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The Role of Renewable Portfolio Standards in the Context of a National Carbon Cap-and-Trade Program

*by Neal J. Cabral**

Introduction

As the Senate prepares to take up a measure, passed by the House of Representatives, for a national renewable energy portfolio standard ("RPS"),[1] and continues serious deliberations about a mandatory greenhouse gas ("GHG") reduction program, it is an appropriate time to examine what role a national RPS would have within a mandatory GHG reduction program. Because Congress seems to prefer a broad cap-and-trade program as the best least-cost vehicle with which to implement a mandatory carbon reduction program, tension exists between a market-oriented cap-and-trade program and a command and control RPS mandate. This debate does not take place within a vacuum, as almost half the states have adopted an RPS or similar renewable energy targets.[2] A national RPS calls into question the role such state RPS programs would have both within a national RPS and within the context of a national carbon cap-and-trade program.

Three primary bases for tension exist between an RPS and a cap-and-trade program. First, renewables, as imposed through an RPS, are typically not the least-cost compliant solution to carbon reductions, particularly in the earlier stages of any carbon cap-and-trade program where the required reductions are expected to be relatively modest. Second, once a carbon cap-and-trade program is enacted, the purpose of an RPS program becomes more uncertain because renewable power purchased pursuant to an RPS program will no longer provide any additional carbon reductions beyond those required by the cap. Third, it is difficult to integrate RPS requirements into a carbon cap-and-trade program in a way that produces relatively fair results with respect to the entities that purchase the renewables and, therefore, bear their costs.

Taken together, these three tensions between an RPS program and a least-cost carbon cap-and-trade policy tend to weaken the current standard rationales for enacting RPS programs. In order to properly sort out these issues and develop a coordinated and sound national carbon policy that includes a renewables component, legislators must evaluate and agree on the specific purposes for enacting an RPS program in the context of an expected carbon cap-and-trade program. They must also structure both programs to meet the defined objectives of the RPS.

Reasons for Enacting an RPS

An RPS requires that electric generators or suppliers source a defined percentage of their power from renewable energy facilities.[3] Qualifying renewables vary by program, but typically include wind, biomass, solar, geothermal, landfill gas, and sometimes hydropower.[4] Although renewable energy is a term intended to describe energy sources that are considered renewable because they are powered by energy coming from an inexhaustible source, or from sources that regenerate fast enough that they will not be depleted, RPS can also include sources that do not fit that description. However, all qualifying RPS sources currently under the various state standards and proposed federal standard are also at least low-carbon or carbon-neutral sources of power, and it is this defining attribute that, from a policy perspective, is probably the most important aspect of renewables.

That RPS mandates are primarily carbon reduction mandates seems relatively clear.

That RPS mandates are primarily carbon reduction mandates seems relatively clear. Although RPS requirements are almost never enacted primarily as specific carbon reduction programs, probably due to political concerns, this seems to be their primary perceived benefit. In other words, while states and Congress apparently count RPS programs as an important contributor to GHG reductions, they rarely discuss any specific carbon-based programmatic aspects of an RPS, such as explaining how the RPS would fit within specifically adopted carbon reduction goals.

Instead, proponents often tout renewables as a sound policy measure because, in addition to being green from a general emissions perspective, they also provide other ancillary benefits. For example, renewables are said broadly to promote energy security. While renewables do promote certain aspects of energy security through supply diversity, they do not tend to reduce fuel imports since the power sector generally imports only a very small amount of fuel from outside North America. Studies on whether renewables contribute importantly to energy

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price stability also conflict.[5] In general, the International Energy Agency has concluded that while "environmental objectives will be uppermost," RPS can provide some energy security enhancements.[6]

However, these ancillary reasons for promoting an RPS do not appear themselves to be sufficiently compelling to support national RPS legislation. Instead, the carbon reduction element of RPS requirements appears to be the driving force. That conclusion seems obvious when one considers whether states would ever adopt RPS programs if qualifying emission sources met all of the non-carbon benefits that RPS advocates purport renewables provide, but were in fact carbon-based sources of power. In such a case, little advocacy for RPS programs would exist at all, and few would be adopted. We can see this quite readily when we consider coal-to-liquids plants. In fact, such plants do rather efficiently reduce dependence on foreign energy supplies such as oil for mobile sources, diversify domestic energy facilities, and promote new technological developments, but they hardly receive support, and are instead typically opposed, because the process is very carbon-intensive.

If the policy support for an RPS primarily tends to be based on the carbon reduction component, it makes sense from a policy perspective to evaluate the efficacy and role of an RPS requirement within a larger national carbon reduction strategy. Based on congressional deliberations to date and proposed legislation,[7] it seems clear that Congress' current preference to address carbon nationally is through a broad cap-and-trade program. Hence, an evaluation of the efficacy and role of an RPS program should include an evaluation of how an RPS fits within a national GHG cap-and-trade program.

RPS Under a Cap-and-Trade Program

Because RPS programs seem largely intended to reduce carbon emissions, despite the fact that they do not actually target carbon emissions, but rather fuel choice, their approach is a potentially inefficient command-and-control mandate at odds with a market-based cap-and-trade program. Market-based cap-and-trade programs hold, as their fundamental premise, that allowing the regulated community to determine its own solutions to meet a mandatory emissions cap is far more cost-effective and more certain than a one-size fits all series of command-and-control mandates, which instead set specific performance or technology standards.[8] As a consequence, cap-and-trade programs are expected to provide least-cost solutions to emission reduction goals.

Benefits of a Cap-and-Trade Program

Cap-and-trade programs have two fundamental benefits as compared with command-and-control emission reduction programs. First, by allowing trading, the program does not decide who has to make reductions. This allows sources to take emissions reduction steps when the costs are favorable to the source and to forgo that option and instead purchase emissions allowances or credits when the costs are unfavorable to a source. Second, a cap-and-trade program does not decide what those reductions must be or how the source achieves the reduction. Instead, the regulated community is free to determine what steps should be taken to meet the overall cap. Consequently, then, it can develop and pursue the least-cost solutions.

The sulfur dioxide emissions trading approach established under the 1990 Clean Air Act amendments[9] produced vast compliance cost savings primarily because the U.S. power industry figured out how to burn low-sulfur coal in units not designed for such coal, and thereby avoided the costs associated with the assumed need to widely employ more expensive scrubbing control technology.[10] In other words, the market figured out a method of compliance that was not anticipated when the requirements were adopted. This method likely would have been unavailable had a command-and control-mandate based on the performance of scrubber technology been adopted.

Notably, the least-cost result expected under a cap-and-trade program is not an end in itself, but rather allows policy makers to set more ambitious and more certain emissions reduction targets than they might otherwise be able to obtain. EPA observed:

> [T]he cost-minimizing feature of cap and trade has long-term environmental benefits. Driving down the cost of reducing a unit of pollution means that policymakers and regulating authorities can set targets that reduce more pollution at the same cost to society. This system makes it economically and politically feasible to achieve greater environmental improvement.[11]

Given Congress' concern about the overall impact of any national carbon reduction strategy on the health of the U.S. economy, the costs of any specific carbon reduction program become an important political question.

Effects of an RPS Conflict with Cap-and-Trade

A national RPS program, as a command and control mandate, could conflict with a market-based cap-and-trade program. That conflict is primarily relevant if a known cost discrepancy actually exists between renewables as a carbon compliance option and other available methods of carbon reduction. The conflict emerges clearly in the case of an RPS because renewables in fact cost more in the aggregate than other carbon reduction options that might be employed, at least until the cap tightens over time.

The relative cost-effectiveness of a national RPS as a carbon reduction strategy has been evaluated a number of times. Most notably, the 2002 *Parer Report* to the Council of Australian Governments on national energy reform concluded that Australia's national RPS program should be abolished and replaced with a national cap-and-trade policy for carbon because the RPS proved a cost-ineffective method of obtaining carbon reductions when compared with a cap-and-trade program.[12] Subsequent analyses of the Australian RPS program concluded that: (1) the dollar per ton cost of carbon reductions associated with a ten percent RPS standard would support four times the amount of carbon reductions if imposed instead as a carbon reduction requirement under a cap-and-trade program; and (2) an amount of carbon reductions equivalent to what a ten percent RPS standard would obtain could be achieved through a cap-and-trade program at a third of the price.[13]

Similar studies have been performed for a U.S. national RPS, and the conclusions are the same. One unpublished study concludes that the carbon reductions associated with an RPS that rises to ten percent cost more than four times as much as would be the case if a cap-and-trade program were placed on the power generation sector.[14] Another study concluded that an RPS is "less cost-effective as a mechanism for reducing carbon emissions from electricity generators than a policy designed specifically to limit carbon emissions."[15]

As these cost studies make clear, a carbon-cap-and-trade program is generally insufficient to sustain widespread penetration of renewables at higher RPS levels simply as a result of power price increases resulting from the cap. If that were true, then renewables would be the compliance option of choice in the economic modeling described above. Instead, it is generally energy efficiency and conservation measures, which often have a positive payback over time and thus cost nothing, that tend to replace renewables as a more cost-effective compliance option. However, some renewable projects remain cost-effective, and are undertaken even under a cap-and-trade program, where the cost of carbon raises power prices. All of these results can change when the stringency of the cap is increased, or if the cap-and-trade program provides specific incentives to renewables through a favorable allowance allocation.

In sum, an RPS appears to be, at bottom, largely intended as a carbon reduction policy and should be explicitly treated as such, including open discussion of how it fits into any national carbon policy, such as a cap-and-trade program; and an RPS mandate is a more expensive and less-cost effective method of carbon reduction than simply adopting a cap-and-trade program with no such command and control mandates. Because Congress has expressed great concern over the cost and broad economic impact of a mandatory carbon program, and intends to seek least cost solutions where available, the higher cost of an RPS versus alternatives to produce equivalent carbon reductions would seem to argue for a careful assessment of the specific goals and benefits of an RPS program in light of an expected mandatory carbon cap-and-trade requirement.

In addition, maintaining an RPS as a requirement independent of a cap-and-trade program does not provide more or additional carbon reductions. This is due to the fact that the carbon reductions from the RPS program are simply factored into the reductions needed to meet the cap, and therefore become a part of the compliance portfolio. As carbon reductions from renewables occur, alternative reductions that would otherwise have occurred to meet the cap are forgone. In general, most renewable energy produces carbon reductions because a power generator somewhere reduces its level of fossil fuel consumption, often natural gas, in an amount equal to the amount of renewable power that is added to the grid. The fossil fuel power generator that reduces its output is now left with allowances to sell or use itself under the cap. This results in an increase in carbon emissions somewhere that equals the carbon reductions caused, and emission allowances "freed up," by the use of renewable power. Thus, overall emissions remain equal to the level permitted under the cap.

Impacts of an RPS Under a Cap-and-Trade Program

While RPS requirements do not provide additional reductions under a cap-and-trade program, they do define renewable power as a specific method of obtaining part of the reductions that will be achieved under the cap. This is true because a certain percentage of renewable power must be purchased under the RPS without regard for the cap. Additionally, the cost-ineffectiveness of an RPS is confined to, and incurred by, entities that must comply with the RPS mandate, and this occurs outside the cap. Thus, the cost of compliance within the cap itself is lowered, although the overall cost to meet the cap is higher when factoring in RPS costs.

In this light, RPS programs lose much of their stated policy support because, upon implementation of a cap, they are no longer a carbon reduction policy. Instead, an RPS becomes a mandate that a certain amount of reductions to be achieved under a carbon cap must come from renewable power. Thus, the question for policy makers to debate is whether renewables, despite their cost, are sufficiently important to an overall national carbon reduction strategy so that they should be mandated as a carbon compliance mechanism? Despite the importance of these issues, virtually no serious debate about them has taken place in the United States. Instead, the benefits of renewables as part of national carbon policy are largely assumed, and their drawbacks ignored.

RPS obligations often fall on the company that distributes power.

Policy Considerations supporting an RPS

While good public policy requires a careful assessment of both the benefits and drawbacks of an RPS within the context of an expected national carbon reduction mandate, the Australian experience tells us this consideration is also important as a practical matter. After the issuance of the *Parer Report*, recommending that that the Australian RPS be abolished and replaced with a more cost-effective cap-and-trade program, investment in renewables slowed due to the obvious regulatory uncertainty. That uncertainty remained unresolved for another two years as Australia reviewed the issues and decided to recommit to the RPS, albeit with some adjustments. Therefore, in order to provide long term certainty in renewables markets, the fact that an RPS requirement is not a least-cost solution to carbon reduction and does not provide any additional reductions beyond what a cap would require should be recognized and accepted after debate, so as not to cause surprises and associated uncertainty later.

Notably, the Australian evaluation of whether to continue with an RPS or replace it with a carbon cap-and-trade program provides some insight into specific policies that would support continuation of the renewables mandate. The primary reasons articulated for continuing the RPS in Australia were based on the expectations that renewables would become a more cost-effective carbon reduction option as the cap tightened over time and as the costs of renewables decreased through continued build-out, and, perhaps more importantly, that renewables presented an attractive hedge against future technology or other failure for other carbon reduction measures.[16] Similarly, the United States could also conclude that renewables do promote greater future compliance certainty and provide an expectation of lower relative costs over time, and that those are sufficient reasons to support continued investment in renewables now so as to preserve these future benefits.

These benefits, rarely articulated forcefully in the limited U.S. debate over the role of renewables in a carbon cap-and-trade program, do provide powerful policy arguments to support continuation of renewables programs. In essence, the primary attraction of renewables is that the technology is well understood, is fairly readily deployed, and can provide relatively large reductions, or avoided emissions, on a project basis. Indeed, it is these aspects of renewables that may make them attractive to industry. Despite the cost issue, industry has not yet objected to renewable mandates on any broad or sustained basis as a cost-ineffective method of carbon reduction, however industry has frequently raised other objections. This may simply reflect the fact that while the attributes of familiarity and certainty provide tangible benefits, they are not recognized in economic cost models. Further, as one compares a suite of specific and discrete renewables projects with a suite of ubiquitous energy efficiency projects that must be undertaken by third parties, namely power company customers, ease of implementation for renewables may prove to be an important factor in tacit acceptance of RPS programs.

Another benefit of an explicit legislative assessment of whether to promote higher-cost renewables requirements when a national carbon trading program is expected to follow is that specific policy reasons to adopt the higher cost alternative can be articulated, and the RPS program tailored to promote the identified objectives. For example, if one of the reasons advanced for an RPS is to make the United States a technology leader in renewables, then Congress should evaluate whether renewables research and development programs would help promote that objective. Similarly, if one of the articulated reasons for employing an RPS mandate is to help the renewables industry achieve critical economies of scale and so reduce the cost of renewables, then the RPS should be sized to specifically promote that objective, and no more.

Perhaps most importantly, if an RPS is to be adopted, legislation should provide a comprehensive package that also removes obstacles to broad renewables penetration and ensures the renewables target can be met. It is no secret that renewables, as intermittent sources often concentrated in specific geographic regions of the country favorable to the type of generation at issue, require important and large-scale changes to the existing transmission and distribution grids in order to achieve significant levels of penetration. The Electric Power Research Institute recently published a paper that specifies precisely what sorts of large-scale grid and other technology improvements would be necessary to accommodate significant penetration of renewables.[17] It is well known that grid improvements are difficult to make, take years to permit, and often are not favored investments by power companies. In addition, newer and better power storage technologies will be needed to accommodate large-scale renewables penetration.[18] Hence, legislative packages seeking to address the research, permitting and financing issues associated with such improvements would seem to be a critical aspect of any sensible and realistic RPS objectives.

Promoting Renewables Under a Cap and Trade Program

If it is decided as a policy matter that renewables should be promoted as part of a national cap and trade program, there are a variety of ways to do this. This Article has focused on an RPS because Congress is currently considering such a mandate, although other options to promote defined renewables goals are also available. An RPS program does have the benefit of providing certainty that a minimum amount of renewable power will be produced. However, that approach does limit the extent of renewables penetration to the amount of the RPS, at least until the time that renewables become competitive as a power source due to a rise in power prices as a result of a tightening carbon cap.

However, a certain inequity exists associated with RPS mandates, in that there is often a disconnect between the renewable purchases and the actual carbon reduction, or carbon avoidance. The power company purchasing the renewable power to meet RPS requirements has paid for the carbon reduction in the form of the cost difference between otherwise available fossil power and the renewable power. However, that company often cannot use the carbon reduction associated with the renewable power purchase for compliance under a carbon cap because the power plant that reduces its load to accommodate the renewable power is often a different company than the renewable power purchaser. Instead, it is either the power generator, which reduces its load that obtains the carbon benefit even though it did not pay for the carbon reduction, or the entire carbon market in general, which obtains a benefit because of lowered demand for allowances and greater availability of lower cost carbon reductions, which are not used in lieu of higher cost renewable power reductions (i.e., some of the costs of compliance with the cap are transferred to the RPS program).[19]

The reason for this inequity is twofold. First, RPS obligations often fall on the company that distributes power, and that company may not own any generating facilities. Second, and more importantly, RPS mandates can typically be met by purchasing renewable energy credits. Use of such credits allows renewable power sources to situate geographically at the least-cost sites for the power produced, and renewable power purchasers, located far away from renewable resources, to readily and

cost-effectively buy renewable power. The consequence of this is that companies obligated to comply with RPS requirements can suffer a double hit, in the form of mandatory purchases of often higher cost renewable power and the general inability to take carbon credit for those purchases under a carbon cap. If Congress elects to pass an RPS and/or to allow states to maintain RPS requirements after implementation of a carbon cap-and-trade program, careful thought need be given to identifying and accommodating, as best as possible, the impacts an RPS could have on cap equities.

Instead of an RPS, renewable incentives could be added in the cap-and-trade program itself by allocating allowances to renewable plants through a renewables set-aside, by allocating allowances to the power sector based on power output and not emissions, or by directing a portion of revenues from any allowance auction to renewables. Each of these mechanisms has individual benefits and complications.

The allowance approach has some appeal in that it provides some cost limits on what renewable power will be sold, thus renewable power is transformed from a power purchase obligation under an RPS to subsidized power that will be bought if the subsidized price is competitive. However, this approach also does not guarantee that a specific amount of renewable power will be produced or that the renewable policy objectives will be met. Other possibilities abound. For example, in some European countries, renewables are promoted outside of the carbon cap by feed-in tariffs or other mechanisms providing price supports.[20] These price supports begin to decline over time to reflect the expectation that renewable costs should decrease as market penetration increases. Whatever solution is decided upon, experience has shown that renewable investment is very sensitive to regulatory uncertainty, and thus, care must be taken to ensure that regulatory support for renewables is not attenuated by the form of the mechanism selected to support it.

It is also important to consider the role and impact of existing state RPS standards, which present their own complexities and may have less well-defined roles once a carbon cap is put in place. Thorough discussion of that issue is beyond the scope of this Article. However, it should be noted that state RPS programs may also warrant reevaluation and refocus once a national carbon cap is adopted because these programs also will not produce any carbon reductions beyond the level of the national cap.

Conclusion

It seems premature for Congress to pass a national RPS in the face of an expected least-cost national carbon cap-and-trade program without first evaluating the costs and benefits of renewables, and assessing what role renewables should play in a national carbon strategy. Renewables are expected to play an important role in any national carbon strategy, and good policy reasons exist to support that conclusion. However, the debate over that issue should be open and clear, and should fully recognize the costs and other issues associated with reliance on renewables as a carbon compliance mandate, to ensure that specific policy objectives for renewables can be identified and agreed upon, legislation adopted to address those goals, and renewables markets provided with certainty.

Endnotes: The Role of Renewable Portfolio Standards

[1] New Direction for Energy Independence, National Security, and Consumer Protection Act, H.R. 3221, 110th Cong. § 9611 (2007).

[2] *See* Barry Rabe, *Race to the Top: The Expanding Role of U.S. State Renewable Portfolio Standards*, Sustainable Dev. L. & Pol'y, Spring 2007, at 10.

[3] Pew Center on Global Climate Change, States with Renewable Portfolio Standards, http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm (last visited Nov. 3, 2007).

[4] Barry Rabe, Race to the Top: The Expanding Role of U.S. State Renewable Portfolio Standards, Pew Center on Global Climate Change 5 (Jun. 2006), *available at* http://pewclimate.com/global-warming-in-depth/all_reports/race_to_the_top (last visited Nov. 16, 2007).

[5] Carolyn Fisher, How Can Renewable Portfolio Standards Lower Electricity Prices?, Resources for the Future, 1-2 (May 2006), *available at* http://www.rff.org/Documents/RFF-DP-06-20-REV.pdf (last visited Nov. 16, 2007).

[6] Int'l Energy Agency, Contribution of Renewables to Energy Security 11 (Apr. 2007), *available at* www.iea.org/textbase/papers/2007/so_contribution.pdf (last visited Nov. 22, 2007).

[7] *See* Global Warming Reduction Act of 2007, S. 485, 110th Cong. (2007).

[8] Michelle Manion & Jason Mathers, *How it Works: Cap-and-Trade Systems*, Catalyst, Spring 2005, *available at* http://www.ucsusa.org/publications/catalyst/page.jsp?itemID=27226959 (last visited Nov. 11, 2007).

[9] Clean Air Act § 111, 42 U.S.C. § 7411 (2007).

[10] *See generally* Joint Economic Committee, Tradable Emissions 2, 5-6 (July 1997) (analyzing the success of the Sulfur Dioxide emissions trading scheme as a model for creating future systems), *available at* http://www.house.gov/jec/cost-gov/regs/cost/emission.pdf (last visited Nov. 11, 2007).

[11] EPA, Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control 1-4 (June 2003), *available at* http://www.epa.gov/airmarkets/resource/docs/tools.pdf (last visited Nov. 11, 2007).

[12] *See* Austl. Greenhouse Office, Renewable Opportunities—A Review of the Operation of the Renewable Energy (Electricity) Act 2000, 83, 128 (2003).

[13] *Climate Change: Lessons Learned from Existing Cap and Trade Programs: Hearing Before the Subcomm. On Energy and Air Quality of the H. Comm. on Energy and Commerce*, 110th Cong. 11 (2007) (prepared statement of Anne E. Smith) [hereinafter Smith].

[14] Smith, *id.*

[15] Karen Palmer & Dallas Burtraw, Cost-Effectiveness of Renewable Energy Policies, Resources for the Future 20 (Jan. 2005), *available at* http://www.rff.org/documents/RFF-DP-05-01.pdf (last visited Nov. 16, 2007).

[16] Austl. Greenhouse Office, *supra* note 7, at xix-xx.

[17] Elec. Power Research Inst. Energy Tech. Assessment Ctr., *The Power to Reduce CO_2 Emissions: The Full Portfolio*, (Electric Power Research Institute, Discussion Paper for Summer Seminar, Aug. 2007), *available at* http://www.epri-reports.org/DiscussionPaper2007.pdf (last visited Nov. 11, 2007).

[18] Elec. Power Research Inst. Energy Tech. Assessment Ctr., *id.* at 3-5.

[19] Energy Info. Agency [EIA], Impacts of a 15-Percent Renewable Portfolio Standard 14 (June 2007).

[20] *See* U.N. Environment Programme, *Changing Climates: The Role of Renewable Energy in a Carbon-Constrained World*, 17 (Dec. 2005) (pre-publication draft *prepared by* John Christensen et al) (discussing the types of price support policies used in different countries), *available at* http://www.reeep.org/media/downloadable_documents/n/d/REN21%20-%20Role%20of%20Renewable%20Energy%20-%20Feb%20'06.pdf (last visited Nov. 11, 2007).