The Potential Economic Impacts of a Renewable Portfolio Standard in Delaware

Briefing Paper

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EXECUTIVE SUMMARY

A renewable portfolio standard (RPS) is a law or regulation requiring state utilities to supply a percentage of electricity from renewable sources (such as wind energy, solar energy, geothermal energy, hydropower, and biomass) according to a specified schedule. Many states are prioritizing renewable energy development as a response to concerns over air pollution, energy security, climate change, energy independence, and economic development.

The RPS has emerged as one of the most popular and cost-effective mechanisms for renewable energy promotion: nineteen states and the District of Columbia have passed RPS laws, and 14 other states are currently considering RPS legislation (Figure 1).

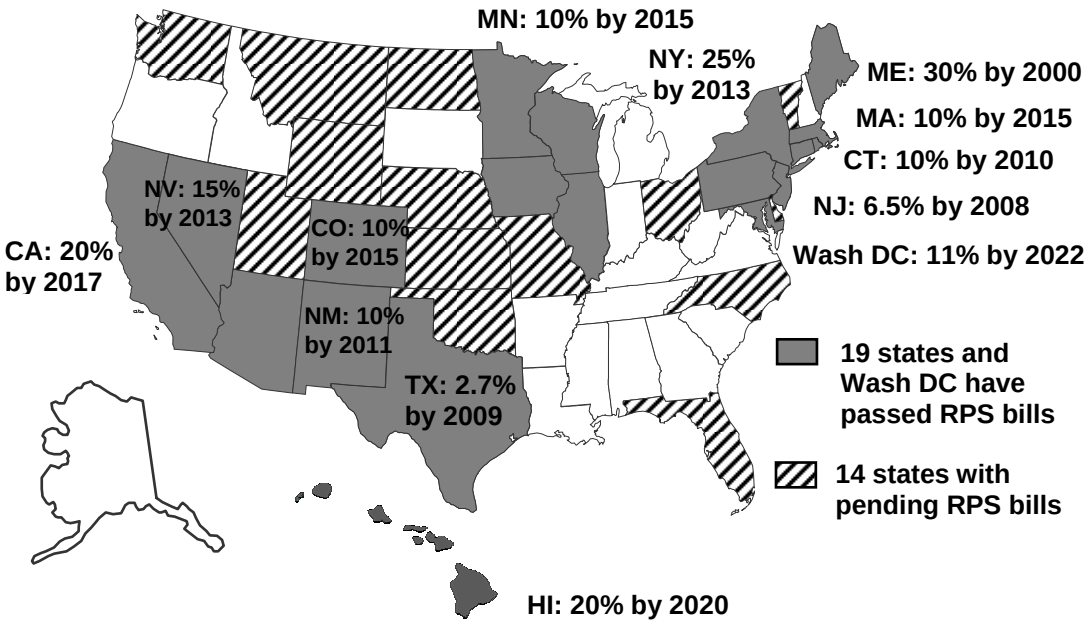

Figure 1. State Renewable Portfolio Standards in the U.S.
Source: Center for Energy and Environmental Policy (CEEP), University of Delaware survey (2005)

An RPS bill is being introduced in the 143rd Delaware General Assembly. The State of Delaware first introduced RPS legislation in 2003 with Senate Bill 161 (SB 161), but the bill did not leave Committee before the end of the legislative Session. In 2004, Senate Majority Leader Harris McDowell introduced a revised RPS, Senate Substitute 1 (SS1) to SB 161, which required 10% of Delaware's electricity to come from renewable sources by 2019. Co-sponsors included Senators Blevins, Copeland, Henry and Sokola, and Representatives Buckworth, DiPinto, D. Ennis, Keeley, Mulrooney, Plant, Roy, Valihura and Williams.

Senator McDowell worked with a coalition of legislators, environmental and community organizations, state utilities, and the Center for Energy and Environmental Policy to draft SS1 to SB 161. The bill reflected best practices found in other state RPS

laws, and also responded to specific concerns raised by Delaware stakeholders. As a result, the bill enjoyed broad support (Delaware Senate, 2004), passing the Senate by a vote of 19-0. However, it remained in the Housing & Community Affairs Committee of the House of Representatives as the 2004 legislative session concluded.

With revisions responsive to the discussions of the 2004 bill, legislation is being reintroduced in the 2005 session (hereinafter referred to as the McDowell Bill).

Based upon an analysis of state RPS legislation in 19 states and the District of Columbia, and legislative proposals considered in the U.S. Congress, and after a review of available economic studies on this policy tool, the Center for Energy and Environmental Policy concludes that the McDowell Bill relies on well-established tools used by other states to minimize costs associated with an RPS policy. It is found to be moderate in its target levels and compliance payments (compared to other states). Finally, the bill is judged to position the State to effectively compete for its share of the burgeoning renewable energy market, while contributing to a healthier environment and stronger state economy.

Will RPS Have Adverse Impacts?

Increasing Delaware's reliance on renewable energy will benefit the state in several ways: renewable resources will displace regional fossil fuel generation and decrease air pollution in Delaware; in-state development of renewable energy will decrease the amount of energy that Delaware will have to import both from other states and abroad; the installation of distributed renewable energy systems will strengthen the electricity grid and improve energy security; and there are gains for Delaware's economy (discussed below) that flow from investment in these options. While the benefits of renewables are substantial, they are not currently reflected in the State's electricity prices. As a result, renewable energy's entry into the marketplace is slowed and conventional energy options are subsidized.

Fortunately for Delaware, many states have moved forward with RPS legislation, enabling the State to learn from the large body of existing analysis on potential RPS impacts on the economy and energy users. This report reviews economic analyses of RPS laws at the state and national level, and surveys different states' experiences with RPS.

In summary, extensive rate impact studies conclude that there is little adverse effect on energy prices and in some instances, a price decrease might result. Job creation studies document the fact that renewable energy development is more employment-intensive than conventional generation and has a more favorable multiplier effect on the local economy. Finally, a review of state policy activity reveals a steady increase in RPS laws passed by states, and strengthened RPS laws in states where legislation was already in place.

RPS Laws Can Reduce Electricity Price Volatility

Unless adjustments are made for environmental and other factors, the electricity produced by most renewable energy sources is currently more expensive than that produced by conventional fossil fuel and nuclear generation. If a state requires its utilities to purchase more renewable energy resources, it follows logically that utilities might be compelled to charge their customers more for electricity. Some policy makers have worried that higher rates could in turn have a negative impact on state businesses, economic development, and job creation.

Studies that forecast rate increases from renewable energy development, however, ignore the current trends in the natural gas market. During the past 15 years, the majority of new US generating capacity has been fueled by natural gas. Over 95% of the 250 gigawatts of new generation added since 2000, has been natural gas-fired technology (Taub, 2003). At the same time, an increasing number of residences and businesses have opted to use natural gas for space heating. As a result, natural gas, which currently accounts for 25% of US energy use, is projected to expand by 1.5% annually at least through 2025 (US Energy Information Administration [EIA], 2005). As many utilities and retail customers have discovered, however, natural gas is proving to be a more volatile commodity than previously predicted (Henning et al., 2003).

Recent supply shortages of up to 4 billion cubic feet per day have caused sudden price increases for natural gas. During the 1990s, natural gas prices hovered around $2.00 per million British Thermal Units (MMBTU). But over the last three years, natural gas prices have spiked to above $6 per MMBTU and have fluctuated dramatically (EIA, n.d.). While one would expect the market to eventually respond to these high prices, the outlook for increased supply in the near term is not promising: current stocks of natural gas in underground storage are unusually low due to a combination of cold weather, declines in domestic production, and declines in net imports (Cambridge Energy Research Associates, 2004). Moreover, even with increased supplies, the seasonal fluctuation in natural gas prices is likely to remain.

The combination of rising natural gas prices and fuel price volatility has contributed to electricity price increases across the country. Utilities typically seek to hedge their natural gas investments through the use of financial contracts like futures and options. Since renewable energy sources like wind and solar energy rely on fixed-price (i.e., free) fuel, they can serve as a direct hedge against natural gas fuel price volatility. Integrating wind energy and other renewable energy resources into a utility portfolio can provide a more complete physical hedge against natural gas price variation than conventional financial strategies (Bolinger et al., 2004). As a result, energy industry experts have argued that diversifying utility generation portfolios with renewable energy is an important best practice for utility managers to reduce fuel price volatility and stabilize electricity prices (Biewald et al., 2003; Roschelle & Steinhurst, 2004).

In addition to serving as a direct hedge against natural gas price variability, renewable energy development also produces downward pressure on natural gas prices by displacing natural gas generation and decreasing natural gas demand (Elliott et al., 2003). The National Renewable Energy Laboratory recently concluded that this price reduction effect can be significant, with a gas price reduction of up to 2% for each 1% of gas demand displaced (Wiser et al., 2005). As a result, it is possible that the above-market cost of renewable energy can be offset by natural gas price decreases caused by expanded use of these options. Integrating renewable energy into generation portfolios not only helps to control generation costs, it also can reduce gas prices and lower consumer electricity bills.

RPS Rate Impacts are Negligible

Federal RPS Rate Impact Studies

There have been several nationwide renewable portfolio standards debated in the US Congress over the past several years. While the Senate has passed a federal RPS on several occasions, none of the bills have passed the House of Representatives.

Because of interest in a national RPS, the US Energy Information Administration (EIA) and several energy advocacy groups have conducted formal rate impact analyses of

RPS proposals (Table 1). In each case, a central finding of the analysis has been the documented downward pressure that renewable energy acquisitions placed on fuel prices.

The two most recent US EIA studies analyzed the potential electricity rate impacts of a 10% national RPS. The first study (EIA, 2002) examined Senate Bill 1766 from 2001, and concluded that electricity rate impacts would be minimal. Moreover, the projected retail rate increases would be partially offset by savings in electricity costs caused by lower natural gas and coal prices. The second study (EIA, 2003), commissioned by Senator Bingaman in 2003, reached similar conclusions (Figure 2).

Table 1. Projected Retail Electricity Rate Impacts of Federal Renewable Portfolio Standards

FEDERAL RPS			
Study	**Target**	**Rate Impacts**	**Other Impacts/Notes**
EIA 2000	7.5% by 2010	+$0.003 in in 2020	
UCS (Jeffords)	20% by 2020	-18%	
Tellus	4% by 2010	+$0.0003 in 2010	
EIA 2002	10% by 2020	no impact	slight retail rate increase possible by 20202
EIA 2003	10% by 2020	no impact	slight retail rate increase possible by 20202

Source: CEEP survey (2005)

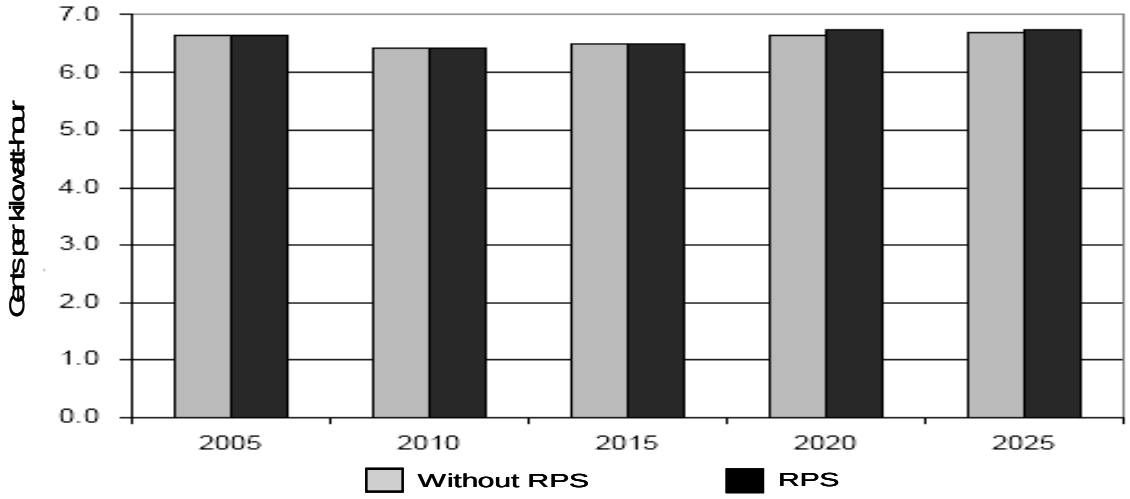

Figure 2. Retail Electricity Prices with and without 10% RPS
Source: US EIA (2003)

RPS Rate Impact Studies from the Mid-Atlantic Region

At the state level, the National Council of State Legislatures (NCSL) recently reported that there are "currently no examples of RPS significantly increasing electricity bills" (Gagliano, 2004). This conclusion is consistent with numerous RPS analyses that have estimated RPS impacts on state retail electricity rates to be minimal. In the Mid-Atlantic region, RPS cost impact analyses have been completed for Maryland, New Jersey and Pennsylvania.

Maryland

The Maryland impact analysis was conducted by Synapse Energy Economics, Inc. in 2003 for a proposed RPS of 7.5% by 2013. Synapse concluded that the RPS could contribute to a rate increase of roughly 0.1% to 1.9% between 2006 and 2013 if natural gas markets were not taken into account. When natural gas markets are taken into account, however, the impacts of the RPS ranged from no impact to a 4% *decrease* in retail electricity rates (Chen et al., 2003). Synapse concludes that, "the cost impacts of the RPS will be very small, and might even be negative."

New Jersey

New Jersey's 2001 restructuring legislation instituted an RPS with a target of 6.5% by 2012. In 2003, the Governor's Renewable Energy Task Force (2003) recommended that the RPS schedule be accelerated. In 2004, the New Jersey Board of Public Utilities approved a new schedule of 6.5% by 2008 and also instituted a target of 0.16% for solar electric systems. A National Renewable Energy Laboratory study in 2003 concluded that the solar component of this new regulation would have a net present value of $236 million (Hoff & Margolis, 2003). This study was followed by a New Jersey Board of Public Utilities (BPU) (2003) calculation that the RPS would result in a rate increase of $0.00058 per kilowatt-hour in 2008. Since the projected rate increase would be minimal, the BPU is currently considering a longer term RPS goal of 20% by 2020 (Miller et al., 2004).

Pennsylvania

In November 2004, Pennsylvania passed the Alternative Energy Portfolio Standard (AEPS) which requires 18% of the state's electricity to come from alternative energy sources by 2020. Eight percent of the portfolio must be met with renewable energy sources, while ten percent can be met through a mix of demand-side management, energy efficiency technologies, coal mine methane, coal gasification, and other energy technologies. The Heinz Endowments and the Community Foundation for the Alleghenies commissioned Black & Veatch (B&V) to conduct an economic impact analysis of the AEPS with the assumption that 10% of the portfolio would be met with renewables, rather than 8%. Even with this more aggressive target, the B&V study predicted that the AEPS would lower electric rates by 1% and generate consumer savings of $1.8 billion over the next 20 years (Pletka et al., 2004). The study also concluded that

the AEPS would result in a $9 billion increase in gross state output, and a $2.7 billion improvement in earnings (due to lower utility costs).

Rate Impact Studies from Other States

Several other states have released rate impact studies that have similarly predicted minimal or negative rate impacts as a result of RPS legislation. The findings of three states are reported in detail below and Table 2 summarizes the results from these and seven other states (see Donovan et al., 2001; GDS Associates Inc., 2001; Thompson, 2003; Woolf, 2003).

New York

In 2004, New York established an RPS of 25% by 2013. Three-fifths of this target will come from existing renewable sources, while 1% is anticipated to come from voluntary green energy purchases. The remainder will be provided by new renewable resources. In February 2004, the New York Department of Public Service collaborated with the New York State Energy Research and Development Authority and several independent consultants to assess the economic impacts of the State's RPS (arguably, the most aggressive in the country). The report concludes that the RPS will displace 9% of the electricity generated by oil and gas resources, and that the rate impacts will range from -1.74% to +2.09%, -1.50% to +2.61%, and -2.97% to +4.18% for residential, commercial, and industrial customers respectively (New York State Department of Public Service et al., 2004).

Colorado

In 2004, the Colorado General Assembly considered House Bill (HB) 1273, which would have required 15% of the state's energy to come from renewable resources by 2021. Public Policy Consulting prepared a cost impact analysis of the bill and concluded that the RPS impact would be minimal. According to its report, monthly bill impacts would range from -$0.31 to +$0.08, with -$0.20 being the most likely result (Binz, 2004). HB 1273 was narrowly defeated, but a subsequent ballot referendum succeeded in establishing an RPS of 10% by 2015. A Union of Concerned Scientists study of the new RPS concluded that it would result in $236 million in consumer bill savings, $70 million in additional state income, $50 million in added gross state product, $709 million in new capital investment, and $107 million in property taxes (Deyette & Clemmer, 2004).

Massachusetts

The current Massachusetts RPS establishes a target of 4% by 2009, increasing by 1% each year thereafter. A 2000 report by La Capra Associates projected that an RPS of 7% by 2012 would result in a 2% retail rate increase (Smith et al., 2000). This report did not take into account the effects of renewable energy development on gas prices. Instead, the report references a 1996 Northeastern Governors' Association report that concludes

electric rates would decrease by 2% if New England relied on renewable energy for 50% of its power. Had the analysis incorporated the effect of an RPS on natural gas prices, it is probable that projected rate impacts would be lower than 2%. This conclusion is supported by a recent US Department of Energy study on offshore wind development. The study concludes that large offshore wind installations planned for the area could relieve natural gas supply constraints in New England and make an important contribution to regional fuel diversity (US Department of Energy, Boston Regional Office, 2004).

The conclusion reached by available state studies is that the rate impact of RPS legislation will be minimal, and could actually lower state electricity prices. The conclusions of these state analyses are consistent with those reached by federal RPS studies, reflecting a broad agreement among energy analysts about the importance of fuel diversity.

Table 2. Projected Retail Electricity Rate Impacts of State Renewable Portfolio Standards

State (current RPS)	Target Analyzed	Rate Impacts
California (20% by 2017)	20% by 2010	-$918 million to -$1.8 billion
Colorado (10% by 2015)	15% by 2021	-$0.20 rate impact most likely range: -$0.31 to +0.08 per month
Hawaii (20% by 2020)	10.5% by 2010	-$62.4 to -$98 million by 2020
Maryland (7.5% by 2019)	7.5% by 2013	range: -2% to +1.9%
Massachusetts (4% by 2009)	7% by 2012	+2%
New Jersey (6.8% by 2008)	20% by 2020	range +1.13% to +3.7%
New York (25% by 2013)	25% by 2013	-1.74% to +2.09% (residential) -2.97% to +4.18% (industrial) -1.50% to 2.61% (commercial)
Pennsylvania (18% by 2020)	18% by 2020	-$2.7 billion
Vermont (none)	10% by 2015	+0.84%
Wisconsin (2.2% by 2011)	10% by 2013	range: -$0.16 to +$0.50

Source: CEEP survey (2005)

An RPS Policy Creates Jobs

Implementation of a state-level RPS can stimulate job creation, a benefit important to both policymakers and consumers. Numerous studies have estimated and documented the job creation effect of renewable energy. Broadly speaking, these studies have demonstrated that renewable energy development is more job intensive than conventional energy development.

The Renewable and Appropriate Energy Laboratory (RAEL) at the University of California, Berkeley analyzed and compared the results of thirteen different job creation studies in a report entitled, *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* (Kammen et al., 2004). RAEL concluded that renewable installations generate more construction, manufacturing, and installation jobs than do coal and natural gas plants. RAEL also noted that job growth in the traditional fuel and utility industries has declined as a result of mechanization and mergers, while job growth in the renewable energy industries has accelerated as a renewable energy markets have expanded. To better illustrate the comparative job creation effect of renewable energy development, RAEL developed five future energy scenarios (Figure 3). The first three scenarios assume a 20% national RPS, while the second two scenarios assume that all future energy needs are met with coal or natural gas. The RPS scenarios create 176,000-241,000 new jobs, while the fossil fuel scenarios create only 86,000 and 84,000, respectively.

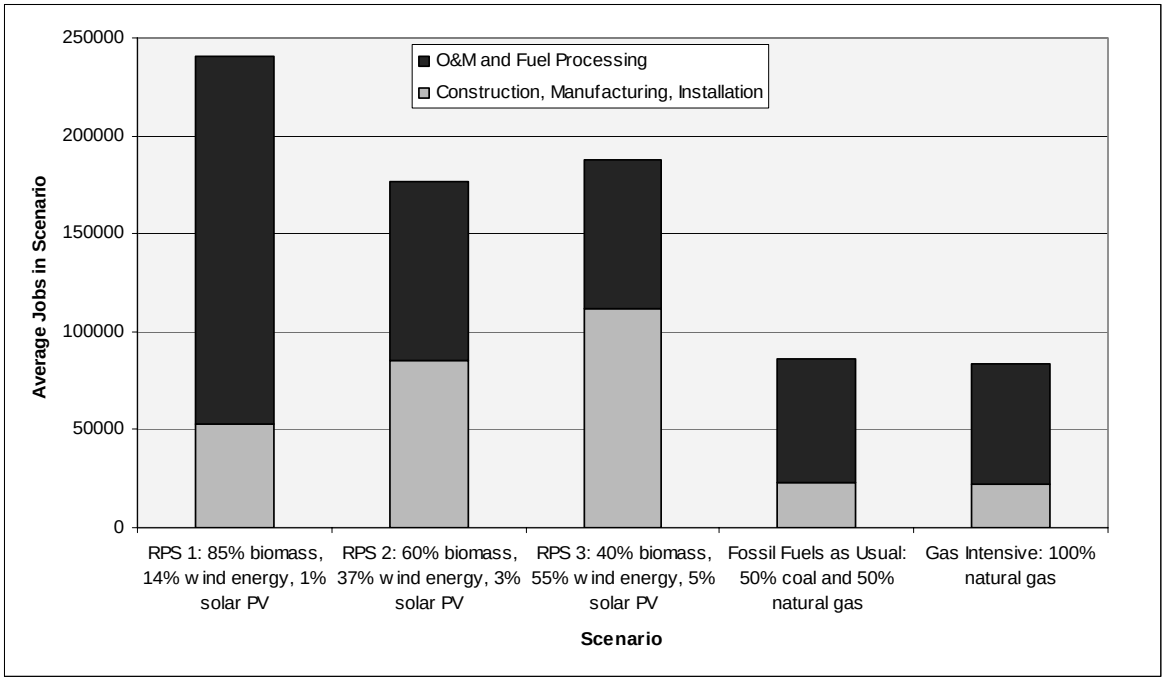

Figure 3. Comparison of average employment from five electricity generation scenarios.
Source: Kammen et al (2004)

In creating these scenarios, RAEL used data from a job creation study completed by the Renewable Energy Policy Project (REPP) in 2001. REPP calculated that PV and wind projects create 35.5 person years and 4.8 person years of employment per megawatt, respectively (Singh & Fehrs, 2001). REPP also concluded that investments in renewable energy development have a more significant job creation affect than equivalent investments in fossil fuel generation. As can be seen in Figure 4, every million dollars invested in wind energy generates 5.7 person-years, while every million dollars invested in solar photovoltaic systems creates 5.65 person-years of employment. By comparison, every million dollars invested in coal technology creates only 3.96 jobs. Wind and solar therefore generate approximately 40% more employment per dollar invested than coal does.

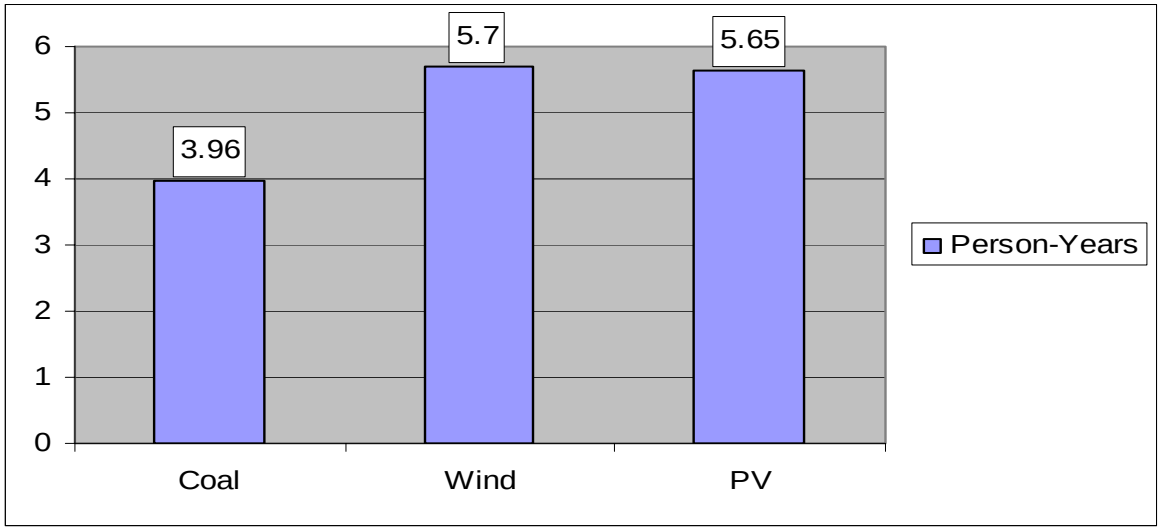

Figure 4. Comparison of Coal, Wind and PV (in Person-Years per $1 Million in Cost over 10 Years Including Capital and Construction)
Source: Singh & Fehrs (2001)

Job Creation Studies in RPS States

One of the stated intents of many RPS laws is job creation and several states have conducted job creation studies in support of their existing or proposed renewable portfolio standards (Table 3). As predicted by the RAEL and REPP studies, these analyses have found that renewable energy investment would have a greater job creation effect than comparable investments in conventional energy projects. An analysis of Colorado's RPS, for example, found that the law would create 2,000 new jobs, or 2.8 times more jobs than would be created by an equivalent amount of fossil fuel generation (Deyette & Clemmer, 2004). Pennsylvania's job study predicted that 70,000 job-years would be created between 2007 and 2020 (Pletka et al., 2004), while the Nevada AFL-CIO & REPP (2002) calculated that the Nevada RPS would generate over 8,000 in-state jobs, and over 27,000 jobs total, by 2015. Texas, which instituted one of the earliest and most successful RPS laws, reported that the RPS created 2,500 new jobs by 2001. If the RPS target is raised to 10,000 MW as currently proposed, the Union of Concerned

Scientists estimates that the new standard will create close to 20,000 new jobs by 2025 (Deyette & Clemmer, 2005).

Table 3. State RPS Job Creation Studies

State	Target Analyzed	Jobs Created	Notes/Other Benefits
Arizona	1% by 2005	600 jobs	Analysis for all-solar portfolio
Colorado	10% by 2015	2000 jobs	$70 million in additional income $709 million in capital investment $15 million in rural land leases $107 million in property tax revenue
Nevada	15% by 2013	8,092	27,229 total (in-state + out-of-state)
New Jersey	20% by 2020	11,700	
Pennsylvania	18% by 2020	70,000 job-years	$9 billion in gross state output $2.7 billion in earnings
Texas	10,000 MW by 2025	19,950 (2,500 new jobs already in 2001)	$4.7 billion in capital investment $1.1 billion in school tax revenues $628 million in land leases

Source: CEEP survey (2005)

Job Creation in Delaware

Evidence from several recent studies strongly suggests that renewable energy investment has the potential to create jobs in Delaware. A recent study by Redefining Progress (2004) estimated that a national commitment to renewable energy sources in the transportation and energy sectors could create as many as 5,000 jobs in Delaware. Given the current political climate, however, it seems unlikely that the federal government will lead renewable energy development. Instead, it is more likely that states will continue to drive national renewable energy markets.

A study by the NJPIRG Policy & Law Center found that "tens of thousands of well-paying jobs" would be created if the Mid-Atlantic region developed its renewable resources. If 10% of the homes in the Mid-Atlantic region installed 2 kilowatt solar systems, for example, NJPRIG calculated that 13,790 new jobs would be created (Algoso & Rusch, 2004). NJPIRG also calculated that twice as many jobs would be created if wind power were used instead of natural gas to meet regional electricity demand (Table 5). While Delaware's wind resource is not a strong as other states in the Mid-Atlantic, two companies proposed utility-scale wind projects for the State during the past three years. Florida Power & Light proposed a 60 megawatt installation in 2003 and Terrapin Wind proposed a 20 megawatt installation in 2004. According to the National Renewable Energy Laboratory's JEDI software, the installation of 80 MW of wind in Delaware would create 192 year-long jobs.

Table 4. Projected Economic Benefits of Wind Power in the Mid-Atlantic Region through 2014, Wind Compared to Natural Gas

	Wind	Natural Gas
Electricity Generation	30,700 GWh	30,700 GWh
New Capacity	10,200 MW	6.670 MW
One Year Jobs		
Manufacturing	5,910	2,500
Installation	5,160	3,260
Supporting Areas	12,700	6,630
Long-Term Jobs		
Operation and Maintenance	740	270
Supporting Areas	850	310
Royalties Paid to Landowners	$23 million	N/A

Source: Algoso & Rusch (2004)

While in-state renewable energy projects create construction and operations jobs, out-of-state renewable energy development could create manufacturing jobs in Delaware. Recent studies by REPP used the North American Industrial Classification System to estimate the number of existing Delaware firms that could manufacture components for wind and solar energy systems. According to REPP (Sterzinger & Svrcek, 2004a, 2004b), there are 23 Delaware companies employing 2,329 people that could position themselves to supply components to the wind energy industry, and 30 companies employing 2,310 people that could manufacture solar energy components. If significant national or regional investments were made in wind and solar power, it is reasonable to assume that new manufacturing jobs would be created in Delaware.

In sum, the job creation benefits of renewable energy are sizable. Job creation from the renewable energy sector will largely occur where RPS legislation encourages development and use of these resources. While RPS requirements encourage in-state projects and local jobs, strong renewable energy markets can also create manufacturing opportunities for companies located throughout the region. Because Delaware imports the majority of its electricity, a Delaware RPS will create incentives for both in-state and out-of-state projects. A Delaware RPS can therefore be expected to create jobs both by encouraging in-state renewable energy development and by creating regional opportunities for Delaware manufacturers.

States are Strengthening RPS Policies

RPS laws vary widely from state to state, but broad conclusions can be drawn about state experience with RPS as a policy tool. A survey of state policies by the Center for Energy and Environmental Policy reveals that RPS is playing an increasingly significant role in energy policy at the state level. The number of states with RPS legislation has steadily increased over time, perhaps in part because adverse price effects have not occurred. Further, several states have strengthened or are considering strengthening their RPS laws, and many states are considering adding RPS laws, due to positive affects of RPS laws on local economies.

Pioneering states enacted RPS targets that were lower than those legislated by several recent adopters. As well, most states have strengthened, or are considering strengthening their RPS regimes. For example, Wisconsin met its 2.2% RPS standard well ahead of schedule and several of its utilities have over-complied. As a result, the Governor's Task Force on Energy Efficiency and Renewables (2004) recently recommended that the RPS be increased to 10% by 2015 and impact studies project that cost impacts will be minimal (Clemmer et al., 2003; Thompson, 2003). The Arizona Corporation Commission (2005) recently recommended that the 1.1% RPS target be increased to 15% by 2025, with 20% of that target coming from solar electric systems and 25% coming from distributed renewable energy systems.

The RPS law in Texas requires 3,000 megawatts (MW), or 2.7%, of the State's electricity, to come from renewable energy by 2009. Like Wisconsin, Texas is already ahead of its target schedule, with over 1,000 MW of new wind energy installed in response to the RPS regulation (Langniss & Wiser, 2003). Texas RPS costs have thus far been low and there have been several recent proposals to increase the RPS target. The Texas Energy Planning Council recommended that the state establish a new RPS goal of 10% by 2020, while Senate Bill 533 proposes a 10,000 MW capacity target by 2025 (Platts, 2004; SB 533)

In addition to Wisconsin, Arizona, and Texas, California is also considering an accelerated RPS schedule. With one utility on track to meet its 20% requirement by 2004, the State has recommended that the compliance schedule be accelerated from 20% by 2017 to 20% by 2010 (Doughman et al., 2004). Governor Schwarzenegger has also proposed an additional target of 33% by 2020 (California Energy Commission, 2004).

Wisconsin, Texas, Arizona, and California are following in the footsteps of states that have already strengthened their RPS regulations: Connecticut extended its RPS to all state utilities and established non-compliance penalties in 2003. Hawaii upgraded its voluntary goal of 9% by 2010 to a mandatory standard of 20% by 2020 in 2004. Nevada increased its RPS from 1% by 2009 to 15% by 2013 in 2001. Pennsylvania replaced its weak RPS with the new Alternative Energy Portfolio Standard in 2004. And New Jersey is considering a second RPS target adjustment, that would create a new renewable portfolio standard of 20% by 2020.

In addition to those states that have strengthened their RPS laws, four states and the District of Columbia added new RPS laws in 2004, and fourteen states will be considering legislation in 2005. Because no states have rescinded their RPS legislation, it can be inferred that RPS is gaining momentum as a policy tool for encouraging the generation of clean and affordable electricity.

RPS in Delaware: The McDowell Bill

During the course of the RPS design process in Delaware, several stakeholders have raised concerns about the potential cost impacts of the RPS on retail electricity rates. In particular, concerns were raised about resource constraints, the alternative compliance payment, and the target schedule.

Resource constraints

In 2003, Applied Energy Group (AEG) (2002) reviewed renewable energy resource assessments conducted by others for the Governor's Energy Task Force Report. AEG concluded that Delaware had limited in-state wind energy, hydropower, and geothermal resources. Delaware has the potential for biomass resource development, but sustainable biomass combustion was effectively banned in Delaware with the passage of Senate Bill 280 in 2000. Delaware's solar resource endowment is moderately good and studies by the Center for Energy and Environmental Policy have identified limited cost-effective solar electric applications for state public buildings (Byrne & Boo, 1999), commercial buildings (Byrne et al., 1997; Byrne et al., 1995) and poultry houses (Center for Energy and Environmental Policy, 2005). However, the cost of solar electric generation remains comparatively high. Due to constrained renewable resource availability in the state, concerns have been raised about the ability of Delaware to meet an RPS.

If a bill limited the resource base to in-state renewable generation, then costs would be high since utilities would have to rely heavily on expensive solar energy. To avoid this, the RPS bill proposed by Senate Majority Leader Harris B. McDowell (hereinafter referred to as the McDowell Bill) follows the precedent set by other states and allows regional renewable resources to be eligible for Delaware's RPS. This means that Delaware utilities can procure low-cost renewable energy from throughout PJM, the Mid-Atlantic power pool in which the state participates. It is expected that this provision will minimize costs of resource acquisition. Adjacent states to Delaware – Maryland, New Jersey and Pennsylvania – have adopted this approach.

Alternative Compliance Payments

All RPS laws on the East Coast, except New York, rely on tradable renewable energy credits (RECs) as the basis for compliance. RECs are designed to provide utilities with a flexible, market-based mechanism to meet their compliance targets. To control costs, an alternative compliance payment (ACP) serves as a cap on credit prices. In Massachusetts and Connecticut, the ACP is set above $50 per megawatt-hour (MWh). In

both of these states, credit prices have risen to over $45 per MWh. During the negotiation process in preparing the McDowell Bill, some stakeholders were concerned that credit prices in Delaware might also rise close to the ACP ceiling. As a result, the ACP included in the McDowell Bill represents a compromise value of $25.00 per MWh.

Table 5. Comparison of RPS Alternative Compliance Payments

Rank	State	ACP
1	Connecticut	$55.00
2	Massachusetts	$51.41
3	New Jersey	$50.00
4	Maine	NE Market Price
5	Rhode Island	$50.00
6	Pennsylvania	$45.00
7	Washington, DC	$25.00
8	Delaware	$25.00
9	Maryland	$20.00

Source: CEEP survey (2005)

The ACP provision is structured so that payments increase in $10 increments, to a maximum of $50 per MWh, if utilities opt to pay the fee rather than invest in renewable energy projects. The approach taken in the McDowell Bill provides an incentive for investments in new renewable generation while minimizing the risk of inflated credit prices. Even at a maximum ACP of $50 per MWh, Delaware RPS credit prices would probably not be as high as those in Connecticut and Massachusetts. Under the McDowell Bill, utilities can bank their RECs for a period of three years. The banking provision decreases REC price volatility, and keeps REC prices relatively low (Nielsen & Jeppesen, 2003). Finally, it should be noted that the ceiling ACP of $50 per MWh would only be reached if a utility or municipal electric company decided on four occasions over the 10-year life of targets in the bill to opt not to invest in renewables projects.

Target Schedule

If Delaware's percentage target were too high, or if its scheduled increases were too ambitious, then the policy could become expensive to implement. When ranked by target percentage, however, Delaware is 15th out of 20 (Table 6).[1] As discussed above,

[1] Iowa is not included in the ranking since its target is capacity based (105 MW) and not percentage based.

this rank could be considered inflated because all of the states with lower percentages than Delaware, except Maryland, are currently planning to increase their targets (i.e., New Jersey, Wisconsin, Arizona, and Texas).

Table 6. Comparison of RPS Targets and Final Implementation Years

Rank	State	Percentage	Year
1	Maine	30%	2001
2	New York	25%	2013
3	California	20%	2017
4	Hawaii	20%	2020
5	Pennsylvania	18%	2020
6	Rhode Island	16%	2019
7	Nevada	15%	2013
8	Illinois	15%	2020
9	Connecticut	13%	2009
10	Washington, DC	11%	2022
11	New Mexico	10%	2011
12	Colorado	10%	2015
13	Massachusetts	10%	2015
14	Minnesota	10%	2015
15	Delaware	10%	2019
16	Maryland	7.5%	2019
17	New Jersey	6.8%	2008
18	Texas	3.0%	2009
19	Wisconsin	2.2%	2011
20	Arizona	1.1%	2012

Source: CEEP survey (2005)

Conclusion

In sum, the McDowell Bill relies on well-established tools used by other states to minimize costs associated with an RPS policy. It is moderate in its target levels and compliance payments (compared to other states). The bill positions the State to compete for its share of the burgeoning renewable energy market, while contributing to a healthier environment and stronger state economy.

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