with location requirements; discuss how federal legislation could either facilitate or hinder states' ability to use RPS policies to promote their renewable energy goals; and provide a list of items that states should address in their RPS statutes, rather than in implementing regulations.

Chapter Two:
Shaping the Statewide Renewable Energy Goal

The first step for policy makers in designing an RPS requirement is to establish the contours of the renewable energy goal that they seek to achieve for the state. This chapter discusses the elements of the contour by addressing six questions:

1. How Large Should the Goal Be?
2. Should the Goal be for Renewable Energy or Capacity?
3. Should the Goal be a Fixed Amount or a Percentage of Sales?
4. On What Schedule Should the Goal be Met?
5. How Long Should the RPS Obligation Last?
6. What Provisions Should be Made for Mid-Course Adjustments in the Goal?

I. HOW LARGE SHOULD THE GOAL BE?

The amount of renewables that an RPS ultimately produces should relate directly to the types of benefits that policy makers seek to achieve. (Those benefits were reviewed in the introduction.) Contributing to technical advancements in renewable energy conversion technologies, for example, will require a smaller quantity of renewables than significantly increasing the resource diversity of the electric system or delivering substantial environmental benefits.

The benefits sought, of course, must be balanced against the cost of achieving them. With cost/benefit analyses on all sides, there are no "right answers." Rather, the answer is appropriately delivered through the political process in view of all the evidence.[3]

A key advantage of the RPS policy is that it relies on the market to deliver a given quantity of renewable energy to the electric system at the lowest possible cost. A disadvantage is that the cost of the policy cannot be precisely predicted, though analysts can predict the costs of differently sized renewable energy goals within a reasonable range.[4]

---

[3] For example, arguments over environmental externalities (the avoidance of which are the environmental benefits provided by renewable energy), have produced volumes of empirical data with wide-ranging results and little consensus. (Ottinger et al., 1990; OTA, 1994.) Moreover, when it comes to determining public policy goals that relate to equity, as distinct from market efficiency, it is appropriate to look to political judgment and moral values rather than the logic of economic efficiency, on which cost/benefit analyses are based (Rader and Norgaard, 1996).

[4] For example, a cost analysis prepared for the Massachusetts Division of Energy Resources estimated the cost of the state's RPS requirement for new renewables under low and high cost scenarios that "likely encompass the majority of possible actual outcomes." All scenarios produced rate impacts of less than 0.1 cent per kWh during the

In the event that a political impasse arises because costs cannot be guaranteed with precision, there are at least two policy design options available to help resolve the impasse. One method is to make interim increases toward the goal contingent upon meeting certain cost targets. Another method is to impose a cost cap on the goal. We address each in turn.

Making Interim Increases Toward the Goal Contingent on Cost. Policy makers can design the RPS with a relatively low initial goal and increase the goal gradually over time if cost targets are met. Each step-increase would take effect only if the implementing agency finds that the estimated cost of meeting the current goal falls within a certain acceptable range. The cost range can take several different forms, such as:

- the total dollar cost of the required renewables,
- the average above-market cost of wholesale renewable power as a fraction of an accepted indicator of wholesale generic power prices, or
- the above-market cost of renewables as a fraction of average consumer bills.

The precise cost of fulfilling the renewable energy requirement will not be readily apparent because most of those subject to the requirement will not voluntarily divulge cost information. However, if a trading market develops for renewable energy (or tradable renewable energy credits, as discussed in Chapter Six), market clearing prices would be publicly available.[5] If a transparent market price is not available, the implementing agency can base its cost estimate on other indicators, such as rates filed by wholesale renewable energy generators at the Federal Energy Regulatory Commission or available cost studies.

Establishing a Cost Cap. Policy makers can apply a cost cap to the RPS policy. One example would be a mechanism that automatically adjusts downward the size of the goal if costs reach a particular level. Such a policy should meet the following principles:

- **The cost cap should not undermine the market for renewable energy.** The RPS policy establishes a market for renewable energy in which price signals draw the most efficient renewable energy competitors into the market. The cost cap must not be set so low that those price signals do not emerge.

---

first four years of the policy, rising to within a range of about 0.1 to 0.5 cents per kWh by the tenth year of the policy. These impacts compare to current retail rates of 9 cents per kWh. (Smith, Cory et al., 2000.)

[5] For example, the Automated Power Exchange posts the monthly market clearing prices in its renewable energy markets. See www.apx.com.

- **The cost cap should preserve investor confidence in the RPS market.** Renewable energy investors must have confidence that there will still be a market for their product if the cost cap is triggered. Though the cost cap would reduce the size of the market created by the RPS, it should not undermine the rest of the market.

In Chapter Eight, which covers administrative issues, we discuss a cost cap methodology which satisfies these principles.

II. SHOULD THE GOAL BE FOR RENEWABLE ENERGY OR CAPACITY?

Policy makers can aim the RPS to achieve either an amount of renewable *energy* (i.e., kilowatt-hours) or of generating *capacity* (i.e., kilowatts).

An energy-based requirement has two important advantages. First, many of the benefits of renewable energy, particularly their environmental benefits, occur when renewable energy generators actually produce energy which replaces nonrenewable energy. Second, by rewarding production, an energy-based standard provides an incentive for facility owners to maintain their facilities at high levels of productivity. This productivity reduces the total cost of renewables generation, while also promoting technology advancement. Currently, all RPS requirements in the U.S. and overseas are based on energy.

Note that a capacity target can be translated into an energy requirement by applying a capacity factor. In Texas, for example, the RPS statute established a fixed capacity target of 2,880 megawatts by 2009. Recognizing the benefits of an energy standard, the Public Utility Commission translated the capacity requirement into an energy requirement using an initial 35 percent capacity conversion factor that will be adjusted periodically to meet the legislative capacity target.

III. SHOULD THE GOAL BE A FIXED AMOUNT OR A PERCENTAGE OF SALES?

The energy goal can be targeted to achieve:

- a *fixed amount* of renewable energy, for example, one million kilowatt hours, or

- an amount of renewable energy equal to some *percentage of retail sales* in the state, for example, two percent of all kilowatt-hours sold at the retail level.

The main difference between the two approaches is that, with a percentage requirement, the absolute amount of renewable energy produced will increase (or decrease) automatically as growth in end-use sales occurs (or doesn't occur).

IV. WHAT SCHEDULE WILL BEST ACHIEVE THE GOAL?

Properly scheduling the RPS requirement will ensure that the renewable energy targets are met with the benefit of vigorous competition. This part discusses four important issues related to scheduling: ensuring competition at the outset; ensuring certainty in the amount of current supply; and establishing the rate of interim increases toward the goal.

A. Ensuring Competition at the Outset

An important factor will be whether projects that are already in operation are included in the group of resources deemed eligible for the RPS, or whether eligibility is restricted to new projects. (We discuss resource eligibility issues in Chapter Three). If only new resources are eligible, then the initial requirement should provide sufficient project development lead time *after regulations are final* to accommodate the type of new resource with the longest development lead time. Sufficient lead time will vary depending on local circumstances, but is usually in the vicinity of two to three years. The situation is the same if both new and existing resources are eligible and new renewable resources are either required to satisfy the standard or are reasonably likely to be competitive with existing renewable resources,

The initial RPS requirement must take effect far enough in the future to allow for competition among all types of eligible renewable resources that are reasonably considered to be in competition with one another. Competition should be assured for the entire quantity of renewables needed to fulfill the initial requirement.

Example: In Texas, implementing regulations were finalized a full two years in advance of the state's RPS obligation, which begins in January of 2002. Retail suppliers began issuing requests for proposals for qualifying renewable power within a month following the adoption of the final regulations. Contracts were signed within six months, which allowed eighteen months for project development. The lead time provided was sufficient to accommodate new wind and landfill gas facilities that were reasonably likely to be the least-cost types of qualifying renewable power. In a state where permitting may be more time consuming, or where new geothermal or biomass projects with longer development lead times are considered to be potentially competitive, providing more lead time would be appropriate.

Where the initial requirement is being set to correspond to the existing amount of qualifying renewable resources (and therefore to support those resources), and where new renewables are not

reasonably considered to be competitive with those resources at the present time,[6] then the obligation can start with little or no lead time after regulations become final. In this case, however, it is important to set the obligation at a level that is far enough below the amount of available renewables (e.g., five to 10 percent below) to ensure price competition.

B. Ensuring Certainty in the Amount of Current Supply

A state legislature may be uncertain about the amount of existing resources that would meet the detailed resource eligibility criteria to be established later by the implementing agency. In this situation, it would be prudent for RPS legislation to direct the implementing agency to set the initial percentage requirement at a level that maintains the amount of existing eligible renewable energy rather than to place a number in the legislation. The agency could then conduct a plant-by-plant survey so that it knows exactly what the current supply of energy is relative to the agency's adopted definitions of eligibility. Alternatively, the agency might require all existing renewable energy generators that want to seek eligibility under the RPS to register with the agency in advance.

C. Rate of Interim Increases in the Target

The RPS requirement should ramp up from the initial level on a predictable, fixed schedule. Such a schedule provides a steadily growing market for renewable energy which, in turn, promotes industry development, technology advancement, and cost reductions. In addition, a stable rate of increase will prevent "boom and bust" cycles in the renewables industries. Such cycles drive up costs because industry infrastructure must be temporarily augmented, usually at a higher cost (or lower value). Two concrete examples:

- The wind industry requires cranes to erect new wind turbines. If too many turbines have to go up at once, cranes must be transported over greater distances at a far greater cost.

- Expert personnel may leave the renewable energy industry during long periods of low activity, resulting in a loss of valuable expertise and institutional memory.

On the other hand, if the overall target is so low, in terms of the absolute amount of renewables capacity that will be added to the system, economies of scale must be considered. For example, if an RPS requirement is going to result in adding just 100 MW to the system, raising the standard by 10 percent per year is likely to eliminate any cost benefits arising from larger project size (depending on the

[6] As existing facilities age and as the cost of competing resources comes down, existing facilities will be subject to competition.

technology types that are both eligible and competitive). In establishing the rate of increase, therefore, policy makers should consider the absolute amount of renewable energy capacity that will be required.

Assuming a significant overall target, however, raising the requirement each year or every other year on the way to the ultimate target will provide the renewable energy industries with stability that will keep costs down.

V. HOW LONG SHOULD THE RPS LAST?

For the same reasons that the RPS should contain steadily increasing interim targets -- because those targets provide a steadily growing renewable energy market that promotes industry development, technology advancement, and cost reductions -- the duration of the policy needs to be long-term. The question then arises, what is an appropriate time at which to end the policy?[7]

Two methods are available for ending the RPS:

A fixed sunset: A specific date is chosen at which time the policy ends.

A self-sunset: The RPS ends when renewables become competitive in the market and the RPS is no longer needed to achieve and support the legislature's renewable energy goal. The implementing agency would make this determination after finding that: (a) the additional cost of renewable energy has declined to negligible levels for at least two years,[8] and (b) the RPS obligation is not integral to that cost-effectiveness.[9]

The self-sunset approach has two advantages. First, market competition among renewables will continue up until the sunset because investors can be assured of recovering their costs. With a fixed sunset that takes effect regardless of whether there is a cost gap between market prices and the cost of renewables, there will be little or no investment in new plants as the sunset date approaches, because at least 10 years are required to recover fixed costs.

---

[7] Note that the rate of increase in the RPS obligation can end well before the policy is terminated.

[8] With tradable credits, this point would be reached when the value of credits stabilizes at negligible levels.

[9] A self-sunset should not be put into effect if the RPS is the basis for the cost-effectiveness of renewables. Some or all renewables may be cost-competitive with conventional fuels over a long time period (i.e., that provided by a long-term RPS) but have trouble getting financing in markets where short-term cost-recovery is the norm. See, e.g., Rader and Short.

Second, credit prices will be more stable over the duration of the requirement. With a fixed sunset, especially one that occurs fewer than 10 years after the last increase in the requirement, credit prices will spike during the years before the sunset, as developers seek to cover their above-market costs within a shorter time period. This effect was shown in a study that modeled the effects of proposed RPS requirements at the federal level that contained both fixed sunsets and self-sunsets. (Union of Concerned Scientists, 1999)

With either sunset approach, renewable energy costs can be substantially reduced if the duration of the standard allows for long-term contracts and lower-cost financing. Absent long-term policy stability, the cost of renewable energy projects could increase by 25 to 50 percent as a result of increased financing costs (Wiser and Pickle, 1997). Long-term stability can be achieved with a self-sunset or with a fixed-sunset that occurs at least 10 years after the addition of the last increment of renewables. It is important to note that, if the RPS is set as a fixed percentage of retail sales, then renewables will be added as long as growth in demand occurs. In this case, a self-sunset would be required.

There is also the option of making the RPS requirement indefinite by not including any sunset provision in the legislation. An affirmative sunset of some sort is desirable, however, because: (a) investors will have greater confidence that their investments will be recovered if there is a clear signal that the requirement will continue as long as it is necessary to support renewables; and (b) there would be no reason to continue the RPS once the targeted quantity of renewables can be supported in the market.

The Texas RPS provides a good example of what an RPS schedule should look like: the policy takes effect in 2002, rises every other year through 2008, and ends in 2019. This statement by the Public Utility Commission of Texas echoes the above reasoning:

> [A] 2019 program end date [10 years after the last 600 MW increase in the obligation] will provide certainty for suppliers financing renewable investments, ensure that all 2,000 MW are installed, and would likely reduce the overall cost of compliance to competitive retailers and their customers. (Texas Substantive Rule, 1999)

The Commission also left open the possibility of sunsetting the program if credit prices fall to zero.

VI. WHAT PROVISIONS FOR MID-COURSE ADJUSTMENTS IN THE GOAL MIGHT STATES MAKE?

A critical guiding principle in designing an RPS is that policy makers need to provide investors in renewable energy projects with certainty that the market created by the RPS will remain stable over time. Absent this condition, the policy will cost more (because investors demand higher rewards for higher risks) or will not achieve the intended goals (because investors won't make sufficient investments), or both. Therefore, if the RPS policy includes any "flexibility" measures, policy makers must structure them very carefully to avoid upsetting investor confidence.

Consistent with this principle, any adjustments that are made to the RPS goal (and the associated obligations discussed in Chapter Four) must be applied prospectively and in a way that does not affect any investments that have already been made.

With this in mind, some types of prospective adjustments in the RPS policy can be considered. We previously discussed methods of making the goal, or increases toward it, contingent upon cost findings (see part I, above). There are two other situations in which policy makers may want to provide for possible changes in the renewable energy goal:

a. **Policy makers want existing renewable energy projects to be eligible for RPS benefits when they leave their utility contracts, but the unpredictable addition of these resources will upset the supply-demand balance in the RPS market.** If no adjustment is made in the size of the RPS obligation as these projects enter the RPS market, then their entry will upset the supply-demand balance crafted in the original RPS obligation. Providing for increases in the size of the RPS obligation as these projects exit their contracts can preserve a supply-demand balance that supports the existing quantity of renewables in the system and provides for growth in that quantity. In this case, contingent increases should take effect with sufficient lead time after the *announcement* that the contract will be exited to ensure that there is competition to fulfill the incremental demand for renewables (see part IV, above).

b. **The state wishes to adjust the RPS in the event that the federal government adopts an RPS or PGC.** The state may want to provide for prospective changes in the size of its RPS obligation in the event that Congress adopts related (and potentially overlapping) policies. If so, the state should indicate that investments that have already been made to satisfy the state RPS will be protected.

Chapter Three:
Selecting the Eligible Resources

In designing an RPS, policy makers must decide which types of renewable resources will be eligible to satisfy the RPS requirement. Renewable resources come in a wide variety of forms and use a wide array of technologies. They have a wide range of costs, geographic availability, operating characteristics, and environmental impacts. Indeed, some renewable resources -- such as solar photovoltaics and agricultural waste -- share just one characteristic: the renewable nature of their fuel. In deciding which renewables will be eligible to satisfy the RPS, therefore, policy makers need to match their goals with the characteristics of different renewable resources.

This chapter reviews the principles that should govern the selection of eligible resources and then discusses many questions that arise in applying those principles.

I. SELECTION PRINCIPLES

A. What are the State's Policy Goals?

Before policy makers determine which resources should be eligible for the RPS, they need to consider what policy goals they are trying to achieve. In the introduction, we summarized various possible objectives: improving resource diversity, obtaining environmental benefits, advancing technologies, promoting in-state economic development, and responding to public preferences. Each different objective can suggest different sets of renewable resources that should be eligible for the RPS. Here, we discuss the eligibility implications of each objective.

1. Environmental benefits

All renewables have significant benefits in several environmental categories. This feature could argue for extending eligibility to every renewable type. Environmental benefits and costs among renewables do vary significantly, however, which may warrant selectivity.

If there is particular interest in the environmental benefits associated with particular renewable energy resources, then policy makers could limit eligibility accordingly. For example, unique benefits are often associated with biomass energy because biomass feedstocks, if not used as fuel, might otherwise be landfilled, burned in open fields, or left in the forest where they may contribute to forest fires. (See, e.g., NREL, 1997.) Alternatively, policy makers could establish a separate requirement within the RPS (a resource "tier") for the preferred fuels (or technologies) if those fuels would not survive competition from other types of renewables (see discussion of resource tiers in part II.D later in this chapter).

Likewise, if policy makers deem a particular renewable resource to have important environmental drawbacks, they can exclude it from eligibility. Such drawbacks might include the hazardous emissions associated with facilities that burn municipal solid wastes (only a portion of which derive from renewable sources) or the degradation of river habitats caused by hydroelectric facilities.

2. Resource diversity

If policy makers are interested in renewable energy to obtain related resource diversity benefits, they should define eligibility broadly. All types of renewables will diversify the existing electricity system in most parts of the country, which are now largely dependent on coal, gas, and nuclear power. An exception to this principle is that, where a state is served by large existing quantities of hydropower and where the policy goal is to diversify the resource base, hydropower should be excluded from eligibility. Achieving resource diversity also means that RPS eligibility should not extend to emerging technologies that use fossil fuels, although some states have allowed such extension.

3. Promoting technologies

Most renewable electricity technologies are in an historically early stage of development (hydropower technologies being the exception), and thus an RPS that promotes non-hydro renewable technologies will promote technological advancement. Not all technologies will be promoted equally, however, as the market seeks the least-cost resource and technology types. In establishing eligibility rules, policy makers will need to decide whether they are content to let the market make all decisions about which technologies to promote.

An RPS that results in the development of a significant quantity of new non-hydro renewables is likely to encourage a diversity of renewable technologies as retailers and investors seek to take advantage of the most cost-effective applications of each resource (i.e., the low-cost end of the supply curve for each resource). One might also expect an efficient market to seek out cost-effective niche applications of renewables, such as distributed applications of photovoltaics.

Technologies and resources that are the promising for future deployment should also attract investment dollars under a long-term RPS. For example, if a solar technology is not the most cost-effective resource now, but private investors think that it will be an economic contender as the RPS requirement grows, particularly because solar energy production is often coincident with valuable peak demand periods, private investors may invest in that technology. Investors are likely to make greater investments in technologies with long-term potential if the RPS policy has a long time horizon and a sizable renewables goal.

Policy makers who are not content to leave to the market the decision about which technologies hold the most future promise, even within the context of a market created for renewables,

have several options: (a) limit the definition of eligible renewables to those technologies that they deem to have the most long-term promise (or exclude those with the least promise); (b) create a separate requirement within the RPS for the technologies deemed to have the most promise; or (c) adopt an additional policy targeted to particular technologies. (For further discussion on these solutions, see part II.D below on meeting competing policy goals.)

4. In-state economic development

Policy makers who are primarily concerned about promoting economic development within the state could limit eligibility to renewable resources that are abundant within the state and competitive with out-of-state renewables. These restrictions will increase the chances that the state will benefit directly from the projects that are developed to meet the standard without incurring the legal risk of applying an in-state eligibility requirement (see part II.C later in this chapter).

5. Respond to public support for renewables

If a primary motivation for adopting an RPS is responding to public support for renewables, policy makers will need to consider whether their constituents support particular resources or technologies or strongly disfavor others.

B. Does the Resource Need Financial Support?

Having considered what their policy objectives are and what set of resources can meet those objectives, policy makers must determine which of those resources need the financial support of the RPS to maintain or commence production. Here are some relevant questions to ask when making this determination.

Are energy companies building renewable energy facilities of each type now? If the market *serving the state* is not advancing a particular resource or technology or advancing it *in the desired quantity*, then it may benefit from the support of an RPS.[10] Even if immediate market conditions are favorable, investors must have confidence that conditions will be favorable over a period of five years or longer to justify capital investments in renewable energy facilities. Renewables usually have high capital requirements compared with those of gas-fired plants; gas plants therefore have lower payback risks that investors usually prefer. Even if higher prices are currently available (e.g., in the

[10] Note that a 1998 survey found that, of 40,500 megawatts of planned merchant power plants (i.e., plants that developers build without long-term power purchase contracts) in the Northeast, Texas and California, the vast majority were gas-fired and included less than 350 MW of renewable energy capacity. Most of that renewables capacity was being supported by California's public goods charge.(See Rader, 1998). More recently, a database of merchant power plants being built around the country shows that, of 20,000 MW currently under construction or development, almost all are gas-fired (McGuireWoods, 2000).

consumer-driven market for "green power"), investors must be confident that the market will sustain these prices over the long run. (Rader and Short, 1998)

Is the continued operation of existing facilities likely? Can the owners of a certain type of facility recover their operating costs (at the designed level of output) and make capital repairs to their facilities under current market conditions without the support of an RPS? As with new plants, investors must have confidence that market prices will be favorable over a long period to justify significant capital repairs and improvements to existing facilities.

What other sources of income do resources have? If existing resources are already receiving sufficient payments under existing utility contracts or under ratemaking policies, they may not require the support of an RPS. Likewise, new facilities whose above-market costs are being recovered through other policies of the state, neighboring states, or the federal government probably do not require additional support. Support could be needed when these conditions end, however.

Do discriminatory market rules increase the costs of certain renewable resources? Grid interconnection and distributed generation policies, and transmission pricing, transmission scheduling, and power pool bidding methodologies might impose undue costs on intermittent and distributed renewable resources. That is, the rules may have little relationship to the actual costs imposed by these resources on the system, causing the resource to be less competitive than it would otherwise be. (See, e.g., Ellison, 2000.)

We discuss many of these questions next.

II. ISSUES THAT ARISE IN APPLYING THE PRINCIPLES

Many practical issues arise when analysts apply the above principles to particular resources or generators with similar characteristics. Here we discuss these issues:

- Do existing renewables require support?
- Should projects already receiving benefits from other programs also receive benefits from an RPS?
- Should generators have to meet location requirements?
- How can policy makers resolve competing policy goals?
- What special issues are associated with specific technologies and fuels?

A. Should Existing Renewables Be Included?

1. Existence is an insufficient characteristic upon which to include or exclude resources

Some argue that an existing resource needs no RPS support because it has survived without the RPS. This argument ignores the important economic question: without RPS support, will the facility continue to operate? Past success, even success built on pre-existing government programs, does not guarantee future viability.

Payments under past policies and market conditions are irrelevant to a facility owner's decision whether to operate in the future. Moreover, the current owner may not be the owner that benefitted from the past conditions. As with any power plant, what matters is whether continued operation is profitable.

An important objective of the RPS is to allow the market to identify which projects and resources are the most cost-effective sources of renewable power. If existing facilities are in jeopardy, it would be most economically efficient to allow the market to decide whether supporting their continued operation is less costly than developing a new facility. Practical considerations complicate the situation, however, as discussed next.

2. Practical problems with including existing resources

Frequently, not every existing facility of a particular resource or technology type will need support to continue operating. In this situation, policy makers can make eligibility decisions on a plant-by-plant basis, they can exclude the entire group from eligibility, or they can make the entire group eligible.

The approach of singling out particular facilities for eligibility after case-by-case determinations of financial need has a few drawbacks. First is the difficulty of making such determinations and the resources required to make them. Second is the possibly of rewarding facilities that, for whatever reason (resource quality, management practices, technology choice, etc.) have proven less competitive than other resources of the same type. Some may view this as unfair.

Excluding from RPS eligibility the entire group of existing resources is likely to make economic sense if the entire group (or most of it) clearly does not require support to operate profitably over the long term. But if only a subset of existing facilities requires support, analysts will need to determine whether the cost of including the entire group of existing facilities -- and raising the RPS percentage

requirement to accommodate it -- would outweigh the benefits gained. Costs may outweigh benefits even when the at-risk subset is less costly than the new facilities that would replace them.

As a hypothetical example, assume that the only existing renewable resources serving State X are existing biomass facilities, which provide 4 percent of the state's electricity needs. Assume that facilities representing 1 of those 4 percent are likely to cease production because operating costs are rising and capital improvements are necessary. Assume that the state wishes to increase the renewable energy in its mix by 3 percent five years hence, compared with what would otherwise occur. Among the state's options are these:

a. The state could exclude existing biomass from RPS eligibility and set its RPS goal at 4 percent, for a net gain of 3 percent when the at-risk facilities close; or

b. The state could make all existing biomass eligible and set its goal at 6 percent -- reflecting the 4 percent of existing biomass plus an additional 2 percent, for a total real change of 3 percent (1 percent preserved plus 2 percent new) compared with the status quo.

To determine which decision makes the most economic sense, the state needs to determine whether, under the second option, raising the RPS goal by 2 additional percent increases the cost of the policy beyond the benefits that the state would gain by preserving the low-cost at-risk biomass.[11]

There is another circumstance under which including a group of existing facilities is not feasible in practice. (While complicated, this is an important circumstance to consider in RPS design.) The circumstance arises when existing capacity serving the state is at risk, but there is a considerable quantity of like capacity that (a) is not at-risk and (b) is not currently serving the state but could be redirected to do so. Here, the capacity that requires no support to maintain operations could fulfill a substantial portion or all of the demand for resources created by the state's RPS. The state would incur policy costs but reap no benefits because no change would occur in the status quo.

For example, assume that a few small hydro facilities currently serve a state and will close without the support of an RPS. A considerable amount of very cost-competitive, technologically similar

---

[11] The PUC of Texas conducted a similar analysis and concluded that allowing existing resources, predominantly hydropower, to qualify for tradable renewable energy credits was not worth the increase in the cost of the RPS policy. The PUCT estimated that these costs would increase by 300 percent during the program's first compliance period if existing resources were included and the obligation was raised to accommodate them.

The record reflects a dispute between parties who contended that hydro resources are at risk, and parties who contended the opposite. As a compromise, and considering the state's RPS legislation that referred to a cumulative renewables capacity target that included existing resources, the PUC decided to allow existing resources to offset the obligation of retailers who own or contract for those resources, while raising the obligation for new resources on all other retailers. The offset is not tradable. (Texas Substantive Rule, 1999)

hydro capacity currently serves neighboring states. Assume that the state wants its RPS requirement to support the at-risk hydro plants that currently serve the state, which provide 1 percent of its power, and wants to add 5 percent of new renewable resources for a total RPS goal of 6 percent after ten years. If the state includes existing hydro in its definition of eligible resources, the cost-competitive hydro resources could fulfill the entire 6 percent. The result would fail to achieve the state's goals of supporting the at-risk hydro facilities and of adding 5 additional percent of new resources.[12]

In this circumstance, policy makers have a compelling reason for excluding all existing hydro resources.[13]

If the relevant quantity of existing resources supplies a particular group of states, there is another option. That option would be for each of those states to adopt RPS laws simultaneously such that the total demand from the sum of each state's RPS would solve the supply/demand problem. But such regional coordination is rare. A state might act alone with the hope that other states in the region will follow, but the state would risk incurring policy costs that exceed policy benefits in the meantime, and perhaps indefinitely.

3. Terminology issues associated with "existing"

Whether policy makers decide to include or exclude existing resources, they will need to define "existing" or "new" carefully. Of particular concern would be a situation where (a) a significant amount of capacity potentially falls into an area that was not clearly defined, (b) policy makers consider that capacity to be less desirable than the intended eligible resources, and (c) policy makers did not consider the amount of the unanticipated resource when policy makers established the size of the goal. In this circumstance, the ambiguity places the attainment of policy objectives in jeopardy. A sufficient remedy can require more than the simple addition of a project vintage date to the definition of eligible resources. Eligibility rules may also need to address the following gray areas.[14]

Mothballed facilities and old equipment. If the chief policy objective is to raise the amount of renewable energy supply serving the state at the lowest possible cost, then policy makers may not be concerned if project owners bring mothballed facilities back into operation. Similarly, it may not matter

---

[12] A similar problem arises at the U.S. level due to large existing quantities of U.S. and Canadian hydropower resources, most of which are relatively low-cost (assuming that the U.S. could not exclude Canadian hydro; see Appendix A).

[13] Note that the state could attempt to address the problem by dividing the RPS requirement into two compartments, or "tiers," and placing the problematic resource type into one of the tiers. Rather than solving the problem, however, this "solution" only limits the problem to one tier.

[14] For further discussion on these issues, see Grace, Wiser, Smith and Holt, 2000, and California Energy Commission, 1999.

if owners move equipment into the region that was operating elsewhere in order to benefit from the state RPS requirement. But if technology advancement and creating a net environmental gain beyond the region are also important objectives, then the definition of eligible renewables should specifically address the eligibility of old facilities and equipment. For example, the definition might include the desirable characteristics of eligible facilities (such as technology vintage and emissions rates). Eligibility rules should also guard against gaming, whereby a facility owner simply moves equipment to a new location and labels it a "new" project.

Facility upgrades. Facility upgrades include retrofitting, refurbishing, or repowering existing facilities with new equipment. Some facilities may be upgraded to accommodate the use of renewable fuels (e.g., a coal plant that is modified to use solid biomass fuels). It may be entirely consistent with policy makers' objectives if, in response to the RPS, facility owners upgrade their facilities to meet the definition of eligible renewables. Upgraded facilities will increase competition between available resources and, because the cost of an upgrade may be less than building a brand-new facility, could reduce the cost of achieving policy goals. Repowering facilities with new equipment will further technology advancement goals.

There are some circumstances, however, under which problems could arise. For example, policy makers might exclude existing resources that would otherwise meet eligibility requirements on the assumption that they will stay in operation without support from the RPS. In this instance, instead of adding to the total renewables supply, an upgraded facility enters the RPS market and replaces the new development that would otherwise have occurred. There would be a public gain in the process -- namely the benefits associated with the upgrade -- but the total renewables supply will be less than policy makers anticipated. One remedy would be to count only the incremental production that results from the upgrade. Other remedies would be similar to those discussed for mothballed facilities.

New fuel in existing facilities. Power plant owners could introduce eligible fuels in existing facilities that historically used ineligible fuels. (This situation is most likely to involve the introduction of biomass fuel into coal-burning facilities or landfill methane into natural gas-burning facilities.) The incremental benefit of the fuel switch will produce many, if not all, of the intended benefits of the RPS. But there are two issues to consider:

- Is it likely, or even possible, that a qualifying fuel currently in use at an existing facility (which is excluded from eligibility) would be shifted to a facility that did not historically use the fuel (making that facility eligible)? If so, since there would be no net gain, this loophole should be closed.

- Is it important to the state that new physical capacity be built in response to the RPS, or can the state's goals be met by existing facilities?

Parties debated the second question in Texas, where the legislature established a goal of increasing the state's renewable energy capacity by 2,000 megawatts by 2009. In regulatory proceedings, some parties argued that fuel-source conversions in existing facilities could be among the most cost-effective ways to achieve the legislature's capacity goal. The avoided capital expenses could be substantial, they argued, because such facilities already have access to the transmission and distribution network, and because they are likely to have the required permits.

Other parties argued that the point of the legislation was to provide for new capital investment in order to increase economic development in Texas and provide jobs, and to cause renewable energy technology costs to go down through the development of new capacity.[15]

The Public Utility Commission of Texas agreed with the latter arguments and drafted its regulations specifically to exclude existing fossil fuel plants whose owners retool the facility to use a renewable fuel (Texas Substantive Rule, 1999). Had the legislature stated the goals of acquiring environmental and fuel diversity benefits (exclusively or in addition to economic benefits), then there would have been clearer grounds for allowing renewable fuels to be introduced in existing facilities.

B. Should Projects Already Receiving Benefits from Other Policies Also Receive Benefits from an RPS?

A project's need for financial support will depend partly on the level of benefits it receives from other policies and programs. Here we discuss programs that benefit existing projects and programs that may benefit new or existing projects (or both).

1. Policies benefitting existing projects: stranded cost recovery and PURPA contracts

Most existing renewable resources are owned by nonutilities who have long-term PURPA contracts with utilities. Some question whether projects which have benefitted from PURPA also should benefit from an RPS.

Moreover, a utility's PURPA contract obligation often translates into purchase prices exceeding short-term market levels, thereby creating stranded costs upon the commencement of retail competition. Utility-owned renewable resources could also result in stranded costs. In this context, a key policy question is whether the project should receive RPS benefits if ratepayers are bearing the project's stranded costs.

---

[15] This argument is aimed at certain technologies that have production economies of scale, such as wind and solar technologies, as opposed to thermal biomass technologies that rely largely on the modification of conventional power plants.

An RPS policy designed to encourage only new projects avoids both these issues, since new projects will not have stranded costs and are unlikely to be PURPA projects. But an RPS policy aimed at existing projects must address a number of questions discussed next.

a. Projects with existing PURPA contracts

The strongest rationale for including existing renewables in an RPS is to increase its output or extend its economic life. Applying this rationale to an existing PURPA project, which already has received public benefits (in the form of a mandatory utility purchase at avoided cost), the award of RPS benefits should require a showing of future benefits, not obtainable without the RPS, sufficient to justify the RPS costs. A state would be justified in conditioning the RPS benefits on the project's continuing to provide those benefits.[16]

Imposing such a condition requires caution. First, the conditions must be voluntary with the project owner. PURPA preempts states from subjecting PURPA projects to any type of economic rate regulation. A state could not require PURPA project owners to open their books, reveal economic information about output or economic life, and on the basis of this compelled investigation make a judgment about whether to apply RPS treatment.

A second question concerns whether the project owner's receipt of RPS-related proceeds violates PURPA's avoided cost standard. The answer should be no. PURPA's avoided cost standard is a limit on what utilities (and their ratepayers) must pay, not on what a project owner may receive. Ratepayers must pay no more for power from PURPA projects than they would have in the absence of PURPA. As long as the state's RPS policy applies to non-PURPA and PURPA projects similarly, any additional ratepayer cost would flow from the RPS policy, not from the project's PURPA status.

Third, a state that includes existing PURPA projects within the eligible RPS category may not reduce the project's avoided cost payment to reflect the RPS premium. PURPA prohibits a state from changing an existing PURPA contract. As to future PURPA projects, the answer still should be negative. Avoided cost is based on the utility's non-PURPA purchase options. The cost of the non-PURPA options is not affected by the level of RPS premium received by the PURPA project owner.[17]

---

[16] A state would not necessarily have to require each generator to make this showing. The state instead could determine, based on evidence such as a decline in overall output of existing generators, that a particular class of renewable generator requires RPS assistance once fixed energy payments ended.

[17] The question has only limited relevance, because it exists only for new PURPA contracts, which will be infrequent. The question exists only for new PURPA contracts because PURPA preempts a state from altering the rates (or any other feature) of an existing contract. (Freehold, 1995)

Some may argue that making PURPA projects eligible for an RPS produces a duplicate benefit: once from the PURPA avoided cost payment and once from the RPS proceeds. The responding argument is that a project's PURPA payment, if it was calculated correctly, did not impose extra cost on the public because it equaled, but did not exceed, the cost the utility would have incurred in the absence of PURPA.

b. Projects with future PURPA contracts

Although new PURPA contracts are infrequent, they are legally possible as long as PURPA remains on the books. The PURPA obligation to buy from a qualifying facility still applies, therefore, to all of the following types of entities:

- in states which have not authorized competition, utilities that still sell as a retail monopoly; and,

- in states which have authorized competition, three types of entities:

  -- utilities that sell at retail as a default supplier,

  -- non-utilities that sell at retail as a default supplier, and

  -- utilities, affiliates and independent companies that sell as retail competitors.

Some argue that with wholesale (and in some cases, retail) competition, a renewable energy project should be able to find a buyer without using PURPA's mandatory purchase feature; thus a QF should have to choose between obtaining a PURPA contract and receiving RPS benefits. While this approach may have policy justification, it would be unlawful. Requiring a project to forfeit its PURPA right to obtain an RPS right would be preempted by PURPA's ban against discrimination. The discrimination exists because a non-PURPA project, unlike a PURPA project, would not have to give up some legal right to obtain an RPS right. The Court of Appeals for the D.C. Circuit outlawed similar discrimination when it reversed FERC's requirement, in its decision approving the PacifiCorp-UP&L merger decision, that a QF forfeit its QF status to be eligible for transmission access over the merged company's system. (Environmental Action v. FERC, 1991)

c. Projects affected by stranded cost treatment

Stranded cost is the unrecovered book cost of assets or obligations, to the extent this book cost exceeds market prices. Among the book costs are the costs associated with purchase obligations to renewable energy projects, both PURPA and non-PURPA.

Some have suggested that RPS treatment be unavailable to projects whose costs have been made recoverable under the state's stranded cost policy.[18] The rationale frequently stated for this treatment is to avoid duplicate payments from ratepayers to assist the same project.

A response to the argument of duplication is that stranded cost payment and RPS premiums are two different policies. Stranded cost payments compensate a utility for its sunk costs and obligations incurred to serve ratepayers during the pre-competition period.

An RPS has a different aim: to create incentives for prospective operation of renewable energy projects. Stranded cost policy focuses on the past; an RPS focuses on the future. Application of two different policies, one to the project's past and another to its future, does not equal duplication.

Duplication would occur if somehow a stranded cost policy compensated the utility for going-forward costs rather than sunk costs. A proper stranded cost policy would not do so, because going-forward costs are not stranded costs. Some confusion can exist where an existing contract mandates future payments (as many long term contracts do). Since the contract obligation is "sunk," i.e., unavoidable, the future payments should not be considered going-forward costs. Stranded cost treatment is appropriate.

In that context, the simultaneous award of RPS benefits is not necessarily duplicative. The question comes down to need. If the cash flow assured from stranded cost recovery makes continued operation economical, RPS benefits are unnecessary. If RPS benefits instead would increase operation or add to the project's economic life, then the RPS benefit is no less beneficial to society in this context than if stranded cost recovery did not exist.

d. For projects with financial need, who gets the benefits from the RPS premium?

If existing renewables are allowed to participate in an RPS, the RPS creates a new source of income -- tradable renewable energy credits[19] -- for existing generation facilities that was not anticipated at the time of the investment. Who should receive this income: the resource owner (which may or may not be the utility), the utility that purchases from the owner, or the utility's customers?

---

[18] For example, Texas' RPS rule makes ineligible for RPS treatment a facility whose above-market costs are included in any utility's stranded cost recovery mechanism. (Texas Substantive Rule, 1999)

[19] We speak of credits here because, if the RPS is not a tradable requirement, the benefits that derive from the RPS cannot be allocated to the resource owner. Without credits, the resource owner has no opportunity to derive more value from the sale of its energy to the utility because it has an obligation to sell under the terms of its existing contract. The utility could, however, resell the renewable power at a premium because the power will have RPS-compliance value to the ultimate buyer. Allocating benefits to the resource owner requires a tradable-credit approach.

Arguments for Allocating Credits Immediately to the Project Owner. If projects are operating under an existing contract, credits can be allocated by policy makers to either party. In most circumstances, the credits should be allocated to the plant owner, who took the initial investment risk and may now need the credit income to maintain operations. This approach assigns the benefits to the party most instrumental in preserving the existing level of renewables generation. The facility owner knows best what dollar flow it needs for operations, and therefore it is in the best position to bargain for the sale of its credits in the market. Allocating credits to the power purchaser also could create a "tilted playing field" with regard to contract buy-out negotiations.

Arguments for Allocating in Other Ways. Another approach is to allocate the credits to the utility purchaser, but to transfer the allocation to the generator after it exits its contract. This policy would encourage generators to exit the contracts, facilitating movement toward a "clean slate" in the new competitive market.

Several cautions are in order. As discussed previously, aiming such a policy only at PURPA contracts would violate PURPA's preemptive ban on discrimination against qualifying facilities. Also, to the extent the proceeds were retained by the utilities (rather than shared with ratepayers), this approach would create a market advantage for utilities, who would possess credits at no added cost. A remedy to this situation would be to designate a marketing agent to auction off the credits, applying the proceeds to reduce ratepayers' stranded costs obligation.

More directly, a reasonable argument for sharing some of the RPS proceeds with ratepayers rests on the traditional regulatory principle that reward should follow risk. For most utility purchase contracts, PURPA or non-PURPA, ratepayers have been required to bear the full risk and pay the full cost. Whether the cost was greater or less than market prices, state-set retail rates included the cost (with the exception of utility prudence findings). Standard regulatory ratemaking allows for the passthrough to the ratepayers of above-cost proceeds related to assets whose costs have been borne by the ratepayers. (DCCDC v WMATC, 1975) This treatment is particularly appropriate where the ratepayers are required, due to stranded cost treatment, to pay for obligations whose costs exceed the market. Thus, if the renewable project for which ratepayers bore the costs rise in value, the ratepayers should share in the rewards associated with their risks and costs.

Administration of the Benefit Allocation. Once the benefit allocation question is resolved, the question of administration arrives. Here are the possible scenarios:

- If the beneficiary is the project owner, there is no complexity: the owner markets the credits and receives the proceeds.

- If the beneficiary is the ratepayers, the project owner, utility or commission can appoint a third party to market the credits; or the project owner can market the credits and

remit the funds to the utility, which then can credit the ratepayers through the distribution charge.

Finally, since the treatment of the proceeds should vary with the facts, this issue is best administered by the state commission through a grant of discretion by the legislature.

2. Policies benefitting new or existing projects: public goods charges and others

There are a number of ways in which a state's RPS policy might relate to various other policies that also benefit renewable energy projects. These different relationships should be considered when a state determines whether a project that benefits from other policies will be eligible to qualify under its RPS. Even if these policies are not currently in effect, states should anticipate their adoption at some point in the future, perhaps by a neighboring state or the federal government.

This part first outlines some principles that policy makers might use in determining whether a project (existing or new) deserves simultaneous benefits from an RPS and another policy. We then discuss these principles in the context of specific types of policies, beginning with Public Goods Charge policies,[20] which a number of states have recently adopted.

a. Relationship of other policies to the RPS

There are two distinct ways in which policy makers might view a project that benefits simultaneously from the RPS and at least one other renewable energy policy: (a) the project is "double-dipping" -- i.e., the project is receiving more benefits than are necessary or deserved, or (b) the project is receiving as many benefits as were necessary to cause the project's development.

In distinguishing between the two effects, some questions to ask are:

- Would the developer have built the project absent the RPS or the other policy?
- Will developers build the type of project in the quantity wanted absent the RPS or the other policy?
- Will the benefits from the other policy(ies) give a particular project, or certain types of projects, an unfair competitive advantage in the RPS market?

---

[20] A Public Goods Charge is a fee placed on utility bills that creates a fund to support public benefits programs. PGC revenues may fund various types of programs, such as those which support renewable energy projects, energy efficiency services (which may include small renewable energy systems installed on customers' premises), and low income programs.

- Will allowing simultaneous benefits from the RPS and another policy increase total benefits, and are public costs and benefits commensurate? Or will simultaneous benefits result in the RPS producing windfall profits and insufficient public gain?

- Is the project owner able to benefit twice from the same kilowatt-hours?

b. Projects benefitting from public goods charge policies

Many states have adopted PGC policies without also adopting RPS policies. In this situation, there is a significant chance that PGC-supported renewables projects will find their way into RPS markets if RPS states do not take some type of preventative action. Without action, the state risks creating unfair competitive advantages, inefficiency, and a diminished total quantity of renewables.

Consider the above principles and questions in relation to the following possible situations with both PGC and RPS policies in effect:

i. Suppose State X has an RPS and neighboring State Y has a PGC policy. State Y awards PGC funds to the least-cost renewable energy project. The project funded receives a sum of funds that, when added to the project's market revenues, produces profit sufficient to justify construction. The subsidy allows the project to sell its output into State X's RPS market at a price that beats the market. The project thus displaces additional capacity that other developers would otherwise have built in response to State X's RPS market.

   In this case, allowing a project to benefit simultaneously from State X's RPS and State Y's PGC is inefficient because the RPS policy produces no results except windfall profits for the project's owners. Had State X made ineligible any project that receives PGC funds, more renewable energy capacity would have been built (as separate responses to the PGC and RPS policies) and the residents of both states would have received more public benefits.

ii. State X has a PGC to support technologies that would not be competitive under State X's RPS in order to leverage a relatively small quantity of those technologies into the RPS market. Developers of the technologies bid to receive PGC funds, taking into account the revenues they are likely to receive in the RPS market. Here, allowing developers to benefit from both policies produces gains: State X achieves the commercialization benefits it was seeking with its PGC and avoids windfall profits because all bidders take into account both policies. The same result occurs if different

states sponsor the two policies, or if the policies are sponsored by a state and the federal government.

When a single state has both PGC and RPS policies in effect, it can fashion the policies in a number of ways to ensure added benefits and avoid windfall profits:

- It can use PGC funds to leverage emerging (or otherwise uncompetitive) technologies into the RPS market, and not fund projects that would be competitive in the RPS market;

- Under RPS or PGC rules, or both, it can make any PGC-funded projects ineligible under the RPS so that benefits are completely additive; or

- It can require PGC-funded projects to return any revenues generated under the RPS to the PGC fund.[21] In this situation, however, projects would have no incentive to seek RPS revenues.

But states cannot control the PGC policies of other states. Moreover, a state's own PGC and RPS policies may be implemented by two different agencies, complicating policy coordination. In these cases, the state (or state agency implementing the RPS) can either:

- make no eligibility restrictions based on PGC funds and hope that other states (or the state agency implementing the PGC) will fashion their PGC policies to avoid undesirable effects, or

- take action to prevent undesirable effects. Such action could be making ineligible for the state's RPS any projects that receive direct-cash production incentives or capital

[21] If the RPS is based on tradable credits, a similar option would be to require the generator, as a condition of PGC funding, to surrender all credits to the PGC administrator, which could then retire the credits or sell them and reimburse the PGC fund.

subsidies[22] from any state or federal government source.[23,24] Alternatively, the state could specify that low-cost technologies that are likely to be competitive under the RPS without added public support will be ineligible for the RPS if they also receive direct-cash production incentives or capital subsidies from a government source.

c. Projects benefitting from other types of policies

Here we consider the relationship between a state's RPS and tax credit policies, RPS laws in other jurisdictions, and distributed generation policies.

Tax credits. If a tax credit is available to a particular type of project but has proved insufficient, on its own, to cause the development of such projects in the desired quantity (or to keep existing projects in operation), then that type of project should be eligible under the state's RPS. Providing a tax credit for a particular resource or technology that has unique benefits not associated with other renewables[25] is one way of encouraging the development of that resource if it would not otherwise be sufficiently competitive in the RPS market.

The converse situation also deserves consideration. If a tax credit is on the books, but the technology that it targets will be sufficiently competitive under an RPS without the tax credit,[26] then policy makers should consider eliminating the credit if it is under their jurisdiction. If the tax credit is not under their control, and if developers would not build the technology in sufficient quantity absent its eligibility under the RPS, then policy makers should not penalize the technology due to the tax credit.

---

[22] Focusing on direct-cash production incentives and capital grants will avoid excluding projects that receive incidental forms of government support, such as tax credits, property tax relief or resource assessment. These forms of support are unlikely to be large enough to have caused a project's development on their own.

[23] If a state makes all PGC-funded projects ineligible under the RPS, including projects funded by the RPS-state's own PGC, the law would not be vulnerable to challenge based on the U.S. Commerce Clause. If a state makes only projects supported by other states' PGC funds ineligible for its RPS, then the state increases its risks under the Commerce Clause (even if the state's own PGC has been fashioned to eliminate undesirable effects while others have not). See part II.C in this chapter for related discussion.

[24] If a project receives PGC subsidies on a production (cents per-kWh produced) basis, then eligibility rules could bar the project from RPS eligibility for as long as the project receives subsidy payments. If the project receives PGC subsidies on a capital basis (up-front cash payment), then it could be barred from RPS eligibility for several years of operation.

[25] For example, using agricultural wastes in electricity facilities might offset the open-field burning or landfilling of these wastes.

[26] The technology may even dominate the RPS market if other technologies do not receive such tax credits.

RPS policies in multiple states. A resource used to satisfy the RPS obligation of a retailer operating in one state should not be eligible to satisfy the RPS obligation of a retailer in another state. This situation would result in counting the same kilowatt-hours twice. In practice, however, a prohibition on the double-use of resources will be difficult to enforce without a single regional accounting system in place to track generation attributes (such as fuel type), and will be particularly difficult if the two states use different accounting systems (contract-path and tradable credits). (This issue is discussed in Chapter Six, part II.)

Distributed generation (DG) policies. DG policies reward decentralized resources -- both renewable and nonrenewable -- for avoiding (or deferring) the need for additional transmission and distribution capacity.[27] On their own, DG policies are unlikely to cause the development of renewable energy resources in significant quantity because (at least under present circumstances) they are generally insufficient to close the gap between the cost of distributed renewable energy projects and the benefits received by the project's owner. This can be true for fossil-fuel DG options, but is especially true for renewable DG technologies. This condition suggests that renewable energy projects that benefit from DG policies should also be eligible under the RPS, because more distributed renewable energy projects are likely to be built as a result.

Eligibility is also appropriate because the two policies target different benefits: the RPS policy accounts for the value of the "renewableness" of the project's fuel, while the DG policies reflect the locational value of the project, which non-renewable projects can also provide.

C. Should Generators Have to Meet Location Requirements?

Renewable resources offer many benefits: environmental, resource diversity, technology advancement, and economic development. Hoping to maximize the benefits for their home state, state policy makers may consider geographic location restrictions as part of their eligibility requirements. These geographic restrictions can be of several types. Eligibility may be restricted to:

- resources located within the state[28] or region;

---

[27] Distributed generation policies might include net energy metering, transmission line extension and upgrade policies that consider DG as an alternative, and distribution service rules governing the interconnection of DG systems.

[28] See, e.g., Nev. Rev. Stat. sec. 704.989(7) (defining "renewable energy resources" to mean wind, solar, geothermal and biomass energy resources *in this state* that are naturally regenerated; defining "renewable energy system" to mean an energy system *in this state* that utilizes renewable energy resources to produce electricity or solar thermal energy systems that reduce the consumption of electricity that was installed and commenced operations after July 1, 1997 (emphasis added).

- resources that can demonstrate that their output is physically delivered to the state or region;[29] or

- resources that can demonstrate that their output is sold to consumers by documenting a contract path between the generator and consumers within the state or region.[30]

Each of these options invites questions of efficacy, constitutionality or both. Another option -- one both efficacious and less vulnerable to constitutional challenge -- is to restrict eligibility to renewable generators, wherever located, that *produce benefits* for the RPS state. Under this approach, the state would, for example, condition the eligibility of renewable energy generators upon a showing that the generator provides environmental and fuel diversity benefits to the state.[31] This approach also avoids the need to demonstrate a contract-path between the generator and in-state consumers, thus preserving one of the benefits of an RPS obligation that can be satisfied by purchasing tradable credits.

The attractiveness of location restrictions arises from a simple political point: for a state's RPS policy to win public support, its benefits must accrue to the state. A state RPS policy increases the cost of electricity to consumers in the state because it imposes on retail sellers within the state a cost they otherwise would not bear. Absent a geographic restriction on eligible renewable generators, there could be a mismatch between costs and benefits: the costs are imposed within the state but the benefits can flow to many states, which become free-riders on the first state's investment. For example, a retail seller in Maine might purchase renewable energy from a generator in California, producing few benefits for Maine while increasing the cost of retail service in Maine. A rational political actor representing rational voters will not support such a mismatch (See Engel, 1999, at 270-71).

The efficacy of in-state restrictions is uncertain, however. The chief reason is that key facets of RPS policy -- electricity flow, pollution reduction, economic development, technological development -- have externalities that do not honor political boundaries. Thus it is difficult to predict whether restrictions other than those based on in-state benefits will in practice benefit the enacting state. It is also hard to tell whether resources located outside of the state will produce the same, fewer, or greater benefits for in-state consumers. A few examples illustrate the issue.

---

[29] See, e.g., Me. Rev. Stat. Ann. tit. 35, sec. 3210 (West 1998) ("As used in this section, the term 'renewable resource' means a source of electrical generation that generates power that can physically be delivered to ... the New England Power Pool").

[30] See, e.g., Mass. Ann. Laws ch. 164, Sec. 11F(a) ("Every retail supplier shall provide a minimum percentage of kilowatt-hours sales to end-use customers in the commonwealth from new renewable energy generating sources ...").

[31] In Appendix A, we explain that a state can create "safe harbors" so that eligibility need not exclusively be determined on a case-by-case basis.

Electricity flow: Electric current flows over an interstate, interconnected grid. In this regard, renewable and non-renewable electricity do not differ. Except in the rare circumstance of a dedicated transmission and distribution system connecting a specific generator to a specific load, a customer cannot physically receive electricity from a specified generator. While the customer can *contract to pay for* electricity from a specific generator, that generator's output will flow into the grid and commingle with the output of all other generators in the grid. The path of this commingled flow to any specific customer is determined by physical laws and their application to the physical characteristics of the grid, not by the contractual arrangements. A generator's output is more likely to flow to the load closest to it, which will not necessarily be a load within the enacting state. Therefore, limiting RPS eligibility to in-state resources does not necessarily mean that the output of those resources actually flow to in-state customers. Similarly, limiting RPS eligibility to resources that sell to in-state customers does not mean that the generation *contractually* serving them will be the generation *physically* serving them.

Environmental benefits: The environmental benefits available to the enacting state's citizens depend on the type and location of the resources that are displaced within the market serving the state. A state's cost-benefit analysis therefore must determine what resources will be displaced *by in-state and out-of-state renewables* (in either case, the displaced resources could well be located outside the state), and whether that displacement will cause net improvements in the state's airsheds, land, and waterways.

Consider differently situated states, for example. A renewable energy plant built in a small New England state to serve the state's RPS requirement may cause reduced production at a coal plant in Ohio, thereby reducing air emissions that would have drifted into the airshed over the New England state. The same result would be achieved if the plant were built next door to the New England state, suggesting a policy basis for a regional, rather than an in-state, location requirement. In the state of Texas, however, where environmental impacts and the energy market associated with those impacts are more self-contained, an in-state restriction may have a strong basis on policy grounds.

Carbon reductions, of course, reduce the global environmental risk associated with climate change and therefore renewable energy facilities will benefit the state (along with all other states) regardless of their location.

Resource diversity benefits: Renewable energy provides various benefits associated with resource diversity. These benefits include: promoting competition among fuels and among retailers that utilize different fuels, improving system reliability, and contributing to electricity price stability. To produce these benefits, the RPS eligibility requirement need not necessarily limit the location of generation to the enacting state, because regional location also can produce

many, if not all, of these benefits for the state.[32] Moreover, with an in-region location requirement, policy makers can presume that the diversity benefits will benefit the state without requiring a contract path between the generator and in-state consumers. The state is served by the regional market, whose new diversity improves the lot of in-state residents. Moreover, even a resource contractually tied to a state would not necessarily stabilize the price for consumers in that state because it may not be a fixed-price contract.

Technology advancement benefits: To produce these benefits, the RPS need not contain any geographic limits, because the technologies that are eligible under the RPS will be advanced irrespective of the location at which they are installed. In this case, as with the reduction of carbon emissions, it is impossible not to create free-rider benefits because all consumers will benefit from the technology advancement that occurs.

Economic development benefits: To maximize direct economic benefits to the state (such as the employment and taxes associated with the construction of new facilities, rather than the indirect economic benefits associated with resource diversity), eligibility criteria would have to include a requirement that facilities be located within the state or, in the case of some benefits (e.g., jobs), within a certain distance outside of the state.

Along with the practical problems with attempting to match geographic cost to geographic benefit are the legal problems. Location requirements raise questions of constitutionality under the Commerce Clause of the U.S. Constitution. We discuss these legal issues in more detail in Appendix A. The main legal principles are as follows:

- Limiting RPS eligibility to generators located within the state is likely to violate the Commerce Clause because it is a facial discrimination against out-of-state goods.

- Limiting RPS eligibility to generators located within a region that includes the enacting state raises the same problem; the law still discriminates against all of the non-region states.

- Conditioning RPS eligibility on the generator providing benefits to the state is less risky constitutionally than conditioning eligibility on location. One exception would be conditioning eligibility on generators providing in-state economic development benefits, which would be facially discriminatory. A state may, however, take location into account in determining whether there are benefits to the state (such as Maine

[32] The state also receives some benefits from out-of-region renewables, because they will reduce overall demand for fossil fuel supplies.

determining that a California-based generator should be ineligible), without running afoul of the constitutional prohibition against discrimination based on location.

- An in-state consumption requirement for RPS eligibility does not escape constitutional risks, and also raises serious practical issues because of the difficulty of tracing the flow of electrons from a particular generator to a particular consumer.

- An in-state sales requirement, while it might be ineffective as a means of ensuring that the enacting state receives benefits, would not be facially discriminatory because any generator, regardless of its location, that can establish a contract-path to the enacting state would be eligible.[33]

D. How Can Policy Makers Resolve Competing Policy Goals?

The different possible RPS policy objectives -- resource diversity, environmental benefits, technology advancement, economic development -- can sometimes compete with one another. In some cases, policy makers can accommodate different objectives by designing the RPS with a resource "tier." In other cases, they may prefer to adopt a complementary policy measure or reconsider the RPS approach altogether.

1. Structure the RPS with a resource tier

"Resource tiers" (or "technology bands") require retail sellers to meet a certain fraction of the RPS obligation with a subset of a larger group of eligible resources.[34] For example:

- New Jersey established a two-tiered standard with two sets of eligible resources. Class I resources include wind, solar, landfill gas and "sustainable" biogas, geothermal, wave, tidal, and fuel cells using any fuel. Class II resources include hydropower up to 30 MW and refuse that complies with certain environmental standards. One tier is open to "Class I" and "Class II" resources and begins at 2.5 percent of total retail sales, remaining flat at that level. The second tier is open only to "Class I" resources and begins at 0.5 percent, rising gradually thereafter.

---

[33] In Appendix A, we discuss two additional types of location restrictions. We explain that a U.S. domestic content requirement, imposed by a state, will not survive review under the Foreign Commerce Clause of the Constitution. And we explain the Constitutional risks associated with limiting eligibility based on whether a resource is located in a state that has opened its markets to retail competition.

[34] Note that this allows technologies in the subset to compete for the rest of the obligation if and when they become more competitive.

- Nevada established an RPS in which one-half is open to wind, solar, biomass, and geothermal resources, and one-half is open only to solar resources.

Adding a resource tier allows policy makers to accomplish two distinct goals with the RPS that a uniform RPS requirement could not meet. In a two-tiered standard, for example, one tier (the larger, "base" tier) can achieve resource diversity in the electric system at the lowest cost. The second, smaller tier may advance a set of higher-cost technologies that policy makers deem to have significant long-term development potential which would not be deployed in sufficient quantity absent the second tier.

A state might also fashion a base tier to coincide with the amount of renewable resources that are already serving the state, while limiting a second tier to new resources. In contrast to a standard that starts at the current level of renewable resources and increases from there, a separate tier for new resources would protect new resources in a situation where they would face competition from lower-cost existing renewable power facilities operating in and serving surrounding states. Without a separate tier for new resources, existing resource owners could direct power sales (or tradable credits) to the RPS state, filling any additional demand for renewable power created by the RPS and preventing any additions of renewable energy to the system. In such circumstances, however, creating a two-tiered standard risks incurring policy costs that exceed the policy benefits of the base tier (see Chapter Three, part II.A). An alternative would be a single RPS requirement that excludes existing resources.

2. Adopt companion policies to the RPS

Instead of trying to meet various goals with an RPS policy, a state can adopt complementary policies targeted to specific objectives. For example, policy makers could promote distributed solar and small wind systems with net metering laws and favorable distributed generation policies; waste biomass could be promoted as a power plant fuel through tax benefits; and public goods charges could fund research, development, and commercialization programs. These companion policies may close the cost gap between different renewable resources, allowing higher-cost resources to participate in the RPS renewables market. (Also see part II.B earlier in this chapter, discussing the relationship of the RPS to other policies.)

3. Reconsider the RPS approach

If, in the process of designing an RPS, it becomes clear that the renewables market is being partitioned or reduced in size to the point where those provisions will substantially compromise competition and market efficiencies, other approaches should be considered. A market-based strategy that requires the involvement of all retail sellers makes sense only if the policy objective is to alter the resource mix significantly and to allow the market considerable flexibility in meeting the objective. If the

policy objective is to promote renewables in a more marginal way, or to advance a few particular technologies, then other approaches may be better suited to the task.

E. What Special Issues Are Associated with Specific Technologies and Fuels?

1. Unique characteristics of hydropower

Hydro stands apart from other renewable energy resources in many respects:

Technological maturity. One of the earliest sources of electrical generation, hydropower technology is fully mature. The primary technological advancements that might be expected under an RPS relate to mitigating environmental impacts, rather than improving conversion efficiencies or reducing costs.

Extensive development. Hydro resources have been extensively developed compared with other renewable resources, representing approximately 10 percent of the U.S. electricity supply vs. less than 2 percent for all other renewable resources combined. However, sites are still available for development, including totally new sites, upgrades or retrofits at existing sites, or placement of generators at existing non-power sites, such as existing irrigation dams. The Department of Energy has estimated that there are 5,677 undeveloped sites with a potential capacity of 30,000 MW that would also meet environmental, legal, and institutional constraints (U.S. Dept. of Energy 1998).

Practical RPS design issues. Because it has been so extensively developed, hydropower is more likely than other resources to create practical problems when policy makers seek to make existing resources eligible under the RPS. (This problem was described in part II.A earlier in this chapter.) In particular, the problem would arise when a state wishes to provide an economic boost to at-risk hydro plants serving the state, but have difficulty doing so because of a large available supply of economically stable hydro resources in the region. Policy drafters would need to take care to target those at-risk hydro plants while not inadvertently helping economically stable ones.

Environmental concerns. Though hydropower facilities have important environmental benefits -- namely, that they produce none of the air emissions or wastes associated with conventional power plants, they can cause significant damage to watersheds, river ecosystems and fisheries.[35] Environmental drawbacks are particularly an issue with larger facilities and

[35] Though other renewable resources also have environmental impacts, none so uniquely affect a limited public resource such as waterways.

facilities with impoundments, as opposed to certain types of run-of-river hydropower facilities,[36] though these impacts are not exclusively a function of size or impoundment. Environmental impacts can always be mitigated to some degree. Because of these possible variances among hydro facilities, segmenting hydro resources based on size or type will not necessarily correlate with degree of environmental damage. A case-by-case review for environmental "acceptability" may be necessary.

Low operating costs, but high environmental mitigation costs. The cost to operate an existing hydro generator is usually low. Frequently, however, regulators or courts have placed limits on generators' use of the water "fuel." Examples: environmental regulations may require dams to "spill" water to increase stream flows; water rights may cause the diversion of water from the generator; and regulators may require costly new environmental mitigation measures as a condition of relicensing. New hydro sites can also be costly to develop due to environmental mitigation costs. Designating hydro as an RPS-eligible resource will help hydro owners pay these costs and thus could help facilities maintain production levels, remain in operation, or commence operation.

Cross-subsidy concerns. In many cases, the generation of electricity is only one of many purposes for building hydro facilities. These other purposes include flood control, irrigation, water storage, and recreation. These purposes may be associated with large government subsidies. Including these types of hydropower within an RPS introduces the possibility that payments to hydro that result from the RPS will cross-subsidize these other uses of the hydro facility, rather than the energy aspect, as intended. Another concern is that some hydro facilities may gain an unfair competitive advantage against other resources due to government-derived benefits.

Variation in output. Hydropower generation can fluctuate significantly from year to year due to variations in precipitation. While other renewable resources, particularly wind and solar, also vary, year-to-year variations in output are typically within 25 percent, while hydro output can vary by 200 percent or more.[37] Large annual fluctuations would make it difficult for retail suppliers to meet a fixed standard each year while providing a predictable market for

---

[36] Some run-of-river facilities do not divert the flow of water out of the stream bed, while others divert the flow from the stream-bed to a generation facility. In both cases, inflow equals outflow, as compared with the losses that occur through evaporation when water is impounded behind a dam.

[37] For example, in California, between 1990 and 1994, under 30-MW, non-utility-owned hydro output varied by a factor of almost four and (typically larger) utility-owned hydro resources fluctuated by a factor of almost two. In the same period, Pacific Northwest hydro imports into California varied by a factor of two. By contrast, production from each of the other renewable energy resources serving California (geothermal, biomass, solar, and wind, both utility and non-utility) varied by 15 percent to 35 percent.

renewables. Crediting hydro users for the resource based on a facility's historical average production could address the problem.

Depending on specific state circumstances, these characteristics might provide a strong rationale for excluding hydro resources from eligibility under the RPS, or for restricting eligibility based on specific characteristics.[38] If hydro is included, drafters of the law must take particular care to ensure that the definition of eligible resources is sufficiently strict to prevent the unanticipated entry of a significant quantity of hydropower into the RPS market, which could prevent the development of other renewable energy resources.

2. Facilities using eligible and ineligible fuels

For purposes of RPS eligibility, there are several possible ways of treating facilities that use a mix of qualifying and non-qualifying fuels, including the following:[39]

Generators that use up to a certain significant percentage of non-qualifying fuel qualify as 100 percent eligible. This rule parallels PURPA, where 100 percent of the output of a generator using up to 25 percent fossil fuel qualifies as eligible. Consistency with historic requirements can be important where a state intends the RPS to support existing mixed-fuel facilities under its RPS.

Generators using a minimal percentage of non-qualifying fuel qualify as 100 percent eligible. This rule would accommodate thermal renewable energy plants, such as those using biomass fuels, that use small amounts of natural gas to facilitate plant start-up and flame stabilization.

Only the energy generated by qualifying fuels qualifies. The significant advantage of this option is that it permits efficient combinations of fuel usage and only the portion of eligible fuel gets credit under the RPS. In this case, however, regulators will need to decide two things: (1) how to measure the contribution that the eligible fuel has made in the electrical output, and (2) if an emissions standard is set for such plants, whether the standard applies to the entire plant's output or only to the emissions associated with the qualifying fuel.

---

[38] Note that pumped hydro storage facilities should be excluded in any case because they are storage devices rather than sources of energy. Pumped hydro facilities use energy produced by other generators to pump water uphill. These generators may or may not rely on renewable energy sources.

[39] Also see the "new vs. existing" discussion of mixed fuel facilities in part II.A.3 earlier in this chapter.

3. Problems of terminology

When crafting the definition of eligible (or ineligible) resources and/or technologies, there are several important reasons why policy makers should avoid terms whose meaning is vague. The first reason is to ensure that the resources that are ultimately developed are consistent with the intended policy objectives. Second, the use of vague terms could upset the intended supply-demand balance of renewable energy, potentially resulting in an obligation that causes no change in the status quo, or that is less effective or more costly than policy makers anticipated. Third, in order to support investments in their facilities, project operators and developers need to know with certainty whether or not their facility will benefit under the RPS. Investors must also have confidence that definitions of eligibility are sufficiently strict that the universe of possible competitors is certain. We discuss some specific terms below (also see discussion of terminology associated with "existing" resources, part II.A.3 earlier in this chapter.)

"Biomass." The term "biomass" is a very general one that can be interpreted to include a wide variety of resources, such as:

- primary biomass resources, such as whole trees and crops grown specifically for energy purposes,
- wastes generated by various forest products industries or in agriculture,
- urban wood wastes (some of which may be contaminated with toxic materials),
- municipal solid waste (i.e., garbage),
- landfill gas, and
- "black liquor," a by-product of pulp and paper production used on site to generate power for on-site consumption or sale.

These fuels can be used in facilities whose technologies have widely varying emissions rates and energy conversion efficiencies. Unless all of these fuels and technologies are consistent with policy objectives, defining eligible biomass fuels and technologies more specifically will be necessary. In any case, all existing resources that fall within the definition should be considered when policy makers establish the initial RPS percentage requirement.

"Advanced," "Emerging," "Sustainable," and "Low Emission." These terms have no commonly accepted definition. Their use, therefore, introduces ambiguity. In their place, use terms that

refer more specifically to the intended technologies (such as biomass gasification or fuel cells) or to their specific environmental characteristics (e.g., a defined emissions rate).

"Green." Although the term "green" has marketing appeal, it has no accepted definition. For example, many environmental groups consider natural gas to be less environmentally harmful than coal, and therefore some may consider it "green." Others may view "green" as limited to renewables, or certain types of renewables. Therefore, RPS laws should avoid the term.

Energy vs. Electricity. Unless specified as electricity generation, the term "renewable resources" and more specific types of renewable energy resources could mean energy from these resources that has not been converted to electricity. Such energy could come from geothermal heat pumps, solar water heating systems, biomass used as a heating fuel, and landfill gas that is upgraded and supplied to a gas pipeline. As long as the use of the energy resource fits with the intended policy objectives, there is no problem. But policy makers should consider the issue, as they did in two states that made specific provisions for renewable energy:

- Nevada specifically defines qualifying solar energy systems to include both electricity generating systems and thermal energy systems that reduce the consumption of electricity (Nevada Statute, 1997).

- In Texas, landfill gas that landfill owners directly supply to a gas distribution system operated by a municipally owned electric utility qualifies under the RPS. The state awards tradable credits to such facilities based on a gas-to-electricity conversion factor (Texas Substantive Rule, 1999).

As the Texas example indicates, some conversion factor needs to be used to award credit to energy resources in terms of units of electricity.

Combined Terms. When eligibility criteria include combine terms, such as "low-emission, advanced technologies," it is ambiguous whether one or both terms must characterize a facility in order for it to be eligible. Using the word "and" or "or" between the terms will eliminate the ambiguity.

Chapter Four:
Translating the Statewide Renewables Goal Into Retail Seller Obligations

After the state determines the type of renewable energy resources it seeks and defines its renewable energy goal, the next steps are to determine:

- which entities the state will oblige to fulfill its goal,
- how it will divide the goal among these entities, and
- whether it will require each obligated retail seller to divide the required amount of renewable energy equally into each of its products, or be allowed to meet the obligation on a portfolio-wide basis without regard to product content.

We discuss these steps in this chapter.

I. WHO SHOULD HAVE THE OBLIGATION TO BUY RENEWABLES?

Here we discuss why states must place the RPS obligation on retail sellers, why default suppliers should be included in this group, and why self-generators should also carry the obligation.

A. States Must Place the Obligation on Retail Sellers

Unlike the federal government, states are limited to the option of placing the RPS requirement on retail sellers, rather than wholesale generators. Retail sellers clearly fall under the state's jurisdiction, while power pools and wholesale generators that do not sell at retail are not. The Federal Power Act vests the Federal Energy Regulatory Commission (FERC) with exclusive authority over the sale of electric power at wholesale and the transmission of electric power in interstate commerce.

A state RPS requirement as envisioned in this paper would leave with the retail seller the decision whether to build the renewable generator itself, buy renewable power from others, or buy renewable credits. By not requiring a purchase at wholesale and by not specifying rates, an RPS placed on retail sellers avoids legal uncertainty related to the Federal Power Act. The state only defines the mix of fuel sources that the retail seller may deploy.[40]

[40] For more discussion on this issue, see Hempling and Rader, 1996.

The state could also place the obligation on retail consumers, but this option either places an unreasonable burden on consumers or, in practice, results in transferring the obligation to the retailers that supply the consumers.

In applying the RPS obligation to retail sellers, therefore, the primary question is whether the state should apply the obligation to all retailers or some subset. The following three principles argue for applying the obligation to all retailers, in whatever form they take.

Cost responsibility for renewables: An RPS program seeks to create benefits for the entire state, whether the benefits sought are environmental, fuel diversity, economic development or technology development. The matching of these benefits with costs is already difficult because the benefits of the program leak out into other states that do not share the costs.[41] To exempt a subset of retailers is to increase the cost imposed on the balance of retailers and their consumers when all consumers receive the benefits. A program that aims to use competitive forces to stimulate a new industry should not have at its core a prominent element of free-ridership.

Entry barriers in the new competitive markets: Entry into a new market always carries a cost. Students of competitive markets focus not only on absolute entry cost, but on *entry cost differences* between the incumbent and the newcomer. A new competitor will be more comfortable incurring an entry cost if all the competitors face a similar cost and less comfortable if some competitors do not. It is especially important to consider this point if the state is contemplating an RPS exemption for incumbent utilities providing default service (see below).

Economic efficiency in retail customer shopping decisions: The theory of retail competition is that efficient consumer decisions will yield efficient production decisions, making the economy more productive and more conserving of scarce resources. The most efficient producer has the lowest costs and can offer the lowest price; rational consumers will select the low-cost producer. This theory fails in practice if cost differences among retail sellers result not from differences in efficiencies but from differences in statutory obligation. To exempt some retailers is to bias the customer toward those providers, even if their actual production costs are higher than their competitors'.

States might contemplate applying the RPS to retail sellers in service territories that are open to retail competition, and exempting utilities operating in service territories closed to competition, particularly municipal or cooperative utility territories. But the above three principles also apply here. Although there is no direct competition among retailers within the exempted service territory, regulated, municipal, and cooperative utilities compete with each other as a form of providing retail electric

---

[41] For more detail on this issue, see Chapter Three, part II.C, which explains that constitutional considerations prevent most states from limiting the RPS to generation located within the enacting state.

service. Moreover, the customers of each utility will benefit from their neighboring customers' investments in renewable energy. The RPS should therefore apply to all retail providers in whatever form they may take.

In a market that is not open to competition at the retail level, there is only one retail seller in each service territory: the vertically integrated utility. Rather than applying the requirement to the utility per se, however, the state should apply the requirement to retail sellers generally so that, should lawmakers introduce retail competition later, the RPS can continue without disruption. Using a more generic definition of retail seller will ease any utility concerns that the RPS might place it at a competitive disadvantage in future retail markets. Anticipating the application of the RPS under possible new market structures will also increase renewable energy investors' confidence in the longevity of the requirement.

B. Default Suppliers Should Not Be Exempted

To exempt a subset of retail competitors, as noted above, is to remove cost responsibility for renewables from those who benefit; to create entry barriers in the competitive market; and to reduce economic efficiency in retail customer shopping decisions. When it is the default supplier[42] that is exempted, the effects are the same, but magnified. Lawmakers should therefore apply the RPS obligation equally to default suppliers.

In the new retail markets, default service and competitive service serve the same pool of potential customers. If the new entrant must incur the RPS obligation but the default supplier does not, the asymmetrical cost could cause the newcomer to avoid the market or be less successful in it. In either case, competition suffers. While the facts in each state will vary with the size of the RPS program relative to the number of shoppers (as well as nonprice features of the default program that might make it more or less attractive), exempting default suppliers would be a shaky start to a competitive market.

Regulators must take care, however, to provide for the recovery of RPS costs in default service rates, which can be done in the following ways.

Traditional rates: Where the default supplier's rates are set on a traditional cost-of-service basis, regulators can estimate the cost of compliance in advance and place it in the regulated cost of service. Alternatively, particularly if the supplier purchases tradable credits in the market, the cost can be subject to an automatic passthrough like a fuel adjustment charge. Like any regulated cost, regulators can address at rate case time whether the default supplier acted prudently in its purchases.

---

[42] Most state retail competition statutes make a "default" or "standard" service option available to customers who fail to shop for electricity or who cannot find a willing supplier. The expectation, at least in the short run, is that many small customers will fail to shop and therefore will take service from the default provider.

Bid price: In some states, prospective suppliers will bid for the role of default provider, and will be selected based on their price bid. Provided the bidders know the parameters of the RPS program in advance, they can incorporate the costs into the bid. In this way, customers benefit from competition-induced efficiency twice: once from the RPS itself, which uses competition to select generators of renewable power; and again from the competition among default suppliers, whose price and profit margins will depend on their ability to minimize their cost of purchasing renewables.

Rate caps: A number of states have legislated rate caps on default service. These caps should include the anticipated cost of the RPS obligation. Problems could arise if caps are based on pre-competitive regulated rates or purchase contracts which necessarily did not reflect RPS costs.

The interaction between the RPS and default service must be considered in advance. If it is not, there is no easy solution to the problem that the interaction creates. To force a regulated entity to bear costs while preventing the entity from recovering those costs is constitutionally risky, unfair to the regulated entity, and inefficient, since it seeks to obtain for the public a benefit at no cost. In this situation, the only workable solution is to amend the statute to allow the supplier to recover the RPS costs.[43]

C. Self-Generators Should Also Carry the Obligation

As with default providers and providers in service territories closed to competition, the principles set forth above suggest that self-generators [44] should share in the cost of the RPS. For practical reasons, however, it would be reasonable to limit the application of the RPS to self-generators above a certain size, such as one megawatt.

Applying the RPS to fossil-fuel self-generation is logical if the state's goals for the RPS include reducing dependence on fossil fuels and associated environmental problems. In addition, on-site, self-generation competes with centralized generation; exempting the former from the RPS would therefore give self-generators an unfair competitive advantage. Moreover, the owner of the self-generation facility will benefit from the effects of the RPS in improving environmental quality and reducing demand for fossil fuel.

By the same token, self-generators that use eligible renewable fuels should be exempt from the RPS because they do not contribute to the problems that the state seeks to mitigate with the RPS. If

---

[43] Although some have proposed adding RPS costs to stranded costs (where the default supplier is the utility), the RPS compliance cost is not a stranded cost because it is not a pre-competition obligation that is not recoverable under competition.

[44] A self-generator is a customer who supplies his own power using a generation facility located on the customer's site. Some generators also deliver excess power into the grid.

the generator itself qualifies for tradable credits under the RPS and obtains credits, however, it should be subject to the RPS.[45] Otherwise, the consumer would not end up bearing his fair share of RPS costs.

Basing the RPS on a system of tradable credits is especially important if the RPS applies to self-generators. Otherwise, in supplying itself with renewable energy, a self-generator's options will be limited to generally more costly on-site renewable energy facilities.

II. HOW DOES ONE ALLOCATE THE STATEWIDE GOAL TO THOSE HAVING THE OBLIGATION?

The state must apportion responsibility for meeting its overall renewable energy goal among all of the entities that it obligates to help meet the goal. The method of apportionment will differ depending on whether the state establishes a percentage or a fixed renewable energy goal, and whether all or only a subset of entities have an obligation to help meet the goal. In addition, the state must determine how to factor line losses into the obligation.

A. Method of Apportionment

If the state's overall goal is to supply *a percentage* of its total electricity consumption with renewable sources, and if all entities selling electricity to consumers share in the obligation -- i.e., all competitive retail sellers, default suppliers, municipal and cooperative utilities, and large self-generators -- then lawmakers can easily translate the statewide goal into the sellers' obligation. If the state's goal is 7 percent, for example, then, because the obligated entities together supply 100 percent of the state's electricity consumption, the size of each of entity's obligation also will be 7 percent.

If policy makers choose to exempt one or more retailers, then, to achieve the state's overall renewables goal, the size of the obligation on the balance of retailers must increase to compensate.

When the state sets a goal of achieving a *fixed amount* of renewable energy, then regulators would apportion this fixed amount among retailers according to their market share.[46] If the goal is to achieve one billion kilowatt hours (kWh) from renewable energy sources, for example, then a retailer that has supplied 60 percent of the state's electricity over a year would be responsible for 60 percent of the renewable energy goal for that year, or 600 million kWh. This apportioned amount of

---

[45] To demonstrate compliance with an RPS obligation of 5 percent, for example, the renewable self-generator could retain 5 percent of its credits and submit them to the RPS administrator.

[46] If the fixed amount is an amount of capacity, it should be translated to an energy figure, as discussed in Chapter Two, part II.

kilowatt-hours will vary as each retailer's market share varies, but will not change as overall electricity consumption changes, as it does with a percentage requirement.

The absolute amount of renewable energy that each retailer will be obligated to deliver will vary with either a fixed or percentage obligation, but the variance should cause no more difficulty than meeting the overall load, which is also variable. Basing the RPS on tradable credits and adopting the flexibility provisions discussed in Chapter Six, part III, will make it easier for retailers to meet their renewable energy obligations. To eliminate any variance in the absolute renewable energy obligation of each supplier would require regulators to prospectively apportion a fixed amount of the overall goal among all retailers, which could result in an unequal burden on retailers whose loads decline after the apportionment.

B. Factoring in Line Losses

Where the state requires retailers to meet the RPS obligation through tradable credits,[47] another issue in correctly establishing the renewable energy obligation is whether to make adjustments for line losses. Policy makers should consider whether to award tradable credits based on the generator's deliveries to the grid or whether to take into account the line losses that occur between the generator and the load it serves.

The issue is potentially important under some circumstances. For example, if the state's initial renewables goal is a fraction of total energy *consumption* in the state, then the retailers' obligation should be adjusted for line losses. Adjustments could take place on the renewable-generator's side, by reducing the number of credits awarded, or on the retailer's side, by requiring retailers to obtain credits equal to their retail energy sales plus associated line losses. Without such an adjustment, the amount of renewable energy produced will be insufficient to meet the legislative goal.

III. PRODUCT V. PORTFOLIO OBLIGATION: SHOULD THE RETAIL SELLER INCLUDE THE OBLIGATED AMOUNT IN SALES OVERALL OR IN EACH PRODUCT SOLD?

After apportioning its renewable energy goal among retail sellers, the state must decide whether each of those sellers will be free to apportion their renewables obligation among the products they sell within the state. There are two basic approaches:

---

[47] Under a contract-path system (see Chapter Six, part II), line losses from renewable energy facilities are likely to have been taken into account by the system operator.

- A **product-based** approach would require each electricity product sold in the state by a retail seller to contain an equal share of the seller's renewable energy obligation.

- A **company-based** approach would allow a retail seller to meet the RPS requirement as a percentage of its total retail sales in the state.[48]

The fundamental difference between these approaches is that the company approach allows retailers to load all the renewable energy content required by the RPS into just one of its products. A retailer could sell a 100 percent renewable product and a product that contains no renewables so long as, on a companywide basis, the retailer complies with the RPS. If the retailer charges a premium price for the renewable product, the practice would shift the company's RPS compliance costs to consumers who buy the renewable product.

For two primary reasons, the product-based approach is superior. First, the product-based approach protects against customer confusion and fraud. Second, the product-based approach potentially will result in a higher level of investment in renewable energy.

A. The Product Approach Protects Consumers From Confusion and Fraud

By definition, an RPS represents an investment in renewables that the law requires. A state's statutory and common law would prohibit retailers from making any unfair and deceptive claims in the course of marketing products containing renewable energy that the law requires them to procure. Retailers that do no more than comply with the law cannot legally imply in their marketing materials that their renewable energy product achieves any greater effect related to renewables than any other retailer's product, or their own non-renewable products.

Retailers cannot imply that the customer's decision has an effect on renewables because the purchase of the renewables product will not affect the retailers' procurement of renewables. Indeed, if the retailer were to load the required renewable energy content into one of its products,[49] it should disclose to the consumer the fact that the consumer's purchase will not affect the retailer's procurement of renewable energy. General legal principles of deceptive advertising require such disclosure:

> Deception can occur through the omission of information that is necessary to prevent an affirmative representation from being misleading. Similarly, it can be deceptive simply

---

[48] If the company sells only one product to all of its customers in the state, the product and company requirements have the same effect.

[49] A company might, for example, load RPS-mandated renewables into the product it sells to its residential customers and eliminate RPS-mandated renewables from the products it sells to its commercial and industrial customers.

> to remain silent under circumstances that constitute an implied but false representation. The test for whether an omission is deceptive is whether the overall impression created by the advertisement is deceptive. (National Association of Attorneys General, 1999)

Even in the absence of advertising and marketing claims, disclaimers would be necessary when retailers report to certain consumers in mandatory fuel source content labels that their fuel mix includes an amount of renewables that exceeds the RPS requirement. Although the label is required by the state, the loading of renewable energy content into certain products is not. Therefore, consumer protection agencies and courts might consider such loading in content labels to constitute a marketing claim.

In theory, the necessary disclosures should undermine any claim of environmental or other benefit from the consumer's decision to buy the product and make a product-based RPS requirement unnecessary. In practice, consumers are likely to be less than fully protected for three reasons. First, retailers might not make the appropriate disclosures, or might not make them adequately. Second, all consumers might not notice and understand the disclosures in the face of potentially contradictory marketing claims. Third, if retailers do not make appropriate disclosures, law enforcement and consumer protection agencies must always take effective action. Enforcement agencies frequently take actions only after the deception occurs.

The company-based approach combined with consumer protection laws is therefore a second-best alternative to a product-based requirement because it subjects consumers to the risk of being confused and misled by marketing claims.

One way to make the company-based approach less likely to result in consumer confusion would be to require very prominent disclosure statements for products loaded with RPS content. But lawmakers would make such a requirement in recognition of the potential for consumers to be misled. A better solution is to prevent the problem from occurring in the first place with a product-based standard. Further, a product-based standard reduces the need to rely on law enforcement agencies to monitor marketing claims and pursue after-the-fact enforcement actions.

B. The Product Approach Promotes Market Competition and Investment in Renewable Energy

The product-based approach could lead to greater investment in renewable energy and greater competition in the retail market than the company-based approach.

Under a product-based approach, every product contains the fraction of renewable energy required by the RPS, which will usually be relatively small. This equal apportionment allows consumers to observe readily the required fraction of renewables in all products on the market, and allows

marketers who exceed that minimum fraction to distinguish themselves easily from the others.[50] Unlike a company-based approach, consumers need not sort through the disclosure statements of "100 percent renewable energy products" to find out how much of the product content is made up of renewables required by the RPS. Likewise, those marketers whose products exceed the RPS requirement need not expend resources to educate consumers about how to tell the difference between meaningful and meaningless renewable energy products. This costly and difficult task could prevent retailers' entry into the market.

This situation improves the chance that consumers will choose products that exceed the minimum renewable energy content. As a result, the total amount of renewable energy purchased by retailers is more likely to increase under a product-based RPS, which could increase the amount of renewable energy that is produced overall.[51] For these same reasons, the product-based requirement will foster competition overall by fostering more competing retailers and by supporting retailers that have more attractive products.

C. Example: Maine

The Maine legislature amended regulations by the Maine Public Service Commission which used a company-based standard that would have allowed retailers to market renewable energy that they also use to comply with the state's 30 percent RPS requirement. The Legislature amended the RPS to preclude retailers from advertising renewable content beyond the RPS while using that same renewable content to comply with the RPS. The amendment requires a product-based approach to RPS compliance. Maine law now provides:

> If a competitive electricity provider represents to a customer that the provider is selling to the customer a portfolio of supply sources that includes more than 30% eligible resources, the resources necessary to supply more than 30% of that customer's load may not be applied to meet the aggregate 30% portfolio requirement. (Maine Public Law, 1999.)

---

[50] Note, however, that unless the state requires retailers to distinguish between RPS-eligible renewables and other renewables, consumers will not be able to tell the difference between the two.

[51] The greater demand for renewable energy will increase the overall amount of renewables generation only if what retailers sell in the green market requires support to continue operating. For example, if the state excludes from RPS eligibility large hydropower or renewables operating under contract to a utility because it deems these resources to be economic, but those resources are the only ones sold in the green market, then there is no change in the overall amount of renewable energy in the system.

Chapter Five:
The Interdependency of Statewide Goals, Eligible Resources and Retail Seller Obligations in Achieving Policy Effectiveness

So far, in this report, we have discussed how to shape the statewide renewable energy goal, select eligible resources, and translate the statewide goal into retail seller obligations. At this point, it is important to consider these factors together, because it is their combination that produces the outcome. Adjusting any one of the factors will often require adjusting one or more of the others in order to achieve the intended benefits within the anticipated range of costs. Failing to make adjustments can result in unanticipated and undesirable consequences.

Consider an initial RPS proposal whose drafter's goal is to support and expand the existing base of renewable energy serving the state. The drafter designs the bill as follows:

- "eligible resources" include the types of existing resources that the drafter deems to be in need of support;
- the size of the initial RPS obligation, 2 percent of each retail seller's sales, is slightly below the actual amount of existing eligible resources as a percentage of total retail sales in the state;
- all retail sellers are subject to the RPS obligation;
- the obligation will take effect soon after policy adoption because of the availability of the existing resources; and
- after two years, the size of the obligation increases by 1 percent every other year for six years, such that the requirement would reach 5 percent after eight years,

If the legislature alters one element of the bill, each of the other elements will require reconsideration. Assume, for example, that legislators decide at the last moment to modify the bill by adding to the group of eligible resources those that the initial drafter previously excluded, because they disagree with the drafter's judgment that those resources do not require the support of the RPS. They make no other changes. The previously excluded resources constitute 3 percent of total retail sales. The legislators will have changed the outcome in several significant respects because the legislators did not also adjust the size and timing of the obligation:

- Because the requirement in the early years is too small to support all existing resources, those resources that require the most support will not get it for up to eight years, and may cease to operate in the meantime without replacement;

- the RPS requirement will not increase the total amount of renewables serving the state (though it would preserve the current amount, or restore it after an interim decline), and therefore the state will realize few, if any, additional benefits[52]; and

- renewable energy costs will decrease because retailers will use lower-cost existing resources to fulfill the obligation rather than the higher-cost new resources anticipated under the original version of the bill.

The crux of the problem created is that the adjustment upset the original balance between the supply of existing eligible renewables and the demand created for those renewables by the RPS obligation. While the original proposal began with supply roughly equaling the demand, with demand rising over time to cause the addition of renewable energy, the change caused the initial supply to exceed demand over the entire period.[53] To restore the supply-demand balance would require changes in the size and/or the timing of the obligation.

Now assume the same initial RPS proposal but with only a "small" oversight: the term used for "retail seller" technically does not include the provider of default electricity service. The implementing agency exempts the default provider -- which is likely to serve more than 90 percent of customers for at least several years -- from the requirement. The 2 percent RPS requirement now applies to less than 10 percent of retail sales. As a result, the existing supply of eligible renewables greatly exceeds demand, and that condition is likely to persist for many years, rendering the RPS requirement ineffective.

The haphazardness shown in these examples is unfortunately not conjectural, but rather reflects the type of problem that many state regulators have encountered as they moved to implement RPS statutes.[54] In Connecticut, for example, the state created a renewables obligation on retailers without establishing any overall renewables goal. In 1999, the Connecticut Department of Public Utility Control exempted default suppliers from the obligation, effectively shrinking the amount of renewables that will be developed under the standard by some 90 percent or more. (Connecticut Regulations, 1999b)

In Massachusetts, when the legislature adopted an RPS as part of an electricity industry restructuring package, it used a number of ambiguous terms. Prominent among the debates surrounding

---

[52] The state might obtain benefits if the existing renewable energy facilities are replaced by facilities that deliver greater benefits.

[53] If the existing supply were to decline significantly for lack of interim support from the RPS, then demand at some interim points might exceed supply. In this case, however, benefits are also lost in the interim.

[54] For an analysis of U.S. state RPS policies, see Rader, 2000.

the interpretation of those terms was what the legislature meant by the term "naturally flowing water and hydroelectric." As the consultant to the implementing agency put it:

> If naturally-flowing is considered a qualifier, then (i) the baseline [renewable energy requirement] would be far smaller, (ii) the amount of existing RPS-eligible renewable resources would be far smaller, (iii) there may be some difficult decisions in characterizing the eligibility of a few specific facilities . . . (iv) costs to retail customers may [be] lower, by virtue of a lower baseline RPS requirement, or higher, by virtue of exclusion of the lowest-cost category of existing renewables, and (v) some facilities that might be supported under the naturally flowing and hydroelectric interpretation might be shut down. (Grace, Wiser, Smith and Holt, 2000)

The confusion in these two states and others: (a) suggests that policy makers did not explicitly deliberate their goals, let alone agree upon them; (b) created a situation where different interpretations of the law will produce very different outcomes; (c) significantly increased implementation costs, as the implementing agency and stakeholders were forced to expend considerable resources grappling with vague or conflicting terminology; and (d) could invite court challenge.

Chapter Six:
Designing Mechanisms for Retail Seller Compliance

Having translated the statewide renewable energy goal into individual retail seller obligations, the state next must establish the means by which (a) retailers will meet their obligation and (b) the state will verify the retailers' compliance. Here we discuss whether the retailer's obligation to support renewable energy should be tradable, and then explain how the state would verify compliance under tradable and non-tradable regimes. Finally, we describe ways in which states can make the retailer's obligation flexible without harming the renewables market.

I. SHOULD RETAILERS MEET THEIR OBLIGATION THROUGH OWNERSHIP OF TRADABLE CREDITS?

We first explain how an obligation based on tradable-credits would work, and then describe the considerable advantages of tradable credits.

A. How Would an Obligation Based on Tradable Credits Work?

In shaping the RPS obligation, states could require each retail seller to generate electricity from its own renewable energy facilities or purchase electricity from a renewable facility owned by others. Alternatively, the state could require each retailer to acquire tradable renewable energy credits that represent the production of electricity from renewable facilities. A RPS based on tradable credits works as follows.

Renewable electricity generators apply for certification as RPS-eligible generators. Certified generators then provide documentation to the RPS administrator that they have generated a certain number of kilowatt-hours during the previous compliance period (e.g., quarter-year). Upon verifying the generator's documentation, the administrator issues to the generator a number of "renewable energy credits" (RECs) corresponding to the amount of renewable energy produced (e.g., one REC for each kWh produced). The RECs are a currency; they serve as evidence that renewable energy facilities have generated a certain quantity of electricity.

Under this credit regime, a generator would have two products: generic power and RECs. The generator can sell each product separately. Then those who purchase the products can resell them: the power into the power market and the RECs into the REC market. The power is tradable, and the RECs are tradable. (A generator may also bundle its power and RECs together for sale to a single buyer.) Thus, a renewable generator would two income streams -- the income from power sales and the income from REC sales. The payment the generator receives for its RECs serves to recognize (and pay for) the desirable attributes of the source of the electricity, e.g., its renewable, emission-free fuel.

Retail electricity sellers are obligated, under the state RPS law, to purchase RECs. If the state establishes the obligation as a percentage energy requirement, then an obligation of three percent would require each retail seller to purchase three RECs for every 100 kWh of power he sells (assuming each REC represents one kWh of renewable power). The retail seller can purchase RECs from anyone who has them: directly from renewable energy generators, from a REC trading market, or from a REC broker (the latter two having bought the RECs from the generators or from other resellers).[55] At the end of each year, retailers submit to the RPS administrator documentation that they have purchased the required quantity of RECs.

Compliance verification is straightforward. As noted above, the administrator already has verified, at the time that it issues RECs, that RECs represent the actual production of qualifying renewable power. Given this verification (and the issuance of electronic, counterfeit-proof credits), the administrator need only ensure that each retailer has turned in the requisite number of credits. The administrator then would retire the "used" credits (i.e., take them permanently out of circulation).

REC prices are determined in the REC market. As with any commodity, the credits can be traded in, and therefore priced by, various markets: short-term spot markets, medium- and long-term bilateral contracts, and futures markets.

B. What Are the Advantages of Tradable Credits?

Establishing an RPS obligation based on tradable credits has numerous benefits that provide a strong rationale for this approach. Eight examples follow.

One of the chief benefits is that credit trading **promotes a competitive renewables market.** The primary appeal of the RPS policy is its market-based nature. Basing the RPS obligation on a system of tradable credits enhances the market-based feature considerably, because separating the "renewableness" of the power from the power itself creates a secondary market in the attribute of interest. The ability to trade credits more easily, as compared to trading power only, intensifies competition for the renewable attribute compared to relying solely on ownership and contracting arrangements. More liquid markets can also facilitate forward markets which, in turn, can facilitate price hedging and project financing. (Grace, Wiser and Abbanat, 2000)

The most competitive renewable energy projects will be those with the lowest credit prices. These prices, in turn, will reflect the *difference* between their production costs and the market price of "generic" power. The most competitive renewable energy projects, therefore, will not necessarily be those with the lowest production costs. For example, a project that is located in a constrained area,

---

[55] Note that the retailer may itself be a renewable generator or be affiliated with one, and therefore generate its own RECs.

that generates consistently on-peak, or that sells into a market with higher clearing prices, will be more competitive than an identical project that does not benefit from one of these circumstances. (See Bernow, Dougherty and Duckworth, 1997; Clemmer, Nogee and Brower, 1999)

Credit trading also **increases efficiency** in at least two ways. First, the availability of tradable credits makes the lowest-cost renewable resources available to retailers who cannot use them to serve their own loads. Second, the availability of credits shifts the focus of decision-making about which renewable energy plants to build to private investors who may have more interest and expertise than retailers. Retailers can involve themselves in these decisions if they choose, or they can simply benefit from the competition that develops between others. We discuss other examples of efficiency in the following section.

Tradable credits **reduce retailers' compliance risks and compliance costs**. Again, because trading credits is easier than trading power, retailers who acquire more (or less) renewable energy than they need to comply with the RPS can more easily sell (or purchase) the excess (or shortfall) in the market. The risks and costs associated with compliance are therefore lower.

Credit trading **reduces policy costs overall** because the credit market seeks renewables with the least incremental cost without regard to whether there is an equal amount of renewables within each retailer's power portfolio. Trading also reduces overall costs because of the reduced compliance risks.

Tradable credits **provide cost transparency** because credit markets will reveal credit prices. These prices can facilitate indexed contracts and provide information to policy makers about the cost of the RPS. In addition, renewable energy producers and investors can better identify the value of RECs in the marketplace,

Credit trading **provides a low-cost, effective way to verify compliance.** Compared to tracing transactions in the power market in order to determine compliance with the RPS (a method discussed in the following section), counting credits is a relatively simple exercise.

A credits market is also **easier for owners of small renewable energy systems to participate in**, since selling a small number of credits into a credit market will have low transaction costs compared to entering into ownership and contracting arrangements with retailers.

Finally, if RPS rules allow members of the public to purchase RECs, tradable credits will **provide a ready means for the public to support the production of renewable energy** above and beyond the RPS requirement.

II. WHAT METHODS ARE AVAILABLE TO VERIFY COMPLIANCE WITH THE RENEWABLES OBLIGATION?

In this section, we further describe how states would verify compliance with RPS laws under a tradable-credits-based obligation. We then describe the alternative non-tradable "contract-path" regime. We discuss these alternative approaches in the dual context of verifying compliance with RPS obligations and verifying retailers' claims regarding the attributes of the power they sell to consumers.

The attributes that a retailer might want to claim in relation to its consumer electricity products include the type of fuel that is used to produce the electricity and the associated air emissions. As with RPS compliance verification, verifying retailers' claims requires a system that can track the attributes of generation sources dependably from point of production to point of retail sale.[56]

After comparing the credits and contract-path models to serve both attribute verification purposes, we conclude that the credits model has important advantages. Finally, in this section, we discuss the importance of coordinating attribute tracking methods on a regional level.

A. Verifying Compliance Using a Credit Accounting System

We explained above that, under the tradable credits approach, each generator begins with two separate products: generic power, and credits reflecting the attributes of the power. Retail sellers purchase generic power and match it with purchased credits. The credits serve as prima facie verification of each retail seller's claims regarding the attributes of the power it sells and compliance with the RPS.[57] The tradable credits approach permits a retailer to make claims about the attributes of its retail products without regard to which generators the retailer pays to deliver power to its customers.[58]

Under a centralized credits model, currently being planned in Texas and New England, a single program administrator maintains these credits in an electronic database. All legal owners of credits establish a credit account. The administrator initially places credits in each generator's account; market

---

[56] Retailers' claims will appear in many places: marketing materials, mandatory product-content labels, and information given to individual consumers over the telephone or Internet. To protect consumers from fraud, and promote cleaner resources, these claims must be verifiable. Consumer protection agencies have made this clear. (National Association of Attorneys General, 1999; Federal Trade Commission, 1998)

[57] The system also would serve to verify compliance with policies that require retail sellers' products to meet certain emissions standards.

[58] The retailer might make payments to generators directly or indirectly. Direct payments would occur if the retailer has a bilateral contract with the owner of a specific generator. The retailer would make indirect payments if it buys power through a power pool or purchases "generic" power from the owner of a mix of generators. We describe these transactions further in the next section on the contract-path tracking method.

participants execute trades when the representative of one account requests a transfer of credits to another account. On a regular schedule (e.g., quarterly or annually), the administrator reconciles a retail seller's credits with its marketing claims and RPS obligations and retires the used credits. A central administrator thus controls the front-end and back-end of credits (issuance and retirement), and also registers all transfers in between.

One of several entities could administer a centrally controlled credit accounting system. Options include: the state utility regulatory commission or other government agency; the independent system operator (ISO); or a private third party (perhaps under contract to states or ISOs).

While the handling of credits can occur centrally or decentrally, we focus on a centralized accounting system due to its significant advantages. Under a decentralized approach, which California is now using on a pilot basis, the state does not track credits in a single electronic system under the control of an administrator. Rather, generators physically create their own credits. The significant associated disadvantages of this approach include: the risks and logistical difficulties associated with paper credits; the vulnerability of paper credits to fraud, which can undermine the confidence in credits and thus in credit trading; higher administrative costs on government and the private sector; and the possible introduction of market-entry barriers to generators and credit traders.[59]

B. Verifying Compliance Using a Contract-Path Accounting System

The theory behind contract-path verification is that the attributes of power remain bundled with the power, so that only the purchaser of the financial contract covering the energy may claim the attributes. Market participants may sell power several times before it eventually reaches the ultimate consumer, but the generation attribute travels with the energy in every transaction. "Centralized" contract-path verification refers to a single administrator who would be responsible for tracking all generation attributes within a given region.[60]

A central administrator must have access to all of the information that is necessary to track generation attributes, including: all of the contractual relationships between generators, wholesale buyers and sellers, and retail sellers; the hourly generation of all power plants; and the hourly retail

---

[59] The authors discuss these issues in a separate paper available upon request.

[60] Under a decentralized approach, no administrator is responsible for tracking all transactions. Rather, regulators audit (or require independent audits of) the records of individual retail suppliers. Maine has adopted this basic approach for RPS compliance but it has not yet been tested. California has a few years' experience with the approach, but has found that it "provide[s] no assurance that the payment for the electricity produced by a certain generator can be traced back from consumer to generator on a kWh for kWh basis without counting some of the same kWh twice." (Grow, 1999) Additional drawbacks of the approach are that it cannot be used to track system or spot market sales, and the audits of individual retailer can be expensive. We focus here on the centralized approach due to these drawbacks.

demand of each retail supplier. Much of this information requires confidential treatment. The only realistic candidate for the central-administrator job, therefore, is the regional independent system operator (ISO), or its equivalent.

Presently, the only example of a contract-path attribute tracking system is in New York, where the approach is being implemented. In that state, the Public Service Commission (PSC) authorized the use of funds from the state's System Benefits Charge to pay for modifications to the New York ISO's existing software.[61] The ISO provides the Department of Public Service staff (the Environmental Disclosure System Administrator) with the transactional data needed to create the disclosure labels. The ISO tracks all flows of power, both bilateral and spot-market transactions, from source to sink. The ISO provides this data, on a 12-month rolling average, to the Administrator on a quarterly basis. The Administrator combines the transactional data from the ISO with information from other sources to calculate the fuel mix and emissions rates, which are included in the label provided to each retail supplier. (NY PSC, 1998; Bala, 2000)

Complete bundled tracking is not possible, however, because of the physical reality of electricity: an electron generated by a wind turbine is indistinguishable from an electron generated by a coal plant. In addition, electrons cannot be directed to flow to particular customers. Dollars are likewise fungible. These characteristics result in the effective unbundling of generation attributes from the generation itself in important instances, including the following.

System Sales. System sales are bilateral transactions not associated with particular generating units. For example, the owner of a group of power plants may sell power from the group as a whole, or a wholesale power purchaser may purchase and resell power from a number of different sources. With system sales, it is necessary for the administrator to assign to the purchasers of the system power the average attributes of the seller's resource mix, after subtracting any unit transactions that the seller has made from that mix. That matching can occur on an hourly basis using a computer to solve thousands of simultaneous equations. (New England Governors Conference, 1998) This averaging process effectively unbundles attributes from the generating plants, although the extent of the unbundling is limited; the attributes assigned to system power purchasers reflect the average attributes of a selling company's generation portfolio in a particular hour.

Spot Market Sales. Unlike system power transactions, spot market[62] transactions are not associated with any bilateral transactions that link production from a generating unit to its final point of purchase. With spot market sales, the administrator would determine the attributes of the power sold

---

[61] The cost of this software modification is expected to be about $200,000; the PSC has set aside a total of $3 million to cover the costs of the disclosure program . (Bala, 2000; NY PSC, 1998)

[62] In a spot market, market participants buy and sell electricity for immediate delivery. Spot markets often serve to balance a retail seller's generation resources with the customer load it serves.

into the pool using the system sales characteristics of each seller into the pool. The administrator assigns each buyer from the spot market the average attributes of the overall spot market mix. (New England Governors Conference, 1998[63]) Thus, a retail seller's fuel source disclosure label might indicate that it purchased "coal" or "wind" power, when it did not arrange to acquire such power specifically.

However, in New York, a retail supplier can contract for the attributes of specific spot market power. To handle the assignment of these attributes, New York uses a mechanism called a "conversion transaction". Governed by certain rules, this mechanism allows retail suppliers to obtain rights to the attributes of specific power sold into the spot market.[64]

Retailers' Discretion. Contract-path attribute tracking stops with the retail seller's purchase of energy. When a retail seller sells more than one product with different attribute profiles, the seller can use its discretion in assigning the attributes of the power they buy at wholesale to their retail products. For example, in New York, the PSC will audit retailers to ensure that they do not report to their consumers, in aggregate, more renewable energy attributes than the retailer purchased, but the retailer is free to allocate the attributes purchased through bilateral contracts to different products and consumers as it chooses.

Load Pockets. In some areas, known as "load pockets," resources outside of the area cannot serve the load due to physical constraints. In these instances, regulators have allowed retailers to allocate renewable resource attributes to consumers in those areas.[65]

---

[63] An alternative approach was suggested in this document that, if successful, would allow some matching of a retail seller's spot market purchases with the power that retailer sells into the market.

[64] Generators and retailers can make “conversion transactions” only up to the amount of power that they sell into and buy from the spot market. The generation attributes associated with conversion transactions will be deducted from the spot market total, and the remainder will be assigned to the spot market purchasers who did not arrange conversion transactions. The original generators who sold the attributes and the retail supplier who obtained the conversion transaction will have to register their transaction with the DPS through a proposed secure web site. (E-mail will be used initially for this purpose). Using the quarterly data received from ISO, the DPS will verify the transactions. (NY PSC, 1998; Bala, 2000.)

[65] The New England Conference of Public Utility Commissioners made such an allowance for the contract-path system it was anticipating at the time (New England Governors' Conference, 1998). (The New England ISO ultimately decided to adopt a credits-based tracking approach.)

C. Comparing the Credit and Contract Path Accounting Approaches

Here we compare the tradable-credits and contract-path models for purposes of verifying the generation attributes of retail sellers.[66] The primary advantage of the contract-path approach is that some view it as more credible because there is a stronger connection between the generation of power and the retail sale of attributes. The attributes assigned to purchasers of system and spot market power, for example, reflect the average attributes of the system mix or sales into the spot market during a particular hour, rather than the overall system mix during some longer time period.

It is our view that this connection is not so strong as to outweigh the advantages of a credits system. These advantages include: an acceptable level of credibility and the comparable cost of a credits system compared with the contract-path approach; its compatibility with tradable RPS requirements; the enhanced ability of retailers to shape and deliver products under a credits approach; the ability of a credits system to accommodate small generation resources; fewer institutional requirements of the credits approach; and the ability of a credits system to scale up easily for regional and national use.

1. Credibility of approach

The most significant disadvantage of the credits-based method relates to consumer perception. An early report on fuel source disclosure noted the "widely-shared concern that customers may see the approach as being fundamentally dishonest.'[67] (Regulatory Assistance Project, 1997) It may not sit well with consumers if, for example, if a retail supplier pays a nuclear power plant to serve its load, matches that power with purchased "wind energy" credits, and reports to its consumers that they are buying "100 percent wind energy." This concern prompted the National Association of Attorneys General to recommend that "certificate-based claims be accompanied by a clear and prominent disclosure of the use of a tagging system to substantiate the claim." (NAAG, 1999)

Several factors mitigate the consumer perception problem. First, the unbundling of power and attributes inevitably occurs to some degree under the contract-path approach, anyway, as explained earlier.

Second, what matters, in terms of encouraging particular types of generation sources -- through RPS policies or marketing efforts -- is whether consumers and retailers financially reward the preferred generation sources. They accomplish this goal through the purchase of credits. In the above example

---

[66] We do not compare the decentralized counterparts of each due to the important disadvantages of those approaches noted above.

[67] The report noted that, absent the supposed credibility problem, credits might be the preferred method.

of "dishonesty," the nuclear generator receives only the going rate for its power, while the wind generator receives the going rate for its power *plus* a premium payment delivered via the sale of the credit. The effect is the same as if the retailer had a bilateral contract to purchase wind energy at a premium.

Third, while the contract-path approach allows an hourly match between the time that a particular generator produces power and the time that consumers use the power, states often relax the period over which retailers must reconcile the two[68] Moreover, states can bound the use of tradable credits by requiring retailers to reconcile them with their sales over a certain period of time.[69] To address New England regulators' view that retailers should match the production of generation attributes closely with retail sales, for example, the New England ISO will require claims to be reconciled monthly. (New England ISO, 2000)

Fourth, consumers are likely to be oblivious to either accounting approach because they are unlikely to look beyond the fuel source label or marketing claim.

Finally, a generator can rebundle its credits with its power for sale under a bilateral contract with retailers who prefer to purchase power and credits from the same source.

2. Cost and complexity

Some analysts have called the contract path system "complex and potentially costly" and "fraught with many difficulties." (Grace, Wiser, Abbanat, 2000) Nevertheless, New York is poised to launch a partial contract-path system at the reasonable cost noted above. Because no one has implemented either a tradable-credits or a contract-path system fully, it is not possible to compare the costs of the two with precision, although they appear to be in the same ballpark.

One can say, however, that, while it is clear that a tradable credits system (which involves a database that is relatively simple compared to tracking electricity sales) can be used to track all electricity attributes in a given market, it is not yet clear that a contract-path system will be practical as a universal system. New York, which, to date, is the only state to have adopted a contract-path

---

[68] For example, California and Maine's settlement period is a year and New York's settlement period for its spot market "conversion transactions" is a quarter. In California, it would be possible for a retail supplier to purchase, for example, no renewable energy on the wholesale market during the first six months of the year, and 100 percent renewable energy during the next six months and be considered as having sold, at retail, a 50 percent renewable energy product over the entire year.

[69] To permit such reconciliation, the electronic credits would need to contain the appropriate information such as the week, month, or year in which the power was generated, which is not expensive or technically difficult to accomplish. Hourly credit "time stamping" is also possible, but would entail greater cost and complexity and reduce some of the benefits of a credit system.

approach, has opted to use a credits-type system for its spot market. Using two types of systems in the same market will almost certainly entail higher costs than using only one.

In addition, in order to track compliance with the portfolio standard requirements of different states, contract-path tracking would need further refining so that it connects the required attributes with retail sales in each state. Making this connection would introduce additional complexities in the tracking system that could be difficult or costly to implement.

3. Compatibility with tradable RPS

If an RPS policy is based on tradable credits but attribute tracking for retail disclosure purposes is based on contract-path tracking, there is a substantial risk that the systems will contradict one another and create problems. Contract-path tracking would show, for example, that Retailer X has contracts only with fossil fuel generators. However, by purchasing tradable renewable energy credits, Retailer X is in compliance with the RPS. The information Retailer X shares with retail consumers will appear contradictory. On the one hand, the retailer will be able to assert that it is in compliance with the RPS, as evidenced by the credits it has purchased through the trading program. On the other hand, the disclosure rules that are based on contract-path verification would require that Retailer X disclose that it has no renewable energy on a contract-path basis.

Building off this same hypothetical, assume that Retailer Y has contract-path rights to the output of a renewable plant and also purchases the RPS credits generated by that plant, but then sells some of the credits to Retailer X. For disclosure purposes, Retailer Y will report that its supply includes all of the output of the renewable plant -- even though it sold the "renewableness" of some of the plant's energy to Retailer X. Because of the dual verification systems, some of the renewable output will be double-counted, once by Retailer X for the RPS requirement and another time by Retailer Y under the disclosure rules. Retailer X will have paid the premium for some of the renewable energy characteristics of the energy sold by Retailer Y, but Retailer Y will get the benefit of consumers' positive perception.

This situation raises an important consumer protection problem: consumers may pay more for contract-path "renewable energy" even though the renewable attribute has been sold, via credits, to someone else. This problem is very difficult, if not impossible, to solve if both a credits and contract-path system are in use.

This double-counting of renewable power has another important negative effect: retailers will support less renewable power than if a single credit system were used. In the above example, more renewable power would be supported under a single credit system because Retailer Y would have to keep all of its renewable energy credits to substantiate its claims, and Retailer X would have to purchase credits from another source.

These examples illustrate how uncoordinated tracking systems would create customer confusion, diminish the credibility of retail suppliers, reduce support to renewable energy producers, and ultimately cause credibility problems that could undermine each policy initiative. The converse also is true -- policy coordination will benefit states by enhancing the success of renewable energy policies and competitive retail markets. A single system will further competitive markets because using one system will entail lower transaction costs for retail suppliers. Any increase in retail transaction costs will diminish competition because of the low profit margins characteristic of retail electricity markets. Also, a single system will better enable suppliers to differentiate their retail products and to assure consumers of their validity.

4. Ability of retailers to shape and deliver products

Selling products with preferred attributes is one of the few ways in which retail marketers can shape their electricity products to appeal to consumer interests. Thus it is important that they be able to shape and deliver those products with ease. The contract-path approach makes it is more difficult for retailers to shape their products. Particularly if states do not provide some flexibility, such as New York's use of a credit-like system for spot market sales, it is impossible for retailers to control the contents of their product completely. For example:

- A retailer that otherwise has contracts with only renewable energy sources will have to report some nuclear and fossil fuel content associated with the spot market purchases that the system administrator assigns to it.

- A retailer that wants to sell a 100 percent wind product could not do so because of the intermittency of the wind resource.

A report prepared for the Massachusetts Division of Energy Resources explained the problem: as a result of the lack of control over its products, a retailer will have to increase the safety margin needed to assure compliance with an RPS requirement or to fulfill its marketing claims. This over-compliance will increase the retailer's costs. Likewise, renewable energy generation can be lost to the spot market or lost in any system power sales that the owner might make. (Grace, Wiser, Abbanat, 2000) To compensate, the owner would need to over-procure renewables to assure that enough will remain to fulfill its obligations to buyers, increasing costs. As noted in footnote 62, above, however, analysts have conceptually developed an approach that could allow buyers and sellers to maintain some control over the attributes of spot market sales.

A credit market further facilitates a retailer's product development and delivery because it is more liquid than a power market. Simply stated, purchasing a credit is easier than purchasing a kilowatt-hour. This liquidity advantage makes it easier for retailers to assure that they meet their marketing claims and allows them to do so at the least cost.

A credit system also allows marketers to reach customers that they otherwise could not reach due to the physical constraints of the transmission system or the distance between a preferred generator and the customer.[70]

5. Ability to handle small generation resources

Independent System Operators do not track generation sources under a certain size, such as two megawatts; or small generators on the customer's side of the meter, such as solar systems. For example, in New England, the ISO does not have settlement or title information on some small renewable generation -- in particular, solar, wind, landfill gas and hydroelectric. These small resource types are eligible under many state RPS policies and retailers market the output of these renewable resources. For a contract-path system to handle these resources would therefore require an adjunct system, while a tradable credits system could accommodate them within its regular processes.

6. Institutional demands

A credit system requires a new institutional structure to account for the credits, while a contract-path system requires the modification of an existing electricity tracking institution. As noted above, however, a contract-path system may also require adjunct systems to track small renewable energy systems and spot market sales. Moreover, an ISO or other existing institution could handle the credit accounting system, though it might prefer to subcontract to firms with special expertise in their design and operation.

7. Ability to scale up system for regional or national use

It is possible that a tradable credits system will be more amenable to regional or national use because, unlike contract-path systems, the complexities of different electricity markets would not encumber the credit system.

D. Coordinating Attribute Accounting Systems Within a Region

The integrity of every state's RPS depends on whether states in the same region coordinate their compliance efforts.[71] Coordination is necessary because, in most cases, the market for electric generation is regional, and generators and retailers operate in more than one state. Without

---

[70] Establishing some relationship between the location of the generator and sales to consumers is still important, however. As discussed in Chapter Three, part II.C, the location of the generator should, for example, provide the consumer with environmental and fuel diversity benefits.

[71] The obvious exceptions are Alaska, Hawaii, and Texas given their geographic separation from other states and the separateness of their electrical grids.

coordination, the RPS will be vulnerable to double-counting, both intentional and unintentional. For the same reasons, regional -- if not national -- coordination is necessary to verify retailers' claims regarding the attributes of their power products.

Moreover, when states determine the RPS-eligibility of renewable energy generators based on whether the generators provide benefits to the state -- and where generators outside the physical electricity trading region can provide benefits -- the region covered by a single tracking system would likewise need to extend beyond the physical trading region. The region needs to cover the same territory in which eligible generators may be located *and the entire electricity trading market in which those eligible generators operate.* Because this territory could be large, a national credit system might be appropriate (see Appendix C).

Regional coordination will also promote competition by establishing a uniform system of rules for retailers to follow when complying with the RPS requirements of different states in the same region.

The higher the level of regional coordination, the less likely that generation attributes will be double-counted. Ideally, all states in the same region should adopt the same credits system, with a neutral institution charged with administering the system. The Massachusetts DOER recently recognized the need for regional coordination when it released a draft proposal calling for a Regional Generation Information System (GIS), based on the credits model. (Massachusetts DOER, 2000)

At a minimum, states with RPS policies should coordinate their compliance systems with the RPS compliance and claims verification systems of other states within the region -- through communications and information exchange -- to ensure that the same renewables generation does not receive credit in two or more states.

III. HOW DOES THE STATE MAKE COMPLIANCE FLEXIBLE?

Providing retailers some flexibility in complying with their RPS obligations will reduce retailers' noncompliance risks, particularly those risks that remain despite good faith compliance efforts. These risks might include clerical errors, unexpected deviations in the output of particular renewable energy generation facilities, or a deviation in the retailer's anticipated volume of retail sales.

Reducing retailers' risk of noncompliance is particularly important since the noncompliance penalty should be high. Relaxing the annual RPS obligation somewhat by building in flexibility measures will prevent retailers from having to over-comply in order to curb non-compliance risks which would, in turn, raise RPS policy costs. States should also avoid providing too much flexibility, however, to ensure renewable energy investors that a renewables market of the intended size will materialize on schedule.

In addition to making the RPS obligation tradable, states can use other measures to provide retailers with flexibility in complying with an RPS. RPS rules can mitigate noncompliance risks by providing true-up periods, credit banking, credit borrowing, and force majeure penalty exceptions.[72] After describing these measures, we discuss the importance of coordinating the measures with the state's generation attribute accounting system and related fuel source disclosure rules.

A. Measures for Achieving Flexibility

1. True-up period

Providing a true-up period (or "reconciliation period") after the RPS compliance year allows retailers an extra opportunity to ensure that they meet their RPS obligation. Retailers that fall short of meeting their obligation can purchase additional tradable credits (or renewable energy, if the obligation is not tradable[73]) to bring them into compliance. Retailers who over-comply can use the true-up period to sell their excess credits to those who need them.

A true-up period could work as follows, assuming a tradable credit system. For compliance year 2002, each retailer would be obligated to demonstrate compliance with the RPS by March 31, 2003 (rather than on January 1, 2003). On January 31, 2003, the credit system administrator notifies Retailer A that its credit account lacks enough credits to meet its obligation. The retailer purchases the number of credits required to make up the shortfall by March 31, 2003. The retailer incurs no penalty.

A three-month true-up period gives retailers sufficient leeway without unduly compromising the renewables market. A year-long true-up period would effectively postpone a segment of the renewables market for a full year.

2. Credit banking

Credit banking means that a retailer can use credits generated during one compliance year to meet its RPS obligation in the following year, or possibly later if rules allow. As with the true-up period, credit banking reduces each retailer's risk that it will end up with too few or too many credits at the end of the compliance year; credits from previous years can help retailers make up current-year shortfalls, and retailers can use current-year excesses to comply in subsequent years. Credit banking also improves the liquidity of the credit market.

---

[72] For discussion on additional types of flexibility measures, see Wiser and Grace, 2000.

[73] Note that, with a credit system, credits representing renewable energy produced during the compliance year could be traded during the true-up period. With an RPS that requires facility ownership or power purchase, this is not possible. Therefore, without credits, a true-up period would allow retailers to use generation that it procures during the true-up period for compliance in the previous year.

Credit banking encourages the installation of renewable facilities and the generation of renewable energy earlier than the RPS requires. With an RPS that increases gradually each year or every other year, banking also provides an incentive for increasing the size of renewable energy facilities to capture economies of scale.

All of these effects provide an argument for allowing credit banking without limiting the length of time credits remain valid. On the other side, it is possible that one or a few retailers who control a large fraction of credits could retain their extra credits rather than sell them in order to exercise market power over their competitors. Limiting the life of a credit can mitigate the concern where it exists.

Some have argued that competition for compliance could develop between new generation and banked generation, possibly making investment in new renewable resources more difficult. (Wiser and Grace, 2000) This same argument would support putting a limit on credit life. But there is little reason to bank credits other than to achieve economies of scale and reduce risk; therefore, any competition that occurs between banked and new generation will be efficient.

An electronic credit system can easily accommodate credit banking, particularly if is anticipated in the initial system design. If the state allows credit banking for a certain number of years (or does not allow banking at all), then the credit system administrator would identify credits by their year of issuance.

If RPS rules allow credits to be generated prior to the initial compliance period, then "early banking" is possible. Early banking may foster a more functional renewable energy (or credit) market at the beginning of the program. In addition, in areas where experience with renewable energy projects is limited, it may be useful to bring projects on line earlier than necessary to allow time for solving potential technical problems. Early banking encourages expedited development by providing a market for early output.

3. Credit borrowing

Credit borrowing policies can take different forms: borrowing during in true-up period and deficit banking.

Credit borrowing in the true-up period allows generation that occurs during the true-up period, rather than in the compliance-year, to qualify in the compliance year. Thus, a retailer may use generation that occurs in February of 2003 to satisfy its RPS requirement in 2002. As with any credit that is used to comply with the RPS, the credit administrator permanently retires it after one use.

Deficit banking allows a retailer to run a credit deficit in a particular compliance year as long as it makes it up in a future year. Essentially, deficit banking is an "IOU" -- a promise to deliver the required credits at some point in the future.

In Texas, for example, in addition to allowing a three-month true-up period after each compliance year, the state provides additional flexibility in the early years of its RPS policy by allowing 5 percent deficit banking. This rule allows retailers a 5 percent shortfall in one year that they make up the next. The state may grant further exceptions for events or circumstances that are outside of a party's reasonable control, which the state carefully defined. Finally, credits will have a three-year life, in part to accommodate natural variations that may occur with intermittent renewables.

In contrast, Maine provides too much leniency by allowing a supplier that meets two-thirds of its "eligible renewables" requirement to "cure" the deficiency over the next 12 months; the PUC may further extend the cure period in some situations.

4. Force majeure penalty exceptions

RPS rules may allow an extended true-up period to allow response time for extreme deviations in expected renewables generation resulting from events that are impossible to anticipate or control, i.e., situations such as a damaging hurricane. Such fluctuations should not affect the entire credit market, but may affect individual retail sellers that have arranged to acquire credits from certain facilities.

B. Coordinating Flexibility Measures with the Disclosure of Generation Attributes

We recommended, earlier in this chapter, using a tradable credits system to support all generation attribute policies, including RPS laws and fuel source disclosure requirements. Here we discuss why -- when the tradable credit system under the RPS is part of a larger credits-based generation attribute tracking system[74] – special features in the tracking system and/or special disclosure rules should accompany RPS flexibility mechanisms. Such provisions are needed because a number of the RPS flexibility mechanisms result in a mismatch between total generation and total sales in each year.[75]

Under a "full credits" verification system and disclosure policy, the system administrator would create a tradable credit for every kilowatt-hour generated, and retailers would acquire tradable credits

---

[74] If the state does not base its disclosure system on tradable credits, but the RPS is, the incongruity creates much more significant problems, as discussed earlier in part II.C of this chapter.

[75] The same situation arises if rules allow tradable credits to be used for purposes other than retail fuel source disclosure, such as getting industries credit for reducing carbon emissions. If credits are bought and used for such purposes, states should bar their use for RPS compliance or retail disclosure purposes.

to match all kilowatt-hours they sell to consumers. As a result, a market for credits of all fuel types would develop. Alternatively, states could allow retailers who do not make claims to use default fuel mix information in their disclosures. The credit system administrator would calculate the information using all of the credits remaining after some retailers have acquired credits to document their specific claims.

The full-credits verification system would serve the dual purpose of facilitating a tradable RPS requirement. In this case, RPS flexibility mechanisms will cause a mismatch between total generation and total sales in each year, which would otherwise be equal to each other (adjusted for transmission losses). For example:

- When someone banks renewable energy credits for sale or use in a later RPS compliance year, there will be fewer credits available in the system than are needed to match with retail sales.

- When a retailer uses renewable energy credits from Year 2 for RPS compliance in Year 1 under RPS "credit borrowing" rules, the retailer will appear to consumers to be under-complying in Year 1 and over-complying in Year 2 unless the disclosure label takes into account the borrowed credits.

- A more serious problem would arise if credit system rules require credits to be reconciled with retail sales on a monthly or quarterly basis for the purpose of making disclosures to consumers. Short settlement periods would reduce RPS compliance flexibility and frustrate many of the flexibility measures discussed above.

Simple remedies are likely to be available to handle these types of mismatches, though remedies to all possible mismatches require further thought. In the first two examples above, for example, it would be possible to resolve mismatches using credits reflecting the system mix in place of banked or borrowed credits in fuel source disclosure labels. In the third example, rather than banking credits, the state could permit retailers to "bank compliance." In this situation, the state would allow over-compliance in Year 1 to balance under-compliance in Year 2.

Chapter Seven:
Enforcing the RPS -- Generator Eligibility and Retail Seller Obligations

The RPS relies on market participants, rather than the government, to take actions to promote renewables. Those participants must therefore be motivated to act. To provide the necessary encouragement, lawmakers must ensure that retail sellers failing to fulfill their obligations will incur penalties that exceed the cost of full compliance. Lawmakers must also impose adequate penalties on renewable energy generators who provide false information regarding their production or their eligibility status. In addition to these issues, we discuss in this section how the state should use any penalty revenues, and how the penalty on retail sellers would relate to a cost cap.

I. WHY ARE EFFECTIVE PENALTIES IMPORTANT?

Effective noncompliance penalties provide potential investors in renewable energy facilities with confidence that a market will exist for the product of their investment. Uncertain enforcement reduces that confidence, causing investors to demand higher returns on their investments that, in turn, increases the cost of renewable energy. Swift and significant penalties are important for the three reasons discussed next.

The limits of pre-existing law. Policy makers should not depend on pre-existing statutory and common law to penalize violators of RPS regulations. The existing set of laws -- including contract law, the commercial code, and general consumer protection statutes -- are likely to fall short of ensuring RPS compliance for several reasons:

- Existing laws may be inadequate for preventing fraud when the damages are small for the individual who is harmed. Where the per-incident damages are small, the transaction costs for processing anti-fraud complaints are high. High transaction costs will prevent those who have suffered harm from pursuing their complaint.

- RPS noncompliance will not always affect a particular party. Rather, the wrongdoing will reduce the overall demand for renewable energy generation. This diffuse harm makes it less likely that a particular generator will take a claim to court under existing laws and shifts the entire responsibility of ensuring compliance to state agencies, such as attorneys general, to prosecute the wrongdoer.

- RPS statutes are relatively new. As a result, at least initially (when strict enforcement is most needed), there will be no precedent under existing laws for enforcement agencies and courts to turn to in assessing RPS compliance and prosecuting violators.

- State law enforcement agencies may lack the resources and commitment to pursue RPS noncompliance. State attorneys general have responsibility for enforcing a broad range of state laws and must constantly assess their resources and establish priorities. One cannot predict where, in the ranking of enforcement priorities, RPS enforcement will lie. One may speculate, however, that RPS compliance would be low on the list of enforcement agency activities due to perceived complexities of RPS compliance, a desire to defer to the regulatory commission, and lack of expertise in renewables or utility regulation.

- Courts may be reluctant to claim jurisdiction over RPS requirements if they perceive that compliance issues raise technical issues on which state regulators have special expertise. Furthermore, courts may be receptive to "primary jurisdiction" arguments that enforcement actions must go before the state regulatory commission before the harmed party may pursue other remedies. A state law can eliminate this risk by stating expressly that all legal remedies remain available.

The risks of uncertain enforcement. The failure to establish specific RPS penalty provisions will diminish investor confidence that the RPS will produce a renewables market of the size that would materialize with full compliance.

Consider the situation in Connecticut where retailers who violate the RPS are subject to the same set of potential penalties established for any violation of the conditions attached to the retailer's license. In determining the penalty, the state PUC must consider, among other things: the number of past violations by the person charged; the "good faith effort" made to achieve compliance; "the proposed programs and procedures to ensure compliance in the future"; other factors "deemed appropriate and material to the particular circumstances of the violation"; and "the gravity of the violation." (Connecticut Regulations, 1999a)

This type of nebulous penalty system could create a "Catch-22" situation, wherein: (a) retailers fail to make a good faith effort to obtain renewables from developers; (b) the lack of good faith effort causes the developers' investors to have insufficient confidence to invest in new facilities; (c) the retailers then claim that they cannot comply because no renewables are available. The state could view the retailer's noncompliance as being in good faith, since there are no renewables available for purchase, rather than viewing the situation as an indication that the retailer failed to make a real effort to comply. If the state waives the penalty, the situation may repeat itself because the state has not given the retailer a strong incentive to work collaboratively with renewable energy suppliers.

The benefits of automatic penalties. A specific RPS enforcement regime, on the other hand, could make noncompliance penalties certain and substantial. To ensure success, legislators

should restrict the discretion of regulators to waive application of the penalties.[76] Automatic penalties then would make the policy self-enforcing by giving retailers a strong self-interest in fully complying, instead of seeking ways out of the program.

Texas provides an example. There, PUC regulations provide for a high, automatic penalty on noncomplying retailers. While the regulations allow the penalty to be waived if the commission determines that "events beyond the reasonable control of a competitive retailer prevented it from meeting its [credit] requirement," this statement avoids the Catch-22 problem:

> A party is responsible for conducting sufficient advance planning to acquire its allotment of [credits]. Failure of the spot or short-term market to supply a party with the allocated number of [credits] shall not constitute an event outside the competitive retailer's reasonable control. (Texas Substantive Rule, 1999)

II. WHAT PENALTIES SHOULD APPLY TO NONCOMPLYING RETAIL SELLERS?

We discuss here monetary penalties, "make-up" penalties, and penalties under rate regulation in instances where retailers fail to acquire sufficient renewable energy. We then discuss penalties for retailers who fail to meet a product-based RPS requirement.

Monetary penalties. We recommend that RPS laws contain a provision that requires the implementing agency to assess swiftly a monetary noncompliance penalty on any retail seller that falls short of its renewable energy obligation at the end of a compliance period. The penalty should exceed significantly the expected cost of compliance to give retailers a self-interest in full compliance. In this way, the policy becomes self-enforcing and avoids the need to resort to costly administrative and enforcement measures.

The EPA's sulfur dioxide (SO2) allowance trading program, which has operated since 1995 under the 1990 federal Clean Air Act Amendments, provides a good model. Under this program, the EPA imposes an automatic $2,000/ton penalty (indexed to inflation) for each excess ton of SO2 produced. SO2 allowances trade at about $100 each, though costs were originally projected to fall between $500 and $1,500. Because it is far cheaper to purchase allowances than to incur the high penalty, the generation units subject to the law regularly achieve 100 percent compliance. (Environmental Protection Agency, 2000).

---

[76] The enforcement regime should allow for suppliers to appeal penalties to the state commission for adjudication. The appeal process of an otherwise self-executing enforcement regime would permit suppliers to raise affirmative proof as to their good faith efforts to comply with the RPS and their reason for noncompliance (e.g., force majeure conditions; see Chapter Six, part III.

RPS regulations adopted by the Texas PUC follow this model. They provide for an automatic penalty of the lesser of $50/MWh or twice the average market value of credits. Because $50/MWh (five cents per kWh) is at least double the expected RPS compliance cost in that state,[77] it meets the objective of clearly exceeding expected compliance costs.

In addition to establishing monetary penalties, the legislature should empower the public utility commission to revoke a retailer's license in the case of repeated violations or nonpayment of penalties. The state attorney general can take additional actions where necessary.

Make-up penalties. Another type of penalty would be a make-up provision, wherein the state requires retailers to make up any renewable energy shortfalls in the following compliance period. Such a penalty could be in addition to monetary penalties or, if violators are required to double or triple the shortfall, it could substitute for monetary penalties. Sole reliance on monetary penalties that significantly exceed compliance costs is preferable because (a) the penalty will be sufficient to deter noncompliance, and (b) imposing additional penalties in the few instances of noncompliance would be excessive, (c) relying on make-up provisions alone will not result in a market of the intended size during the compliance period, and (d) make-up periods would not have certain closure -- i.e., the state would have to take additional actions if the make-up provision is not satisfied.

Penalties under rate regulation. In states where the RPS applies to only regulated utilities, rate regulation gives the PUC greater powers than in states where the PUC oversees (more numerous) non-rate-regulated retail sellers. In this case, high automatic penalties may be less important, but may still serve to encourage full and timely compliance. Establishing penalties is especially important if the RPS is envisioned to continue under possible retail competition the future.

Penalties for violating a product-based RPS. Under a product-based RPS (discussed in Chapter Four, part III), retailers will have to demonstrate that each of their products meet the RPS requirement, because only retailers will know the content and sales of each of their products. To ensure the accuracy of each retailer's demonstration, the state should reserve the right to audit the retailers' records or require each retailer to hire an independent auditor to confirm its statements, and impose a fine if the retailer fails to meet the requirement or submits false information. The fine should be commensurate with the harm that the retailer imposes on consumers and other marketers by presenting misleading product-content information.

[77] The compliance cost is the above-market cost of eligible renewable power. The price of tradable credits represents this incremental cost.

III. WHAT PENALTIES SHOULD APPLY TO RENEWABLE ENERGY GENERATORS WHO VIOLATE THE RULES?

Renewable energy generators could violate RPS requirements in one of two ways: they could report the generation of more power than they actually produced, and they could claim that their power is eligible when it is not. These types of violations, while they might cause significant harm, are of less concern than noncompliance by retailers since the latter could threaten the overall effectiveness of the policy. In addition, generator violations are likely to represent a relatively small portion of the total amount of renewables required under the RPS.

For these reasons, violations by generators will not threaten investors' confidence in the RPS market to the same degree as would noncompliance by retailers. The state must still deter each type of violation with penalties, however. We discuss each situation next, and then explain how the state should treat credits issued before the administrator detects a violation.

False Reporting of Production. In the ideal situation, metered generation data for all eligible facilities above a certain size will be provided by the ISO directly to the RPS administrator, or the administrator of the tradable credit system. Second best is data provided by generators that the administrator randomly cross-checks against ISO data at some later point.[78] Third best would be to rely on generator data with random audits of generator records and/or on-site visits to verify generators' statements.[79] Verification of output by small systems that are not metered by the ISO require the third treatment (see Chapter Eight.).

When data is provided by the ISO, there will be no false reporting. In the second and third cases, establishing penalties for false reporting should reduce the number of spot checks that are necessary because of the deterrent effect. The penalty should significantly exceed the benefit that generators gain by cheating (or by simple carelessness). For example, the penalty might be double the price that credits sold for during the period in which the generator reportedly produced the power. Repeat offences should disqualify the generator for eligibility for at least one year.

False Reporting of Eligibility. Since each facility will undergo a thorough review when the implementing agency initially certifies it, false reporting of the eligibility of generation is primarily an ongoing issue for facilities whose characteristics can change during their operation. This situation can arise when a facility is technically equipped to use a combination of eligible and ineligible fuels, such as biomass facilities that can use fossil fuels and solar-thermal generators that can use natural gas to heat

---

[78] If the ISO provides electronic data, automatic cross-checking of all data might be possible at minimal cost.

[79] The state should require generators to authorize access to any data needed to verify their generation claims.

the fluid that circulates past solar collectors in closed loops. Another situation that will require ongoing monitoring is when RPS eligibility requirements impose an emissions standard on thermal plants. In this case, generators would not be eligible while their emissions rates exceed the authorized levels.

In these cases, the state can require generators to submit records supporting their claims (e.g., records of all fuel purchases or reports of continuous emissions monitors), but the RPS administrator can also conduct audits. Audits might be conducted when an abnormality is detected, or by a tip-off from an interested party.

As with the false reporting of production, penalties should reduce the amount of spot-checking that is necessary and the penalty should significantly exceed the benefit that is gained by the false report.

Effect of generator fraud on credits. The RPS administrator might not detect the false reporting of production or eligibility until after it issues tradable credits to the offending generator and after the generator sells the credits to another party. In this case, the credits should remain valid because (a) the purchaser is likely to have no knowledge of the generator's violation, and (b) more important, confidence in tradable credits is essential for credit markets to develop; once issued to and sold by the generator, credit buyers must be assured of their validity. The threat of a substantial penalty can help prevent the situation entirely.

IV. HOW SHOULD PENALTY REVENUES BE USED?

If the state sets the noncompliance penalty at a sufficiently high level, it will likely collect few, if any, penalties because of the deterrent effect that the penalty will have.[80] In the event that the state does collect penalties, it should use the revenues to purchase renewable energy or tradable credits immediately, so that the state brings the renewables market to its intended size. This action will correct any harm done to eligible generators and to the goals of the RPS.

Penalty levels will allow the purchase of more credits than would have been purchased absent the violation. The implementing agency can use the revenues beyond those necessary to make the market whole to purchase more renewables, or it can turn them over to the state treasury or to another renewable energy program, such as an R&D program.

[80] As noted above, the EPA has yet to collect a fine under its tradable sulfur allowance program because of 100 percent compliance rates.

V. HOW DOES THE COST CAP RELATE TO THE NONCOMPLIANCE PENALTY?

In principle, the penalty should be higher than the cost cap (discussed in Chapter Two, part I), because the two serve different functions.

The penalty:

- ensures that retailers will make a good faith effort to comply;
- discourages retailers from seeking ways out of the program; and
- leads to an active credit market.

The cost cap:

- is insurance that the actual compliance cost will not exceed some reasonable level;
- protects those who make a good-faith effort to comply and cannot find credits below the cap price; and
- takes effect only if the cost of renewables exceeds expectations.

In practice, however, if the cost cap is set at a level that is significantly higher than expected costs, it can also serve as the penalty.

Chapter Eight:
Administering the RPS

In addressing issues related to RPS administration, we first discuss the implementation responsibilities that the state might delegate to its regulatory agencies and other institutions. We then describe ways in which the state can recover implementation costs. Finally, we describe the ongoing functions involved in administering an RPS.

I. TO WHICH REGULATORY AGENCIES AND OTHER INSTITUTIONS SHOULD THE STATE DELEGATE ADMINISTRATIVE RESPONSIBILITIES?

To ensure that the state effectively implements the RPS, the legislature must clearly assign implementation tasks to one or more of its regulatory agencies. The legislature will need to vest one agency with primary authority to implement the RPS policy, which we will call the "lead" agency. This agency will be responsible for adopting implementing regulations and performing all ongoing administrative functions (described below in part III) that are not assigned to other agencies. The legislature will also need to instruct other agencies and institutions to play specific supporting roles, which we describe below.

When selecting the lead agency, the state legislature should consider what each agency's supporting role would be to see whether the overall efficiency and effectiveness of implementation would be improved by giving that agency lead responsibility. Improvements might be gained, for example, if the same agency implements both the RPS and fuel source disclosure rules. Likewise, because many PUC decisions, such as those relating to default service, could have important effects on the RPS, designating the PUC as the lead agency might be advantageous.

We now describe the roles that various state agencies, as well as private institutions, might play in RPS implementation.[81] These institutions include the public utility commission, state energy and environmental offices, independent system operators, local distribution companies, and private third parties. The legislature should instruct these institutions to perform any tasks assigned to them.

A. State Public Utility Commission

The following areas will require the PUC's participation, whether or not the state assigns overall RPS implementation responsibility to the PUC:

[81] For a detailed discussion on many of these issues, see Grace, Wiser and Abbanat, 2000.

- The PUC should anticipate any impacts of the RPS, such as the cost of RPS compliance in the provision of default service, on the PUC's other restructuring objectives.

- If the state charges the PUC with implementing fuel source disclosure rules, the PUC should coordinate these rules with the RPS compliance verification system (see Chapter Six, part II).

- A PUC likely will be involved in enforcing the RPS, even if the state does not charge the PUC with administering the RPS, because the PUC will license the retail suppliers who are subject to the RPS. If the RPS administrator repeatedly imposes a monetary fine on a noncomplying retailer, or if the retailer fails to pay a fine, the PUC should suspend or revoke the retailer's license (see Chapter Seven, part II).

- The PUC might need to direct the local distribution companies that it regulates to cooperate with the RPS administrator in determining each retailer's total retail sales. The PUC might need to require retailers to authorize distribution companies to release load data to the RPS administrator. The RPS administrator will need this information to determine how much renewable energy each retailer is responsible for (assuming that the RPS is a percentage-of-retail-sales requirement).

- Finally, the PUC might need to ensure that utilities equitably distribute RPS benefits among ratepayers, contracted facilities, and shareholders. This situation will arise when utility-owned facilities or facilities under contract to the utility are eligible for benefits under the RPS. (See Chapter Three, part II.B.1(d) for a discussion of these issues.)

B. State Energy and Environmental Offices

In some states, state energy offices and/or environmental agencies perform siting and permitting functions and sometimes conduct planning and analytic functions related to the electricity industry. Where these agencies have information and expertise about generation facilities that are relevant to the RPS eligibility criteria, these agencies could be well suited to determine whether particular generation facilities are eligible under the RPS.

If the state has already charged one of these offices with implementing fuel source disclosure rules, the agency will need to coordinate these rules with the RPS compliance verification system (see Chapter Six, part I).

C. Independent System Operator

If the state adopts a tradable credit system for the RPS, the administrator of the credit system will need accurate data about the generation of power by eligible renewable energy facilities so that it can issue the appropriate number of credits. The RPS administrator could require each facility to provide documentation of its generation (e.g., by submitting copies of statements that it receives from the ISO, which meters each generator's output[82]). It would be more efficient, however, to have the ISO routinely transfer all generation data in an electronic form that the RPS administrator could upload into its electronic credit system.

If RPS compliance is based on central contract-path verification, then the ISO would have a far larger role, as indicated in the discussion on this topic in Chapter Six, part II.

States do not directly regulate ISOs, but states do regulate the transmission-owning utilities that join (or participate in creating) the ISO. States have an opportunity to influence the ISO when they require their utilities to belong to an ISO that meets certain requirements, such as an independent governance structure. Most states, for instance, have statutes requiring public utility commission approval before a utility transfers its transmission assets to the ISO's control. Depending on state circumstances, therefore, the state might be able to require indirectly that the ISO perform certain duties related to RPS administration.[83]

D. Local Distribution Utility

Under the protocols developed to implement retail competition, each local distribution company is responsible for reading customer meters and calculating the load obligations of the retail suppliers serving the customers in their territory. The LDC determines load using interval meter data, class-specific loss adjustment factors, and estimated statistical load profiles for accounts without interval meters.

---

[82] Small generators that are not monitored by the ISO would need to provide documentation in some other way. (See part III, below.)

[83] State involvement in the functions performed by ISOs is not invalid simply because the Federal Power Act gives FERC jurisdiction over the regulation of transmission facilities. The only area in which FERC clearly has exclusive authority is the establishment of transmission prices, terms, and conditions for unbundled transmission service in interstate commerce. While a state commission cannot put a utility in a position of having to comply with two sets of requirements -- one federal, one state -- that are irreconcilable, requiring a utility do something *not required* by FERC, but also *not forbidden* by FERC, does not require the utility to comply with conflicting regulatory requirements.

Under an RPS, on at least an annual basis, each distribution company will need to report to the RPS administrator the load for each retailer that operates in its territory.[84] The lead agency will need this information to determine the renewable energy obligation of each retailer (assuming that the RPS is a percentage-of-retail-sales requirement). It would be most efficient for the distribution company to transfer this information to the RPS administrator on a routine schedule in an electronic form.

Another option would be to rely on retailers for this data. This approach would require each retailer to hire an independent auditor to confirm its stated retail sales volume and/or the state could impose a large fine on retailers that submit false data. The RPS administrator could use each retailer's information as a cross-check on distribution company data. This could be important if the administrator will be compiling data from more than one distribution company for retailers who sell in more than one territory.

ISOs might also be able to acquire the capability to provide retail sales information, although the state might not have the authority to require it to perform this function.

E. Private Third Party

The lead agency might want to call upon an independent third party to administer some aspects of the RPS. A third party, such as an ISO or private company, might certify the eligibility of individual renewable energy generators or design and operate the tradable credits system. Using a third party administrator for the credit system could facilitate the development of a multi-state credit system (the benefits of which we discussed in Chapter Six, part II.D). The state legislature should authorize the agency implementing the RPS (and fuel source disclosure regulations) to involve third parties in the administration of credit trading systems, if authorization is necessary.

Note that the state should not allow the operator of the credit accounting system to expand the system to include *credit trading* or *credit exchanges*, however. The accounting and verification function is a monopoly function of the state, while competing market participants should provide credit trading functions. Mixing the two in a single corporation could provide an unfair competitive advantage to the credit accountant in competitive markets and create cross-subsidy problems between the functions.

[84] The PUC might need to require retailers to authorize distribution companies to release load data to the RPS administrator.

II. HOW CAN THE STATE RECOVER IMPLEMENTATION COSTS?

Policy makers will need to determine how to recover the administrative costs involved in implementing the RPS. Costs are associated with each of these aspects of policy implementation:

1. adopting RPS regulations, which will involve many of the policy issues discussed in this report;

2. determining the initial and ongoing eligibility status of renewable energy generators;

3. establishing procedures to verify compliance with the RPS;

4. verifying compliance with the RPS on an ongoing basis, which, if compliance is based on tradable credits, will involve operating the credit-accounting system;

5. imposing penalties on noncomplying retailers and generators;

6. hearing appeals as necessary; and

7. revising RPS regulations as necessary.

Most of these functions involve costs that are not unique; rather, they are the type of cost associated with the implementation of any number of other public policies related to the electricity industry. Unless the RPS requirement is very small, these administrative costs should be a small fraction of total policy costs, although they could still be a large absolute value.[85] Depending on particular circumstances in each state, the implementing agency might be able to absorb these costs within its existing budget; in other cases, a budget adjustment will be necessary.

What is unique about RPS implementation are the procedures and systems required to verify compliance with the RPS, and the ongoing verification process (items 3 and 4 in the above list). The cost of these procedures will vary considerably depending on the accounting and verification system adopted for the RPS, as discussed in Chapter Six, part II. For either type of system, the incremental cost of the RPS compliance system will be lower if it is a part of a central accounting system used to support other generation attribute policies. Costs will be lower still if several states use the system, since the system administrator can spread fixed costs over a larger credit volume.

---

[85] A study of Massachusetts' RPS law, for example, estimated that administrative and transaction costs will account for about four percent of total policy costs. The state's RPS requires new renewable energy resources to account for 4 percent of total resources in 2009. The analysis assumed that the RPS would be based on a state tradable credits system. Estimated costs would be lower if the analysis assumed a regional credit system. (Smith, Cory, Grace, and Wiser, 2000)

The administrative costs of the accounting and verification system could be borne by the government, the users of the system, or a combination of the two. More specifically, the cost-recovery options include:

ISO fees. If the ISO administers the system (even if the ISO subcontracts with another entity), the ISO could include the costs as part of the ISO's transmission fee. Recovering costs through ISO fees would be particularly appropriate with a "full credits" accounting system because most, if not all, power transmitted by the ISO would generate credits that the system would track.

Under a credit accounting system, fees on system users. With a credits-based verification system, users would include all entities that have credit-tracking accounts, including generators, brokers, and retailers. The credit system administrator could charge fees for any of the following: establishing an account, maintaining an account, issuing credits (i.e., a fee per credit issued), transferring credits between accounts, and issuing end-of-year compliance reports. The fee structure could reflect the fixed and variable costs of the system.[86]

Public goods charge funds. The state could tap public goods charge funds, as did New York (see Chapter Six, part II.B). These funds would most appropriately cover system start-up costs.

State agency's existing budget. If the implementing agency's budget is large enough, it could cover some or all start-up and/or operating costs.

III. WHAT IS INVOLVED IN THE ONGOING ADMINISTRATION OF AN RPS?

In this section we list, and in some cases briefly discuss, the ongoing functions involved in administering the RPS program. For this discussion, we assume that the state will base the RPS on a system of tradable credits, given the significant advantages of such a system discussed in Chapter Six, part I. The state could perform all of the functions listed here. Alternatively, as discussed above, one or more private contractors could perform a subset of the functions, depending on the state's own capabilities, the cost-effectiveness of outsourcing certain functions, and other factors.

---

[86] The credit system administrator could separately recover the costs that it incurs before its system is operating (e.g., through one of the sources listed below), or it could recover start-up costs through the ongoing fees. These pricing issues are best handled in contract negotiations between the state (or group of states) and the entity that the state hires to design, develop and/or operate the credit accounting system.

We divide the balance of this section into two subsections: administrative tasks not directly associated with the credit system, and administrative tasks that are directly associated with the credit system.

A. Administrative Tasks Not Directly Associated With the Credit System

The following RPS administrative tasks are not directly associated with the credit system:

1. Certify generators that are eligible under the RPS

The certification process will require:

- developing the application process and application forms for generators and small system aggregators that wish to certify themselves as eligible under the RPS;
- receiving, evaluating, and approving or denying those applications;
- if the entity that certifies facilities is not the RPS program administrator, the certifying entity will need to notify the administrator that it has certified a facility to produce RPS-eligible credits (and provide notification if a facility later becomes decertified); and

2. Verify generation by certified facilities

a. ISO-metered facilities

Ideally, the ISO would provide data for ISO-metered facilities directly to the RPS program administrator (see part I in this Chapter, above). Alternately, each generator can submit documentation that verifies its generation (e.g., a copy of the ISO's or local distribution utility's meter-reading statement).

Audits of facilities that cannot use ineligible fuels (such as a wind facility) should not be necessary. The RPS administrator should require facilities that can use ineligible fuels (such as a biomass facility) to submit records documenting fuel purchases, which the administrator could audit on a random spot-check basis. (See Chapter Seven, part III). Fewer spot-checks will be necessary if the RPS administrator is authorized to assess penalties when it discovers violations in the auditing process.

b. Non-ISO-metered facilities

Facilities that are not metered by the ISO include electric facilities and non-electric facilities.

i. Electric facilities

Electric facilities that the ISO does not meter (if eligible under the RPS) include grid-connected facilities below a certain size (e.g., 2 MW), both metered and non-metered, and non-grid-connected facilities.

Grid-connected facilities use meters to record production as a basis for settling transactions between the generator and the energy purchaser. The RPS administrator can use the recordings of these meters to verify production from small facilities. If the ISO does not recognize the generator as a settlement resource, then the ISO might be able to provide data from sub-ISO meters along with the data it provides on the generators that the ISO itself meters. If the generator sells its energy to a local distribution company (e.g., under PURPA or a state "mini-PURPA" statute), the distribution company should have similar data, or the generator should have the distribution company's confirmation of the data, which it could provide to the RPS administrator.

Off-grid and unmetered generation usually do not have separate meters that measure production.[87] If RPS eligibility rules include such systems, the RPS administrator can verify production from these facilities in a number of ways:

- **Require meters and independent meter reading.** RPS rules could require meter readings on the same schedule as the administrator issues renewable energy credits (e.g., quarterly). This method, although more costly for system owners, is the preferred method of verification since it provides exact, substantiated information on actual renewable energy production. Moreover, costs should not be significant except for very small systems (e.g., less than 10 kW), for which other methods can be used. RPS rules could require system owners to use a meter that meets a certain standard, or periodically require them to obtain an independent test of meter accuracy.

- **Estimate production based on technology type, size, and local renewable resource availability.** After the system owner provides documentation that he purchased and installed the system (e.g., by submitting copies of equipment purchase receipts and independent certification of proper system installation), the RPS administrator would issue credits based on a formula that takes into account the appropriate factors. This process does not require meters. In this case, the RPS administrator would need to conduct random on-site spot checks to ensure that

[87] Unmetered facilities include small renewable energy systems, such as rooftop photovoltaic panels, that reduce the amount of electricity drawn from the grid to meet electricity needs at the site. In some cases, the facility delivers electricity to the grid because the system produces more power than is used on site. A single bidirectional meter or two separate meters can measure the net production, but only two separate meters will distinctly measure the renewable energy production.

systems continue to operate. RPS rules should allow the administrator to impose high penalties when it detects fraud so as to deter it and to reduce the need for spot-checks.

- **Require meters but only periodic meter reading to confirm estimates.** RPS rules could require meters without requiring regular meter readings. The system owner would report system output, which the RPS administrator would confirm with periodic meter readings. To reduce verification costs, the administrator would conduct meter readings on a random spot-check basis, and impose penalties when it detects fraud.

ii Non-electric facilities

If non-electric facilities are eligible under the RPS (such as solar water heating systems or landfills that supply gas to the gas distribution system rather than convert the gas to electricity), the RPS administrator must devise formulas and apply them to calculate the renewable-electricity equivalent that it will credit to the facility. In some cases, the administrator can use industry standards, such as the solar water heating industry has developed. The RPS administrator can use gas production meters as it uses sub-ISO meters, and it can measure solar hot water production using the type of estimating technique described for non-metered electric facilities.

3. Provide information to the public

The program administrator should compile information to help the public and policy makers analyze the effects of the policy and to help facilitate the renewables market. This information might include:

- a list of certified renewable energy generators that are producing RPS credits;
- the total number of credits that the administrator issues annually and the total number required under the policy; and
- contact information for those credit traders and exchanges that wish to be listed.

4. Adjust the RPS obligation as necessary

In states where the RPS obligation is not a straightforward fixed percentage, or where other factors complicate the requirement, the administrator might need to calculate the retailers' obligation periodically. Adjusting the obligation could involve gathering data, developing equations, and making various calculations.

In Texas, for example, the "new" renewable energy requirement of each competitive retailer will vary depending on whether it has contracts with existing renewable energy facilities. The PUC developed a formula for determining the new renewables requirement of each retailer, which reflects the amount of existing contract capacity each retailer possesses (the state awards non-tradable credit "offsets" to retailers with existing capacity). Upon the retirement of any of that existing capacity, the state will adjust the new renewables requirement upward to replace the retired capacity two years after the retirement occurs.

5. Impose penalties on retailers that do not meet their RPS obligation

If the RPS administrator is not the state (e.g., if it is a private third-party under contract to the state), the state could give the administrator the authority to impose and collect penalties. If the state does not grant such authority, then the administrator would submit a report to the state indicating which (if any) retailers are not in compliance with the RPS, and the state would impose and collect the penalty.

The administrator could dispose of any penalty revenues by: (a) using them to purchase RPS credits in the market (as recommended in Chapter Seven, part IV); (b) depositing them in a state renewable energy program account; or (c) turning them over to the state treasury. (Note that, under a well-designed RPS, few, if any, retailers will incur penalties.)

6. Establish and manage any "cost cap"

If the RPS statute includes a cost cap, the RPS administrator must carefully design the cost cap methodology to avoid undermining investors' confidence in the renewables market created by the RPS and to avoid eliminating competition in the renewables market, as we discussed in Chapter Two, part I. A methodology that satisfies these principles would work as follows, assuming that the RPS obligation is based on tradable credits:

1. Policy makers would establish an upper limit, called the "cap price," on the price that the state expects electricity retailers to pay for renewable energy credits (RECs). A cap price of $0.025 per credit (the credit representing the price difference between "generic" and renewable power) might be appropriate.

2. If, in shopping the market for RECs, a retailer is unable to purchase the number of RECs it needs at the cap price or below, then the RPS administrator issues the number of "proxy" credits that the retail seller needs to be in compliance, charging the seller the cap price. This activity would take place for each retail seller needing credits toward the end of the "true-up" period each year. At this point, each retail seller has met its

obligation under the RPS using proxy credits, and the administrator has a sum of money.

3. The administrator takes the collected sum of money from sales of proxy credits and uses it to purchase RECs in the market, lowest prices first, until it expends the funds. Renewable energy generators compete to sell their RECs as close to the cap price as possible.

   Although this process will result in supporting less than the number of renewable kWh necessary to achieve the standard (this is the nature of a cost cap), it assures retailers, consumers and policymakers that the policy will not exceed a certain total cost. For renewable energy generators, it preserves a market close to the intended size (assuming the cap price is not set too low).

4. The maximum possible cost of the RPS would be the number of RECs required under the standard (under various assumptions for growth in total kWh sales, if it is a percentage requirement) multiplied by the cap price. The *maximum* cost will exceed the *expected* cost.

If the cost of renewables is within the range that policy makers expect, retailers would never use the cost cap mechanism, since renewables will be available in the market well below the cap price. If retailers do use the cost cap mechanism, the RPS administrator will need to issue proxy credits and dispose of the revenues collected in one of the same ways that it would handle penalty revenues (see previous section 5).[88]

B. Administrative Tasks Associated with the Credit System

If the RPS administrator will itself operate a credit accounting system, it will perform the following tasks:

1. **Develop registration or application forms for entities that wish to participate in the credit program.** These entities will include:

   - eligible renewable energy generators,

   - retail suppliers, and

[88] The RPS administrator could delegate some tasks related to proxy credits to the credit system administrator.

- credit brokers.

In addition, the system could be set up to accommodate:

- entities that wish to serve as small system credit aggregators, and

- consumers, businesses, or other entities that wish to procure credits for various other purposes, such as to encourage renewable energy production or obtain recognition for reducing carbon dioxide emissions.

2. **Receive, evaluate, and respond to applications from entities that wish to participate in the credit program.** This process could require credit account applicants to post credit and to execute an agreement with the administrator. Whether the posting of credit is necessary depends in part on whether the administrator will assess fees on users of the credit system.

3. **Create and maintain credit accounts for each program participant.**

4. **Periodically (e.g., quarterly), award tradable credits earned by generators based on verified production data.** With an RPS-only credit system, only qualifying generators will be eligible to receive credits. With a single-tiered standard, only one type of credit would be issued, signifying that the generation qualifies under the RPS. If the RPS has two tiers, there would be two types of credits. A system that serves both claims verification and RPS compliance purposes will issue various types of credits that reflect fuel type, whether the generation qualifies under the RPS, and any other information required by the state's disclosure law, such as air emissions and nuclear waste generated by the fuel.

   The RPS administrator might need to adjust the number of credits awarded to generators by some predetermined factor to account for the line losses that occur between the generation and the retail consumption of electricity. (See Chapter Four, part II.B.)

5. **Verify that retailers meet the annual RPS obligation.** Verification entails confirming that retailers possess, in their credit account, a number of credits equal to the product of the RPS percentage requirement and the retailers' annual retail kilowatt-hours delivered. Retail sales information could be provided by the ISO, retailers, local distribution companies, or some combination. (See part I in this chapter, above.)

An additional step would be required under a **product-based** RPS requirement (discussed in Chapter Four, part III). Under a product-based RPS, in addition to ensuring that each retailer has the required total number of credits (which is **supply-side** information), the administrator would need to verify that the retailer included the required RPS content in each product sold. Looking at each product requires **demand-side** verification of the claims that the retailer has made in advertising, consumer contracts, and product-content labels.

Only a few states have begun the process of establishing procedures for verifying demand-side claims. In California, the California Energy Commission (CEC) requires that each retailer submit a statement from an independent auditor. The statement attests to the auditor's performance of a set of "agreed-upon procedures" to verify the retailer's statement of the amount of generation of each fuel type that the retailer promised to its consumers during a certain period. These procedures involve, for example, conducting a statistically valid sampling of the retailer's customer-sales records and ensuring that the retailer's calculations are mathematically accurate. (California Energy Commission, 2000)

6. **Retire credits that retailers use to comply with the RPS.**

7. **If credits have a limited lifetime, retire them from the accounts of program participants as they expire.**

If a credit system is already in place (or is under development) to support other generation attribute policies, such as verification of fuel source disclosures, the RPS administrator will not need to duplicate the system. The RPS administrator will need to ensure only that the credit system enables the state to determine RPS compliance. To determine RPS compliance:

- the RPS administrator will need to know whether the credit is valid for RPS compliance purposes. In a multi-state credit system, where more than one state has an RPS but eligibility criteria differ, each credit would need to indicate the states that have deemed the source of the credit to be eligible for the RPS. It should be easy to include such features in an electronic credit system, particularly if the system designer can include the features in the initial system design.

- the credit system would have to track RPS-eligible credits for each retailer and produce retailer compliance reports; and

- the credit system would have to accommodate the banking and borrowing of RPS credits (see Chapter Six, part III.B).

Appendix A:
Legal Issues Associated With Location Requirements

I. In-State and In-Region Requirements

In-state requirements serving as a condition of eligibility can fall into four main categories: (a) a requirement that the renewable generator be *located* in the state or region[89]; (b) a requirement that the renewable generator, wherever located, *produce benefits* for the state; (c) a requirement that in-state customers *physically consume* the renewable energy; and (d) a requirement that the renewable energy be *sold to consumers* in the state. We will discuss each in turn.

A. Excluding Out-of-State Generation

1. In General

Some states have limited renewable resource eligibility to production from generation facilities located within the state. Absent a significant change in Supreme Court application of the Commerce Clause of the U.S. Constitution, the restriction to in-state generation will, if challenged, be found unconstitutional. The courts have continually found that facial discrimination by a state against out-of-state resources is "virtually *per se* invalid." *Philadelphia v. New Jersey*, 437 U.S. 617, 624 (invalidating New Jersey's ban on imports of out-of-state garbage). The exclusion of out-of-state generation is sufficiently similar to court precedents to expect invalidation here.[90]

Nor does the proposal's constitutionality improve upon expanding the in-state generation requirement to an in-region requirement: say, a Vermont law that restricts RPS eligibility to generators located in New England. The state law still would discriminate, facially, against other states. A state law that makes eligible generation located in a list of six states still discriminates against the remaining 44 states. The Court's "virtually per se invalid" test still will apply.

---

[89] As discussed below, an in-region location requirement raises the same legal issues as an in-state location requirement.

[90] One legal writer, acknowledging that current Commerce Clause analysis would likely prohibit an in-state generation requirement, has argued that courts should adjust the analysis to take into account the externality, or free-rider problem, thereby upholding state requirements that limit RPS credits to in-state generation where the stimulation of a trading market increases efficiency. (Engel, 1999, at 322-49)

2. The Texas Approach

One variation on the restriction to generators that locate in the state appears in Texas' RPS regulations. There, an out-of-state generator is eligible for credits if its production is transmitted into the state on a dedicated line and metered in Texas.[91] This proposal takes an analytical approach similar to the Maine statute, in that the eligibility is limited to generators that deliver their power to a location relatively near consumers, ensuring that the renewable generation displaces non-renewable generation that otherwise would have operated to serve these consumers. The Texas approach is thus best viewed as a *means of achieving* the goal of restricting RPS benefits to generators that will provide benefits to Texas by requiring, indirectly, that they be located in or near Texas. As the Texas Commission explained:

> The intent of this requirement is to ensure that all [tradable credits] participating in the trading program represent actual megawatt-hours of renewable energy for consumption by Texas retail customers. Renewable facilities that deliver electricity into a transmission system where it is commingled with electricity from non-renewable resources could not be verified as delivered to Texas customers. (Texas Substantive Rule, 1999)

The Texas statute presents some constitutional risk, but the matter is not clear. One might argue that the benefits to Texas of an out-of-state generator flow from its proximity to the state, not from its interconnectedness to the state. Two identical renewable generators located in the same Oklahoma city could provide the same benefits to Texas (e.g., in terms of displacement and diversity). If one of them invested in an interconnection with Texas and the other didn't, the former would not necessarily provide more benefits to Texas, yet would have to pay the extra interconnection cost. (The interconnection might result in more benefits, but the benefits would depend on how the interconnection altered the configuration of generators actually operating.)

Also consider two generators located very close to one another, one inside the Texas border and the other located just over the border. If the two generators are nearly in the same location, the one outside Texas would not necessarily provide fewer benefits to Texas than a renewable generator located just inside the Texas border; yet the non-Texas generator would have to bear the cost of building a special dedicated interconnection to allow for direct, in-Texas metering of its output. The non-Texas generator would have to bear a cost not imposed on the in-Texas generator, *not because it produces fewer benefits because it was located outside the state.* A court could view this treatment

---

[91] Section 25,173(c)(11)(e)(4) of the Texas rules states that to be eligible for credits, the facility's output "must be readily capable of being physically metered and verified in Texas by the program administrator. Energy from a renewable facility that is delivered into a transmission system where it is commingled with electricity from non-renewable resources can not be verified as delivered to Texas customers."

as discrimination without a substantial basis. No challenge has been made to the Texas approach, however.

B. Restricting Eligibility to Generation, Wherever Located, Which Produces Benefits for the State

An alternative approach would be to condition RPS eligibility to generators not based on their location but on whether they provide benefits to the state. The contributions would include one or more of the features of renewable energy noted above, depending on what the state's goals are. Thus, for example,

- that the generator's output displaces output from generation contributing to pollution problems affecting the enacting state;

- that the generator's market presence improves the resource diversity in the market which serves the enacting state, and thereby contributes to the stabilization of prices within the state; and/or

- that the generator will contribute to the advancement of renewable technologies.

Under this approach, the generator would qualify for benefits regardless of where it is located or to whom it sells its power, because its benefits to the region and the enacting state flow from what it displaces or contributes, not from its physical location or the contractual path its output takes. This approach also avoids the need for contract-path verification (unlike in-state consumption or in-state sales requirements, discussed below).

These restrictions would be legitimate efforts by a state to gain benefits in return for the RPS costs it incurs. While location would be a factor in determining benefits to the state, it would not be the determining factor. Although such a policy clearly will exclude distant generators, the exclusion will occur not because those generators are located in another state, but because their physical circumstances preclude benefits to the state. This feature avoids the facial discrimination attack which makes explicit location requirements vulnerable.

One example of an effort to solve this problem is the Maine statute, which restricts RPS eligibility to entities which "generate power that can physically be delivered to ... the New England Power Pool." Me. Rev. Stat. Ann. tit. 35, sec. 3210 (West 1998). This approach prevents the California-Maine problem, where there is no possibility of benefit to the enacting state. The premise here is that, if the generator is able to deliver to the New England Power Pool, it is likely to be in a location where its displacement and diversity benefits can accrue to Maine.

A state enacting such a concept should take care to make the test fact-based. A provision saying that "all RPS generation must be located within the enacting state or an adjacent state" is vulnerable, even if "adjacent states" seems like a reasonable proxy for "locations that will provide benefits to our state," because it facially discriminates and offers no hope for anyone in any other state to offer proof. It is legally safer to engage in a case-by-case analysis, although fact-based safe harbors (arrived at by a commission, based on an evidentiary record rather than legislated rigidly) might be possible.[92]

The notion of restricting RPS eligibility to generators that can show benefits to the state is likely to satisfy constitutional scrutiny for at least two reasons. First, it does not discriminate against out-of-state generators: any generator, whether in-state or out-of-state, can qualify if it can demonstrate that it provides benefits to in-state consumers. Second, the proposal does not harm out-of-state consumers; it simply makes the enacting state, and the surrounding region that is associated with providing benefits to the state, a more attractive market for renewable energy generation in the same way as would a tax break offered to those who sell to or locate within the state. (See Engel, 1999, at 276-78). (Although the legal problems may diminish, there still could be, from the enacting state's point of view, some mismatch of costs and benefits since the enacting state pays higher power prices while the state hosting the generator realizes job and tax benefits.)

C. In-State Consumption Requirements

Some have suggested that a proxy for providing in-state benefits is in-state consumption. That is, if a generator can show that power physically is flowing from the generator to consumers within the state, the state receives benefits. We offer a few thoughts on this approach.

First, there is not a direct relationship between location of consumption and location of benefit. Unless a state is a market unto itself, the benefits of displacement and diversity are likely to be regional. Therefore, a requirement of in-state consumption does not garner more benefits for the enacting state than the approach described in the preceding subsection, i.e., conditioning RPS eligibility on a showing of some state benefit.

Second, it is technically complex to trace electrons from a generator to a destination; flows can change every hour due to temperature, wind, outages of other generators, changes in demand, and other factors. Even if the generator could show that power flowed into the state, that does not mean that the power would remain and be consumed in the state. Each state, other than Texas, Hawaii, and Alaska, is interconnected with its neighboring states through alternating current ties. As a result, power flowing into the RPS state can readily flow out of the state. Even if there is a requirement of a dedicated line from the generator to the in-state grid, the problem would remain because once the

[92] For more discussion on safe harbors, see the following subsection.

power enters the state it could leave the state and be consumed elsewhere. (Texas, which has a dedicated line requirement, largely escapes this problem because its interconnections to neighboring states are limited largely to direct current ties. On direct current ties, as distinct from alternating current ties, power flows only when manually directed to. There is, in effect, a mechanical override of the physical laws that normally rule the flow on a conventional interconnected system.)

A statute that restricts RPS eligibility to generators whose output is physically consumed in the state raises constitutional questions, although not as stark as the in-state location requirement. The enacting state's legal argument would be that the in-state consumption requirement, while *discriminatory against generators whose output does not physically flow into the state*, is reasonably discriminatory because it is a proxy for benefits to the state. Because the benefits of renewables are (except in rare cases) not easily confined to a single state, however, the in-state consumption requirement is not a good proxy for benefits. A court therefore could reject the proxy argument and find the statute unnecessarily and unreasonably *discriminates*, particularly where less discriminatory alternatives (such as the requirement of showing regional benefits having a reasonable likelihood to benefit the state, described in the preceding section) are available.

If an in-state consumption requirement is constitutional, and a state wishes to apply the requirement rather than the more efficacious benefits test, the question then arises how an out-of-state generator can show that its output was consumed within the state. As discussed above, this showing is a challenge because, unless a generator is directly connected with the in-state consumer (a very rare circumstances), it is not automatically true that its output will be consumed inside the state.

This challenge is not insurmountable, but it is difficult. The general principle would be to allow the generator to meet the in-state consumption requirement if it can demonstrate a contract path to consumers in the state and a reasonable likelihood that a substantial portion of the output actually flowed into and was consumed within the state. This approach would require showing that the contract paths reasonably resemble physical paths. The generator could make the showing in a variety of ways, such as:

- estimating the power flows from the plant for the specific transactions at issue, showing that a substantial part of the output will flow into and be consumed within the RPS state;

- demonstrating that the contract path falls within a region whose historical pattern of flows indicates that power generated by the plant normally flows into or near the RPS state; and/or

- showing that the generator is connected to specified backbone transmission facilities which, based on historical patterns, carry power to the RPS state.

To simplify the administrative process, a state commission could make some or all of these factors safe harbors, i.e., if the generation satisfied one of these factors it would be entitled automatically to eligibility under the contract-path approach. It is important, however, to allow those who do not meet a safe harbor to seek to make the showing. Making the safe harbors the exclusive means of compliance could lead to court challenge arguing that the safe harbors constituted a ruse to discriminate against out-of-state generators.

Because the closeness of the fit between contract path and physical path will vary with facts, it is best to place the general principle in legislation, and require the state commission to apply the principle on a case-by-case basis. Specifying in legislation a qualifying geographic area (e.g., "any renewable generator located within a 100 mile radius of the state may qualify") comes uncomfortably close to establishing an exclusive, impermeable boundary that courts will view as discrimination. Requiring instead that a generator must demonstrate a reasonable likelihood that its output is consumed within the enacting state allows the state commission to apply flexible, practical tests. Provided the state commission bases its decisions on facts applied evenhandedly, courts will have a basis for deferring to the state.

Finally, it is best if the obligation to make this showing falls on every generator, not only on out-of-state generators. Even an in-state generator cannot assume without inquiry that its output is consumed within the state (unless that generator is located in Texas, Hawaii or Alaska, i.e., states not interconnected with other states through alternating current ties). To impose the factual showing obligation on out-of-state generators only therefore could be seen by a court as discriminatory.

In-state consumption requirements based on contract paths, even with simplifying safe harbors, however, present all of the practical difficulties associated with contract-path verification, discussed in Chapter Six, part II, in addition to presenting potential Constitutional problems. Moreover, though an RPS could still, in theory, be based on a system of tradable credits under this approach -- the credits would be awarded after the generator shows that its output was contractually tied to in-state consumers and is reasonably likely to resemble a physical path -- the need to document contract paths eliminates one of the significant benefits of a tradable credit system: that tradable credits do not require the physical or contractual delivery of power to particular consumers.

D. In-State Sales Requirements

Another approach for linking renewable generation to the state enacting the RPS is to require a contract path between the generator and in-state consumers, an approach sometimes called an "in-state sales requirement." While this approach carries a smaller constitutional risk, it fails to assure that the state will receive benefits.

An in-state sales requirement would not contain a facially discriminatory provision and therefore avoids the potential Commerce Clause problems associated with an in-state location requirement or an in-state consumption requirement. It is not facially discriminatory because any generator, regardless of its location, that can establish a contract-path to the enacting state would be eligible.

Although the statute might appear to discriminate against out-of-state consumers in that only in-state customers can purchase the power, its constitutionality is unaffected. Nothing about the enacting state's law prevents other states from obtaining the same benefits for their own consumers. In the context of consumer treatment, the Court "prohibits states only from forcing out-of-state consumers to 'surrender whatever *competitive advantages* they may possess' over in-state consumers." [Engel, 1999, at 277-78 (quoting *Brown-Forman Distillers Corp. v. New York State Liquor Auth.*, 476 U.S. 573, 580 (1986) (emphasis added).]

Despite its constitutional soundness, the in-state sales approach fails to ensure benefits for the enacting state, as does the approach of conditioning RPS eligibility upon a showing of benefits to the state. The in-state sales requirement has no inherent connection to in-state benefits because it is possible to create contract paths from very distant generators that provide few if any benefits to the in-state purchasing consumer.

In addition, as discussed in Chapter Six, part II, it is not possible to trace the contract path between all generators and the load that those generators serve contractually since not all generation is sold pursuant to bilateral contracts involving specific generators. Finally, as with the in-state consumption requirement, the need to document contract paths would eliminate one of the significant benefits of a tradable credit system: that tradable credits do not require the physical or contractual delivery of power to particular consumers.

II. U.S. Domestic Content Requirement

Given significant renewable resource opportunities in Canada and Mexico, a border state might consider excluding or limiting those resources in order to increase the chance that the resources developed for its RPS will produce benefits that will accrue to the state. Vast Canadian hydroelectric resources present a special case of this issue for any state wishing to use an RPS program to support or expand the hydroelectric resources currently in its resource mix.

The same *per se* prohibition on a state requiring in-state generation sources applies to a restriction against foreign resources. Under the Commerce Clause, a state may not discriminate against out-of-state resources, whether those resources reside in another state or in another country.

Because of this Commerce Clause prohibition, it is not necessary to consider similar obstacles that would face a ban on extra-territorial resources that might exist under international trade agreements and international law. However, a domestic-content requirement also could be subject to challenge under international trade agreements. In particular, Canada or Mexico could file a challenge to a state's domestic requirement with the international tribunal established to arbitrate compliance with the North American Free Trade Agreement (NAFTA). Such a challenge might contend that the requirement is an illegal barrier to trade in renewable generation. The likelihood that such a challenge would be successful is beyond the scope of this report.

On much stronger constitutional footing would be a restriction against a source rather than against an origin. Excluding hydroelectricity is different from excluding Canadian power. That hydroelectric power is a more significant resource in Canada than in the enacting state does not change this analysis. Assuming that hydroelectricity is physically feasible within the enacting state, the restriction would fall on both in-state and out-of-state resources, and therefore it would not discriminate on geographic grounds. If hydroelectricity was not feasible within the state, however, a court might view the prohibition as geographic discrimination in disguise, and invalidate on that basis.

III. Reciprocity Requirement

Some have suggested that a state exclude from eligibility renewable resources that (a) are located in states that have not opened their markets to retail competition, or (b) are owned by or under contract to a utility whose retail service territory is not subject to competition. The first limitation will likely fail constitutional review because it discriminates based on state boundaries. The second is likely to pass because it does not so discriminate.

The desire of a retail competition state for "reciprocity" from other states does not change the discriminatory nature of a law that discriminates on the basis of state boundaries. In *Great Atlantic & Pacific Tea Co., Inc. v. Cottrell*, 424 U.S. 366 (1976), the Court invalidated Mississippi legislation stating that milk from another state could not be sold in Mississippi unless the other state accepted milk from Mississippi on a reciprocal basis. The Court reasoned that a state may not condition its conformance with the free flow of goods under the Commerce Clause on the other state's conformance with the Commerce Clause. See also *Sporhase v. Nebraska*, 458 U.S. 941 (1986) (reaching the same conclusion in a water exportation scenario).

The same constitutional infirmity would not exist if the state aimed its reciprocity goal not at other states, but at certain service territories within the enacting state. In some states, retail competition legislation authorizes municipal and rural cooperative systems to "opt out" of retail competition. A state might wish to make ineligible for RPS compliance those resources that are owned by, or under contract to, such in-state entities where the entities have not opted for retail competition. Because all the

affected territories are within the enacting state, no Commerce Clause issue arises. (Advocates of this approach should consult their state constitutions, particularly the equal protection clauses therein.)

A closer question is whether the state could condition eligibility on the generator being located in territories that have retail competition, whether such territories are inside or outside the state. If the enacting state has territories that lack competition (such as municipal or cooperative areas), the risk that such a requirement would be seen as a simple exclusion of power from other states would be reduced. The requirement of competition in the generator's location would be independent of the state in which the generator is located.

Likewise, if the RPS excludes all generators that are owned by a utility whose retail service territory is not subject to competition -- particularly where the restriction would also include some in-state facilities -- then the risk of invalidation would be reduced. For policy and practical reasons, however, excluding resources on this basis is unwise. First, the status of retail competition in the utility's territory may have no bearing on whether the facility continues to produce power.

Second, unless the exclusion is applied to all affiliates of such utilities (which could significantly narrow the pool of eligible renewable energy projects and project investors), then the resource could simply be transferred to an affiliate of the regulated utility.

Third, the exclusion imputes a culpability to the owner that may have no basis. In short, retail competition is a gross proxy that raises unsolvable practical issues. A better test would be a facility-by-facility review of such facilities, or the exclusion of certain types of facilities that are generally economic and which may, in the process, exclude many utility-owned resources.

Appendix B:
Items to Include in RPS Legislation

This appendix sets forth the RPS design details that the legislature should establish, rather than leave to the agency level. We assume that the obligation will be based on tradable credits. From all of the issues discussed in the report, we created this list of items to include in legislation for three reasons.

First, these design features will determine the cost of the policy and the goals that will be achieved by the policy. Second, these design features, in combination, are integral to the efficiency and effectiveness of the policy and to achieving the legislature's intended goals. Third, legislative approval of certain policy features (such as penalties and the duration of the standard) is necessary to provide renewable energy investors with sufficient confidence to invest in the market created by the RPS. The legislature might include additional design details in the legislation, but their inclusion will not be as critical to the success of the policy.

We divide the legislative items into five categories: define the obligation; define renewable energy credits and related rules; define eligible renewable energy resources; identify the implementing agency and set forth additional implementation tasks; and require other institutions to cooperate.

I. Define the Obligation

1. Obligate each retail seller of electricity to demonstrate to the implementing agency that it has acquired and permanently withdrawn from circulation a number of eligible renewable energy credits equal to a specified percentage of the total kilowatt-hours (or megawatt-hours) sold to its retail customers in the state during the preceding year. Ensure that the definition of retail seller includes all sellers of electricity at the retail level, including the default provider(s).

2. Obligate each self-generator of electricity over X MW in size to acquire a number of tradable renewable energy credits equal to a specified percentage of the total kilowatt-hours (or megawatt-hours) they generate and consume each year. Exempt self-generators using eligible renewable energy resources that do not apply for tradable credits under the RPS.

3. Require retail sellers to include the specified percentage in all products sold to consumers and prohibit retail sellers from representing to any consumer or prospective consumer that any of its products contain more than the specified percentage of eligible renewable resources unless the retail seller has acquired and withdrawn from circulation an equivalent number of eligible renewable resource credits.

4. Define the specified percentage as X in year 20XX, rising to Y in the year 20YY, and remaining in place at that level until [20YY + 10 years].

5. If the initial specified percentage is intended to preserve the current amount of eligible renewable resources serving the state:

   a. direct the implementing agency to adjust the initial percentage requirement as necessary to ensure that it is between 5 and 10 percent below the current amount of eligible renewable energy resources that are serving the state (i.e., the amount in the year the statute was enacted); and

   b. authorize the implementing agency to determine the current amount of existing renewables based on an advance registration process for eligible facilities or by conducting a survey of renewable energy generation plants.

6. Establish interim specified percentage requirements such that the requirement increases gradually between 20XX and 20YY. The schedule should allow economies of scale to be achieved and facilitate efficient and orderly renewable energy developments.

7. Require the implementing agency (or its designee) to assess and collect a penalty of at least twice the estimated market cost of an eligible renewable energy credit for each such credit that (a) a retail seller or self-generator fails to acquire and withdraw from circulation pursuant to implementing regulations, or (b) an eligible generator acquires in violation of the implementing regulations. Require the implementing agency to use any proceeds from such payments to purchase the least-cost eligible renewable energy credits available in the market. Specify that such penalties shall not diminish the liability of retail sellers or generators for the same violation under any other applicable provision of law.

II. Define Renewable Energy Credits and Related Rules

1. Define "eligible renewable energy credit" as a certificate of proof, certified by the implementing agency or its designee, that one kilowatt-hour (or megawatt-hour) of electricity was generated by an eligible renewable energy resource. If non-electric resources are eligible, specify that the implementing agency shall, for purposes of issuing credits, determine the electricity equivalent of non-electric eligible renewable resources.

2. Specify that renewable energy credits may be sold or exchanged by the person to whom issued or by any other person who acquires the credit.

3. Require the implementing agency to establish a credit-accounting system (or ensure that, if there is already a generation attribute accounting system established in the state, that it will facilitate the tradable RPS requirement). Direct the agency to participate in a regional credit-accounting system if the system, in conjunction with the implementing agency, is able to identify credits that are from a generator that qualifies for the state's RPS, and to perform other credit-accounting functions necessary to implement the RPS as determined by the implementing agency.

4. Specify that the renewable energy and other environment-related attributes associated with an eligible renewable energy kilowatt-hour (or megawatt-hour) shall be sold or transferred only through the eligible renewable energy credit, and that the credit shall be used only once.

III. Define Eligible Renewable Energy Resources

1. Define the resources and/or technologies that a generator must use in order for its production to qualify for eligible renewable energy credits. Include major limiting criteria, including:

   a. A benefits-based location requirement

      Direct the implementing agency to certify only those generators, wherever located, that meet the agency's fact-based criteria for eligible renewable resources and whose output contributes to the state's welfare. Depending on the state's policy goals, the state could condition RPS eligibility upon a generator demonstrating one or more of the following:

      - that the generator's output is likely to displace output from generation contributing to pollution problems affecting the enacting state;

      - that the generator's market presence, by virtue of displacing other generation and other fuels, is likely to improve the resource diversity in the market which serves the enacting state, thereby contributing to the stabilization of prices within the state; and/or

      - that the generator will contribute to the advancement of renewable technologies.

Authorize the implementing agency to develop criteria, which, if satisfied, automatically will entitle a generator to eligibility (a "safe harbor"), while allowing generators that do not meet the criteria to make a showing that they contribute to the state's welfare, as statutorily described.

b. An anti-double-dipping provision

Specify that generators receiving direct-cash production incentives or capital subsidies from a state or federal government source are ineligible, except for technologies that the implementing agency may determine are insufficiently competitive under the state's RPS policy alone.

c. A provision on multi-fuel facilities

Specify that, in multi-fuel facilities, only the energy generated by qualifying fuels shall be eligible unless the use of non-qualifying fuels is below a certain level, such as two percent.

2. Require the implementing agency or its designee (or another state agency) to certify the eligibility of renewable energy generators based on the implementing agency's adopted criteria.

IV. Identify the Implementing Agency and Set Forth Additional Implementation Tasks

1. Identify the implementing agency.

2. Direct the implementing agency to:

a.. adopt final implementing regulations at least two years before any new renewables are required to meet the policy; and

b. establish compliance flexibility measures, such as credit banking and borrowing, that reduce compliance risks without unduly compromising the renewables market created by the RPS.

3. Authorize the implementing agency to:

a.. promulgate such rules as may be necessary to effectively and efficiently implement the policy, including rules requiring the submission of any information

that may be necessary to verify (i) the eligibility of renewable energy generators and the production of power from such generators, and (ii) the annual electricity sales of retail sellers and the annual generation and consumption of self-generators; and

b. impose or authorize a fee on users to the credit system in an amount equal to the reasonable administrative costs of issuing and tracking such credits and related services.

V. Require Other Institutions to Cooperate

Require other institutions to cooperate with the implementing agency in implementing the RPS policy in the specific instances where required. For example, require local distribution companies to provide information on the retail sales volume of each retail seller to the RPS administrator.

Appendix C:
Relationship Between Federal and State RPS Policies

Whether or not Congress adopts a national RPS policy, federal legislation -- most likely a provision of national electricity industry restructuring legislation -- could either facilitate or hinder states' ability to use RPS policies to promote their renewable energy goals. This section describes various ways in which federal legislation could facilitate state RPS laws.

These ways include:

- creating a national credit accounting system;
- allowing states to add state RPS requirements to any national RPS;
- authorizing states to use state-based location requirements as part of their RPS renewable energy eligibility criteria; and
- placing any national RPS requirement on retailers.

I. Create a National Credit Accounting System

A national credit accounting system would facilitate the implementation of state-level RPS requirements and other generation attribute policies, such as voluntary fuel source claims verification programs, fuel source disclosure requirements, and emissions portfolio standards. Congress could establish a national credit-accounting system whether or not it adopts a national RPS.

A national accounting system should be a single, tradable-credits-based system -- or a set of consistent, regional credit systems, rather than a contract-path-based system, because of the advantages of tradable credits discussed in Chapter Six.[93] Although it would be possible to attempt to coordinate different types of systems in different regions, there is no reason to do so given the increased cost, complexity and risk of error that would be introduced.

The benefits of a national credit accounting system are several. Such an accounting system would:

---

[93] Options for covering the costs of the national accounting system would be the same as described for state systems in Chapter Eight, part II, with the same types of federal funding sources providing additional options. Congress would also need to ensure that various institutions cooperate with the credit system administrator (also described in Chapter Eight, part II.)

- ensure the integrity of verification systems;
- accommodate state-specific policies;
- reduce entry barriers; and
- reduce costs through economies of scale.

We describe these benefits in turn.

Ensure the integrity of verification systems. The integrity of most states'[94] generation attribute policies, including RPS policies, depends on whether all states in the relevant electricity market use a single compliance-accounting system, or at least use and coordinate accounting systems that are compatible. Accounting system uniformity is necessary because most states draw their electricity from a regional market, with generators and retailers conducting business in more than one state. Without uniformity, generation attributes could be double counted, both intentionally and unintentionally.[95]

A national accounting system would have significant value to states because the lack of regional authorities makes it difficult for states to work together to establish and fund a uniform regional verification system. The need to coordinate neighboring regional systems -- assuming regional systems emerge -- adds further complexity. It is particularly important to coordinate regional verification systems when state RPS eligibility requirements are based on whether generators provide benefits to the state, and where those benefits can be provided by generators located outside the physical electricity trading region. In this case, the relevant region for the generation attribute accounting system to cover would be the physical trading region in which the state exists as well as the trading region(s) in which eligible generators may be located.

Accommodate state-specific policies. Each state's policies need not be uniform just because a single credit-accounting system is used. An electronic credit system can (and should) be designed such that the tradable credits issued to each generator carry whatever identifying information is required by all states that participate in the system. Two examples:

- A generator has been qualified as eligible by State A for its RPS, but the generator does not qualify for State B's RPS. The generator's credits are "imprinted" with a code that indicates that the credit will satisfy State A's RPS only.

---

[94] The obvious exceptions are Alaska, Hawaii, and Texas given their geographic separation from other states and the separateness of their electrical grids.

[95] For more discussion on these issues, see Chapter Six..

- State C requires that emissions be disclosed to consumers in an "electricity facts" label, but State D requires that only fuel sources be disclosed in labels. All credits could carry both fuel source and emissions information, but, in State D, only the fuel source information is used.[96]

Note that many differences between state RPS policies would be of no consequence simply because a single accounting system is used. For example, no administrative complications would be introduced if one state's RPS is a product-based requirement and another's is company-based, or if some retailers are exempt under one state's policy but not under another's. As long as a single credit system is used, credits will only be used once, and they will be used in accordance with each state's policy.

Each state would need to work with the administrator of the credit system to ensure that its policies will be accommodated by the system. Each state would then use reports produced by the system administrator to determine whether retailers operating within their jurisdiction have complied with their generation attribute policies.

Reduce costs to retailers. A national credit accounting system would create benefits beyond the prevention of double-counting of renewable energy and other generation attributes: it would reduce costs to retailers, and thus promote competition by establishing a uniform, low-cost accounting system for retailers to use when complying with state generation attribute policies.

Reduce costs through economies of scale. Using a national credit system would avoid the need to design, build, and operate numerous state- or regional-level systems. Instead, the fixed costs would be incurred only once. (At least some of these cost savings would also be achieved if a uniform, coordinated set of regional credit systems were adopted.) The fixed costs associated with the ongoing operation of the system should also be significantly less the sum of the fixed costs of operating several systems. These costs would also be spread over all users, reducing each user's individual cost.[97]

---

[96] The information that is carried in each credit could be left up to generators, which would supply the information when they apply for credits. But, if information is lacking, the generator's credits would not be usable by retailers in states that require the missing information.

[97] A "user" could be each state or each retailer using the system, unless system costs are covered by the federal government.

II. Allow States to Add State RPS Requirements to Any National RPS

If Congress adopts a national RPS policy, it should include a "savings clause" specifying that the federal RPS is a floor upon which states may build. Without such a savings clause, state RPS policies could be challenged as violating the Supremacy Clause of the U.S. Constitution, on the grounds that Congress intended to preempt state regimes. Such preemption could be implied, even where there is no direct conflict between the federal and state systems.[98]

To ensure that a national RPS does not end up acting as a ceiling on renewables development, a savings clause is required. Such a clause would enable states to build upon the federal requirement with their own RPS requirements, which may contain different eligibility criteria, higher obligations, and/or other variances from the federal policy.

III. Authorize States to Use State-Based Location Requirements As Part of Their RPS Renewable Energy Eligibility Criteria

States run a significant risk of running afoul of the U.S. Constitution when they impose criteria that require renewable energy facilities to be located within a state, or group of states, in order to be eligible for RPS benefits. (See Chapter Three, part II.C, and Appendix A..) Congress can, however, authorize states to impose eligibility criteria which, absent Congressional authorization, would violate the

---

[98] Congressional intent to preempt may be (a) *clearly expressed* in a federal statute or (b) *implied*. Courts have found implied congressional intent to preempt state law in three general categories of situations:

- where there is a need for uniform national standards;
- where Congress has legislated in an area comprehensively, occupying the entire field of regulation, and leaving no room for state supplementation;
- where the state law actually conflicts with federal law and compliance with both state and federal law is impossible.

dormant Commerce Clause.[99] For a court to uphold state interference with interstate commerce on the basis of Congressional authorization, the court must find that Congress' intent is "unmistakably clear."[100]

In Chapter Three, part II.C, we argued that in-state -- and even in-region -- location requirements will not necessarily be efficacious in securing renewable-energy benefits for a state that enacts an RPS. This is because the benefits (environmental, economic, and technology development) have externalities that do not honor political boundaries. There are, nevertheless, at least three practical reasons why states may want to impose jurisdictional (in-state or in-region) location requirements:

1. Jurisdictional location requirements will **facilitate the fuel source tracking and verification process** where the location coincides with the regional electricity market -- a level at which tracking systems are likely to develop (e.g., in conjunction with regional independent system operators). This is particularly appropriate where the jurisdictional boundaries serve as a reasonable proxy for the geographic area where, if renewables are located within that area, benefits will be produced for the enacting state.

   If, on the other hand, the eligibility of renewable energy generators is based on whether generators provide benefits to the state[101] -- and benefits can be provided by generators located outside the physical electricity trading region, the region covered by a single fuel-source tracking system would likewise need to extend beyond the physical trading region. To ensure that renewables are not double-counted, the tracking region would need to cover the physical territory in which eligible generators may be located

---

[99] Engel, 1996. Engel cites the following cases: *Northeast Bancorp, Inc. v. Board of Governors of the Federal Reserve Board*, 472 U.S. 159, 173-74 (1985) (In enacting the Bank Holding Company Act and the Douglas Amendment to that Act, Congress authorized individual states to comprehensively regulate acquisitions of local banks by out-of-state holding companies, an activity that would surely run afoul of the dormant Commerce Clause in the absence of such legislation.); *White v. Massachusetts*, 460 U.S. 204, 214 (1983) (Insofar as Mayor's executive order requiring city residents be hired for city-funded construction projects did not fit within the market participant exception to the dormant Commerce Clause, the order was affirmatively sanctioned by federal regulation.); Id. at 215 (J. Blackmun and J. White, concurring) ("As the Court holds, Congress unquestionably has the power to authorize state or local discrimination against interstate commerce that otherwise would violate the dormant aspect of the Commerce Clause."); *Carbone v. City of Clarkstown*, 114 S.Ct. 1677, 1691-92 (1994) (J. Connor, concurring) (considering, but ultimately rejecting the conclusion that the Resource Conservation and Recovery Act authorized the flow control law held by the majority to violate the dormant Commerce Clause).

[100] Engel, 1996. Also note that a state (or even federal) RPS that imposes jurisdictional location restrictions may encounter problems under international law (see Appendix A).

[101] As we suggest in Chapter Three, part II.C, a "benefits test" would be the most precise way to ensure that environmental and fuel diversity benefits are received by the state, and has the additional benefit of avoiding legal risk associated with the dormant Commerce Clause.

and the entire electricity market in which those eligible generators operate.[102] Given a lack of regional and inter-regional decision-making authority, setting up a regional accounting system on this scale is a difficult, if not impossible, task for a single state to accomplish.

This practical problem would be solved with a national accounting system, discussed above.

2. Jurisdictional location requirements can **resolve the dilemma that states can face when they seek to ensure the continued operation of existing at-risk resources**. This dilemma arises when existing at-risk resources are operating within state boundaries and those resources are of a type that is commonly found operating competitively in the regional electricity market. Making eligible all resources of that type creates a supply of eligible resources that exceeds the total demand created by the state's RPS requirement. The result is to potentially render the RPS policy meaningless because at-risk generators may receive no benefits from the RPS, and thus no change would be made in the status quo. (We discuss these and other practical problems in Chapter Three, part II.A.2.)

3. Jurisdictional location requirements **allow states to capture the economic development benefits of the RPS**. Some states may be interested in establishing an RPS only if the state is assured of receiving the economic benefits associated with the development of renewable energy facilities, in addition to other benefits.

IV. Place Any National RPS Requirement on Retailers

Unlike states, Congress is not limited to the option of placing an RPS obligation on retailers. Congress has the additional option of placing an RPS requirement on generators, whether or not they sell at retail.[103] If a national RPS obligation were placed on generators, however, it would create a problem in situations where states (or Congress) require all retailers to disclose their actual fuel

---

[102] For more discussion, see Chapter Three, part II.C, and Chapter Six, part II.

[103] Some Congressional RPS proposals have placed the RPS requirement on generators in order to exempt hydropower generators from the RPS obligation (i.e., hydropower generators would not have to acquire renewable energy credits). This provides a benefit to hydropower projects without making them eligible to receive renewable energy credits for their power generation. A standard that is placed on retailers does not provide this type of opportunity.

sources.[104] This is because generators would "use up" credits from renewable energy generators that retailers would need to match against their retail sales for disclosure purposes. In other words, there could potentially be insufficient generation credits to match against retail sales. This problem with the "conservation of attributes" is avoided if the federal government places the RPS obligation on retail sellers.

Moreover, it would be more efficient to place all RPS requirements on one group of entities (retailers) rather than two (retailers and generators), because transaction costs fall on only one group.

[104] The problem is mitigated if retailers who make no claims about the generation attributes of their products are allowed to use a "default" label. See Chapter Six, part III.B.

Bibliography

Bala, K. (New York Public Service Commission), 2000. Personal communication. December.

Bernow, Steve, William Dougherty, and Max Duckworth, 1997. "Quantifying the Impacts of a National, Tradable Renewables Portfolio Standard." *The Electricity Journal*. May.

California Energy Commission, 1999. *Guidebook: Renewable Technology Program, Vol. 2B: New Renewable Resources Account - Implementation of Auction Results.* January. (Available at www.cec.gov.)

California Energy Commission, 2000. "Protocol for the Power Source Disclosure and Customer Credit Programs" (Draft Final; P500-00-005). March.

Clemmer, Steve, Alan Nogee, and Michael C. Brower, 1999. *A Powerful Opportunity: Making Renewable Electricity the Standard.* Union of Concerned Scientists. January. (Available at www.ucsusa.org.)

Connecticut Regulations, 1999 (a). Section 16-245, Licensing of Electric Suppliers and Electric Aggregators. Department of Public Utility Control.

Connecticut Regulations, 1999 (b). Docket No. 99-03-3699-03-36, Determination of The Connecticut Light and Power Company's Standard Offer. Dep't of Public Utility Control.. July 7.

DCCDC v WMATC, 1975. *Democratic Central Committee of the Dist. of Columbia v. Washington Metropolitan Area Transit Comm'n.*, 485 F.2d 786, 808 (1973), cert. denied, 415 U.S. 935 (1975).

Ellison, Chris, 2000. "Fair Transmission Access for Wind, A Brief Discussion of Priority Issues." American Wind Energy Association. (Available at www.awea.org/policy/documents/transmission.PDF.)

Engel, Kirsten, 1999. "The Dormant Commerce Clause Threat to Market-Based Environmental Regulation: The Case of Electricity Deregulation." *Ecology Law Quarterly*. Vol. 26 No. 2.

Environmental Action v. FERC, 1991. 939 F.2d 1057 (D.C. Cir.).

Environmental Protection Agency, 2000. "1999 Acid Rain Program Compliance Report." (Available at http://www.epa.gov/airmarkets/cmprpt/arp99/index.html.)

Federal Trade Commission, 1998. "Comment of the Staff of the Bureau of Consumer Protection of the Federal Trade Commission on the NAAG draft guidelines." August 10.

Freehold, 1995. *Freehold Cogeneration Associates v. Board of Regulatory Commissioners*, 44 F. 3d 1178 (3rd Cir. 1995).

Gallagher, Jim, 2000. (New York Public Service Commission.) Personal Communication. November 13.

Grace, Robert C., Ryan H. Wiser, and Brian Abbanat, 2000. "Massachusetts Renewable Portfolio Standard: RPS Accounting & Verification Mechanisms and Policy Coordination Report." Massachusetts Division of Energy Resources. June 30. (Available at www.magnet.state.ma.us\doer).

Grace, Robert C., Ryan H. Wiser, Douglas C. Smith, and Edward A. Holt, 2000. "Massachusetts Renewables Portfolio Standard, White Paper #5: Eligibility." Massachusetts Division of Energy Resources. January 18. (Available at magnet.state.ma.us\doer.)

Grow, Robert, 1999. "Authenticity for Green/Special Power: A Pilot Program in Certificates." California Energy Commission. October 6.

Hamrin, Jan and Nancy Rader, 1993. *Investing in the Future: A Regulator's Guide to Renewables*. National Association of Regulatory Utility Commissioners. February.

Hempling, Scott and Nancy Rader, 1996. "State Implementation of Renewables Portfolio Standards: A Review of Federal Law Issues." January. (Available from the authors.)

Maine Public Law, 1999. Public Law 1999, ch. 398, Part I.

Massachusetts Division of Energy Resources, 2000. "Preliminary RPS Design Proposal." June 16. (Available at magnet.state.ma.us\doer.)

McGuireWoods, LLP, 2000. Merchant Plant Scorecard. (Available on-line at http://www.mwbb.com/departments/corporate_services/merchant_power.asp.)

National Association of Attorneys General (NAAG), 1999. *Environmental Marketing Guidelines for Electricity*. December.

National Renewable Energy Laboratory, 1997. "The Environmental Costs and Benefits of Biomass Energy Use in California." NREL/SR-430-22765. May.

New England Governors' Conference, 1998. "New England Tracking System (NETS). October.

New England ISO, 2000. "Proposal for a Generation Information System Database: Project Description." GIS Working Group. September 29.

Nevada Statute, 1997. NRS 704.989.

New York Public Service Commission, 1998. Opinion in Case 94-E-0952. December.

Ottinger, R., D. Wooley, N. Robinson, D. Hodas, and S. Babb, 1990. *Environmental Costs of Electricity.* Pace University Center for Environmental Legal Studies. New York.

Office of Technology Assessment (OTA), 1994. *Studies of the Environmental Costs of Electricity.* OTA-ETI-134. September. (Available from the U.S. Government Printing Office.)

Rader, Nancy and Richard B. Norgaard, 1996. "Efficiency and Sustainability in Restructured Electricity Markets: The Renewables Portfolio Standard." *The Electricity Journal*. July.

Rader, Nancy and William P. Short, 1998. "Competitive Retail Markets: Tenuous Ground For Renewable Energy." *The Electricity Journal*. April.

Rader, Nancy, 1998. *Green Buyers Beware: A Critical Review of "Green Electricity" Products.* Public Citizen. October. (Available at www.citizen.org\cmep.)

Rader, Nancy and Ryan Wiser, 1999. *Strategies for Supporting Wind Energy: A Review and Analysis of State Policy Options." National Wind Coordinating Committee*. July. (Available at www.nationalwind.org.)

Rader, Nancy, 2000. "Getting It Right and Wrong in the States," *Windpower Monthly*. April.

Regulatory Assistance Project, 1997. "Uniform Consumer Disclosure Standards for New England: Report and Recommendations to the New England Utility Regulatory Commissions." October 6. (Available at www.rapmaine.org.)

Serchuck, Adam, 2000. "The Environmental Imperative for Renewable Energy: An Update." Renewable Energy Policy Project. April. (Available at www.repp.org.)

Smith, Douglas C., Karlynn S. Cory, Robert C. Grace, and Ryan Wiser, 2000. "Massachusetts Renewable Portfolio Standard: Preliminary Cost Analysis Report." June 3. (Available at magnet.state.ma.us\doer.)

Texas Substantive Rule, 1999. Section 25.173. (Available at www.puc.state.tx.us/rules/subrules/ electric/25.173/20944adt.pdf.)

Wiser and Grace, 2000. "Massachusetts Renewables Portfolio Standard. White Paper #7: Design Issues." Massachusetts Division of Energy Resources. February 9. (Available at magnet.state.ma.us\doer.)

Wiser, Ryan, Kevin Porter and Steve Clemmer, 2000. "Emerging Markets for Renewable Energy: The Role of State Policies during Restructuring," *The Electricity Journal*, January/February.

U.S. Department of Energy, 1998. "U.S. Hydropower Resource Assessment Final Report." December.