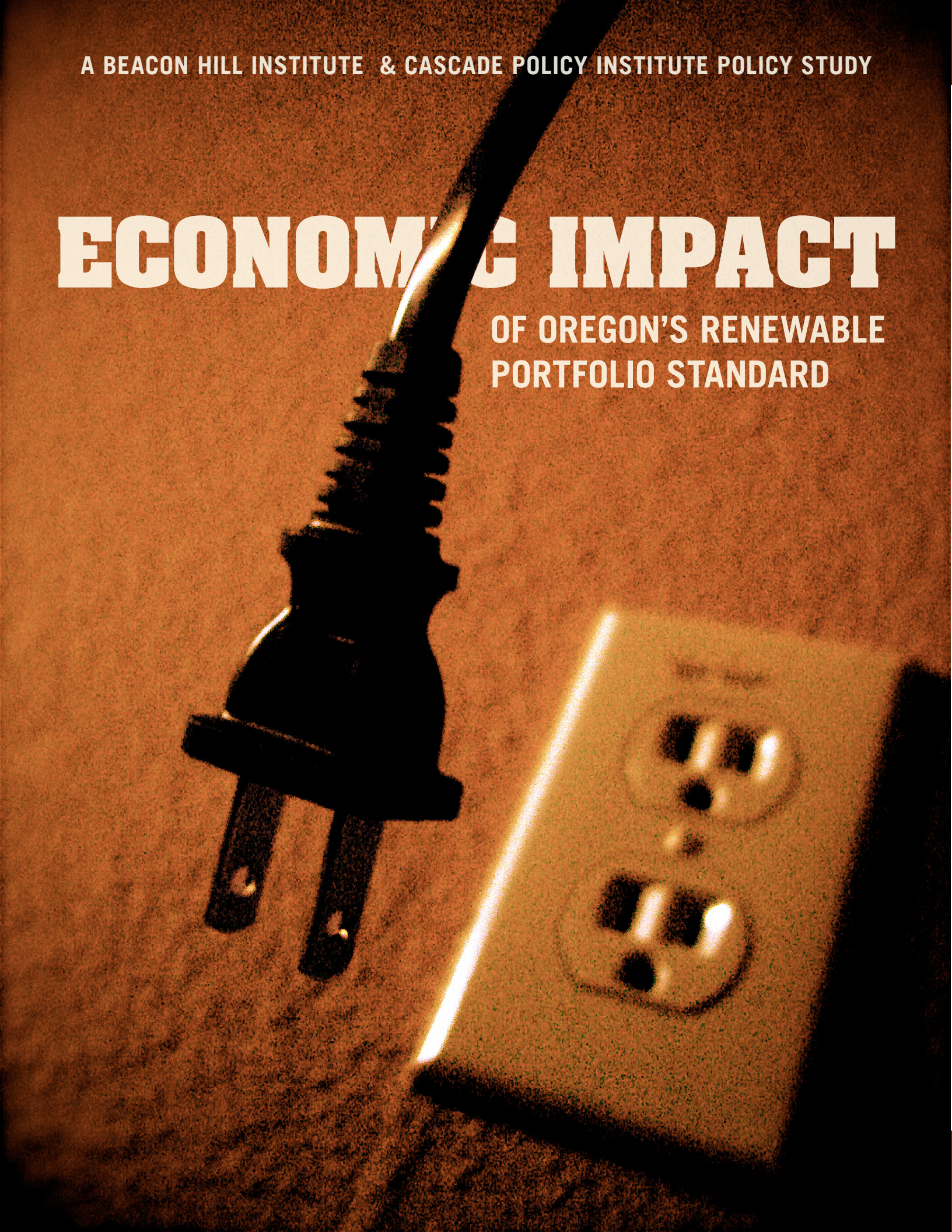
A BEACON HILL INSTITUTE & CASCADE POLICY INSTITUTE POLICY STUDY

ECONOMIC IMPACT

OF OREGON'S RENEWABLE PORTFOLIO STANDARD



ECONOMIC IMPACT

OF OREGON'S RENEWABLE PORTFOLIO STANDARD

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EXECUTIVE SUMMARY

In 2007 Oregon passed Senate Bill 838 (SB 838) which established a state Renewable Portfolio Standard (RPS). The RPS mandates large utilities (those providing 3% or more of the state's electricity load) to supply a minimum percentage of electricity sold to retail customers derived from new renewable resources. Renewable resources include energy from solar, wind, ocean thermal, ocean wave power, geothermal, hydrogen derived from renewable sources, biomass and small hydroelectric facilities.

Specifically, SB 838 requires that Oregon's public electric utilities increase the percentage of electricity generated from new renewable energy sources. The RPS will be phased in over time, mandating that renewable sources account for 5% of all power generated by 2011 through 2014, 15% for 2015-2019, 20% for 2020-2024, and 25% by 2025. Smaller utilities are subject to lower standards.

Since renewable energy generally costs more than conventional energy, many have voiced concerns about higher electricity rates. Moreover, since Oregon has a limited ability to generate new renewable energy, the state will start from a low power generation base. In addition, some renewable energy sources (wind and solar power in particular) require the installation of conventional backup generation capacity for cloudy, windless days. The need for this backup further boosts the cost of renewable energy.

Oregonians will begin to see these higher costs on their electric bills this year. Pacific Power and Portland General Electric implemented rate increases (in some cases double-digit percentage increases) directly tied to SB 838.[1]

The Beacon Hill Institute at Suffolk University (BHI), in conjunction with Cascade Policy Institute, set out to estimate the costs of SB 838 and its impact on the state's economy. To that end, BHI applied its STAMP® (State Tax Analysis Modeling Program) for

Oregon (OR-STAMP), which allowed us to estimate the economic effects of the state RPS mandate.[2]

A wide variety of cost estimates exist for renewable electricity sources. The U.S. Energy Information Agency (EIA), a division of the Department of Energy, provides estimates for the cost of conventional and renewable electricity generating technologies. However, the EIA's assumptions are optimistic regarding the cost and capacity of renewable electricity generating sources to produce reliable energy.

A literature review shows that in most cases the EIA projected costs can be found at the low end of the range of estimates, while the EIA's capacity factor for wind is at the high end of the range. EIA does not take into account the actual experience of existing renewable electricity power plants. Therefore, we provide three estimates of the cost of federal RPS mandates: low, average and high, using different cost and capacity factors estimates for electricity-generating technologies from the academic literature. The top half of Table 1 displays our cost estimates.

In the aggregate, the state's electricity consumers will pay $992 million in 2025, within a range of $562 million and $1.404 billion due to the RPS. Over the period of 2015 to 2025, SB 838 will cost $6.811 billion, within a range of $4.009 billion and $9.310 billion. Oregon's electricity prices will increase by an average of 1.73 cents per kilowatt-hour (kWh), or 23.9%, in 2025, within a range of $0.98 cents per kWh, or 13.6% and 2.46 cents per kWh, or 34%.

These increased energy prices will hurt Oregon's households and businesses and, in turn, inflict significant harm on the state economy. Our estimates are measured against the baseline assumption that no RPS policy is in place and reflect the total aggregate change to date against that baseline. The lower portion of Table 1 presents our estimates of the effects of the state RPS in 2010 Net Present Value dollars (NPV).

TABLE I

THE COST OF SB 838 ON OREGON (2010 $)

COST ESTIMATES	LOW	AVERAGE	HIGH
TOTAL NET COST IN 2025 ($ millions)	563	992	1,404
TOTAL NET COST 2015-2025 ($ millions)	4,009	6,811	9,310
ELECTRICITY PRICE INCREASE IN 2025 (CENTS PER KWH)	0.98	1.73	2.46
PERCENTAGE INCREASE	13.6	24.0	34.0
ECONOMIC INDICATORS	**LOW**	**AVERAGE**	**HIGH**
TOTAL EMPLOYMENT (JOBS)	-10,025	-17,530	-24,630
GROSS WAGE RATES ($ PER WORKER)	-157	-275	-385
INVESTMENT ($ MILLIONS)	-83	-145	-204
REAL DISPOSABLE INCOME ($ MILLIONS)	-101	-170	-230

The BHI model suggests that by 2025 the Oregon economy will lose an average of 17,530 jobs, within a range of between 10,025 jobs under our low-cost scenario and 24,630 jobs under our high-cost scenario. We report net employment losses that include jobs that would be created to build out renewable electricity power plants and infrastructure under each cost scenario.

The decrease in labor demand, as seen in the job losses, will trigger gross wages to fall. In 2025, the RPS mandate will reduce annual wages by an average of $275 per worker, within a range of between $157 per worker $385 per worker.

The job losses and price increases will reduce real incomes as firms, households and governments spend more of their budgets on electricity and less on other goods and services such as groceries, entertainment, dining-out and personal services. In 2025, annual real disposable income will fall by $170 million, within a range of $101 million and $230 million.

Annual investment will fall by $145 million, within a range of $83 million and $204 million under our low- and high-cost cases, respectively. As with employment, the investment losses will be tempered by the investments required in building renewable power plants, transmission lines and reconfigurations to the electricity grid.

Table 2 shows how SB 838 will affect the annual electricity bills of households and businesses in Oregon. In 2025, the RPS will cost families an average of $247 per year, commercial businesses an average of $1,394 per year and industrial businesses an average of $11,585 per year. Over the 10 years, the average household ratepayer will pay $1,706 in higher electricity costs; the average commercial ratepayer will spend an extra $9,641 and the average industrial ratepayer an extra $80,115.

TABLE 2

EFECTS OF RPS ON ELECTRICITY RATEPAYERS IN 2025

TYPE OF RATEPAYER	2010 $
RESIDENTIAL RATEPAYER	247
COMMERCIAL RATEPAYER	1,394
INDUSTRIAL RATEPAYER	11,585
	TOTAL OVER PERIOD 2015-2025
RESIDENTIAL RATEPAYER	1,706
COMMERCIAL RATEPAYER	9,641
INDUSTRIAL RATEPAYER	80,115

"These increased energy prices will hurt Oregon's households and businesses and, in turn, inflict significant harm on the state economy."

One could justify the higher electricity costs if the environmental benefits, in terms of reduced greenhouse gas (GHG) emissions, outweigh the costs. However, it is unclear that the use of renewable energy resources, especially wind and solar, actually reduce GHG emissions. Due to their intermittency, wind and solar require significant backup power sources that are cycled up and down to accommodate the variability in the production of wind and solar power. As a result, a recent study found that wind power actually increases pollution and greenhouse gas emissions.[3] Thus, there are, in fact, no benefits of implementing RPS policies based on heavy uses of wind.

Also, firms with high electricity usage likely will move their production, and emissions, out of Oregon to locations with lower electricity prices. Therefore, the Oregon policy will not reduce global emissions, but rather will send jobs and capital investment outside the state.

As a first step, Oregon's policymakers should repeal SB 838 before electricity costs spiral out of control. In addition, legislators should demand that future environmental policies be subject to a process of regular and rigorous analysis of its environmental effects, costs and benefits and economic impacts.

INTRODUCTION

"Increases in electricity costs are known to have a profound negative effect on the economy not unlike taxes, as prosperity and economic growth are directly related to access to reliable and affordable energy."

Combined with fluctuations in fossil fuel prices, the push to mitigate the adverse effects of climate change has encouraged many state governments to respond with public policy initiatives designed to promote the use of alternative energy sources.

Oregon is a national leader in mandating renewable energy production and subsidizing the "green" economy. In 2007, the Oregon legislature passed the Oregon Renewable Energy Act (Senate Bill 838), imposing a Renewable Portfolio Standard (RPS) mandate on electric utilities. SB 838 requires large utilities (with 3% or more of the state's electricity load) to use specific levels of renewable energy in their electricity generation: 5% by 2011 going through 2014, 15% for 2015-2019, 20% for 2020-2024 and 25% by 2025. Smaller utilities are subject to lower standards.[4]

The statute defines alternative energy to include only solar, wind, small-scale hydropower, ocean thermal, wave power, geothermal, hydrogen derived from renewable sources, and certain forms of biomass energy "renewable" resources. Large-scale hydroelectric generation on the Columbia River system—the dominant source of low-cost, reliable electricity in the Pacific Northwest—is specifically excluded as a form of "renewable" power.

Most "renewable" electricity sources are more costly and unreliable than conventional energy sources such as coal and natural gas and stand little chance of commercial success in a competitive market. Thus, producers of renewable energy seek to guarantee a market through RPS legislation. Unfortunately, this guarantee is going to be very costly for ratepayers.

In order to keep the voltage of the electricity grid in equilibrium, intermittent resources such as wind and solar power need reliable back-up sources. If the wind dies down, or blows too hard (which trips a shutdown mechanism in commercial windmills), another power source must be ramped up instantly.

Over the past decade, the Columbia River hydro system has provided that back-up in the Pacific Northwest. However, the federal power marketing agency that manages the Columbia, Bonneville Power Administration, has announced that the system will not be able to handle future load growth.[5] Therefore, every new source of "renewable" electricity added to the Oregon electricity grid in response to the RPS must be accompanied by a conventional source of electricity, such as natural gas. The natural gas turbines will have to run in standby mode (similar to a jet engine idling on the airport tarmac) even when windmills are producing power, so that they can be turned up the moment they are needed.

Electric utilities have already incurred the expense associated with alternative sources and have responded by passing the costs down to consumers. Portland General Electric (PGE), one of the biggest utilities in the state, has added a "renewable resource adjustment" to electric bills which totals $2.13 per month for an average household that generates close to $1.5 million per month. [6]

In addition, PGE implemented a rate increase effective January 1, 2011 that will raise the average household electricity bill by 4.2%. According to PGE, these costs are mainly the result of state renewable energy mandates. The second largest utility in Oregon, Pacific Power, also won approval for 14.5% rate increase with the Oregon Public Utilities Commission effective January 1, 2011. This increase is also mostly due to mandated expansion of wind farms and the cost of integrating unpredictable wind power into the electricity grid.[7]

Increases in electricity costs are known to have a profound negative effect on the economy not unlike taxes, as prosperity and economic growth are directly related to access to reliable and affordable energy. Since electricity is an essential commodity, consumers will have limited opportunity to avoid these costs. For the poorest members of society, these energy taxes will compete directly with essential purchases in the household budget, such as food, transportation and shelter.

In this report, BHI and Cascade Policy Institute estimate the costs and benefits of SB 838 and the economic impact of the legislation on the state economy. To that end, BHI applied its STAMP® (State Tax Analysis Modeling Program) for Oregon (OR-STAMP), which allowed us to estimate the economic effects of the state RPS mandate.

OREGON-STAMP

BHI has developed a Computable General Equilibrium (CGE) model for Oregon. The purpose of the model, called OR-STAMP (Oregon State Tax Analysis Modeling Program) is to identify the economic effects of a variety of state policy changes.

OR-STAMP is a five-year dynamic CGE model that has been programmed to simulate changes in taxes, prices (general and sector specific) and other economic inputs. As such, it provides a mathematical description of the economic relationships among producers, households, governments and the rest of the world. It is general in the sense that it takes into account all the important markets and flows. It is an equilibrium model because it assumes that demand equals supply in every market (goods and services, labor and capital). This is achieved by allowing prices to adjust within the model. It is computable because it can be used to generate numeric solutions to concrete policy and tax changes, with the help of a computer.[8]

THE COST OF ELECTRICITY FROM DIFFERENT SOURCES

As noted above, governments enact RPS policies because most sources of renewable electricity generation are less efficient and thus more costly than conventional sources of generation. The RPS policy forces utilities to buy electricity from renewable sources and thus guarantees a market for the renewable source. These higher costs get passed on to electricity consumers including residential, commercial and industrial customers.

The U.S. Department of Energy's Energy Information Agency (EIA) estimates the Levelized Energy Cost (LEC), or financial breakeven cost per MWh to produce new electricity in its Annual Energy Outlook.[9] The EIA provides LEC estimates for conventional and renewable electricity technologies (coal, nuclear geothermal, landfill gas, solar photovoltaic, wind and biomass) assuming the new sources enter service on 2016. The EIA also provides LEC estimates for conventional coal, combined cycle gas, advanced nuclear and onshore wind only, assuming the sources enter service in 2020 and 2035.

While the EIA does not provide LEC for hydroelectric, solar photovoltaic and biomass for 2020 and 2035, it does project overnight capital costs for 2015 and 2025. We can estimate the LEC for these technologies and years using the percent change in capital costs to inflate the 2016 LECs.

In its Annual Energy Outlook, the EIA incorporates many assumptions about the future price of capital, materials, fossil fuels, maintenance and capacity factor into their forecast. Over time the EIA projects that the LEC for all four electricity sources (coal, gas, nuclear and wind) fall significantly from 2016 to 2025. The fall in capital costs drives the drop in total system LEC over the period.

Using the EIA change in overnight capital costs for solar and biomass produces reductions in LECs similar to wind from 2016 to 2035. The biomass LEC drops by 57.3 percent and solar by 47.3 percent over the period. These compare to much more modest cost reductions of 23.1 percent for coal, 9.9 percent for gas and 26.7 percent for nuclear over the same period. EIA does provide overnight capital costs for renewable technologies under a "high-cost" scenario. However, for each renewable technology the EIA "high-cost" scenario projects capital costs to drop between 2015 and 2035, which appears odd for a so-called "high-cost" case. The high cost case is only "high" in the sense that costs fall at a slower rate.

The EIA also projects capacity factors for all technologies. The capacity factor measures ratio of the electrical energy produced

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by a generating unit over a period of time to the electrical energy that could have been produced at 100 percent operation during the same period. In this case, the capacity factor measures the potential productivity of the generating technology. Solar, wind and hydro have the lowest capacity factors of the generating technologies due to the intermittent nature of their power sources. EIA projects a 34.4 percent capacity factor for wind power, which appears to be at the high end of any range of estimates.

Estimating a capacity factor for wind power is particularly challenging. Wind is not only intermittent but its variation is unpredictable, making it impossible to dispatch to the grid with any certainty. This unique feature of wind power argues for a capacity factor rating of zero. Nevertheless, wind capacity factors have been estimated to be between 20 percent and 40 percent.[10] The other variables that affect the capacity factor for wind is the quality and consistency of the wind and the size and technology of the wind turbines deployed. As the U.S. and other countries add more wind power over time, presumably the wind turbine technology will improve, but the new locations for wind power plants will have diminishing wind resources.

The EIA estimates of LEC and capacity factors paint a particularly rosy view of the future cost of renewable electricity generation. Other forecasters and the experience of current renewable energy projects portray a less sanguine outlook. The Appendix of this report contains a detailed discussion of other projections for LEC, capacity factors and other issues that would increase the costs of so-called renewable electricity generating sources.

BHI ESTIMATES AND RESULTS

In light of the wide divergence in the costs and capacity factor estimates available for the different electricity generation technologies, we provide three estimates of the effects of Oregon RPS mandate using low, average and high estimates of LEC and capacity factors for the generation technologies with the highest generation rates (coal, gas, wind and biomass). Each estimate represents the change that will take place in the indicated variable against an assumption that the RPS mandate would not be implemented. The Appendix contains details of our methodology. Table 1 displays our estimates of the cost and economic impact of the RPS mandate on the state.

SB 838 would impose costs of $992 million in 2025, within a range of $463 million and $1.404 billion. For the period of 2015-2025 the RPS mandate would cost $6.811 billion, with a low estimate of $4.009 billion and a high of $9.310 billion. As a result, the RPS mandate would increase electricity prices by 1.73 cents per kilowatt-hour (kWh) or a 24% increase, within a range of 0.98 cents per kWh, or 13.6 and 2.46 cents per kWh, or 34%.[11]

The OR-STAMP model simulation indicates that upon full implementation the RPS law will impose significant harm on the Oregon economy. Oregon's ratepayers will face higher electricity prices which will increase their cost of living, which will in turn put downward pressure on households' disposable income. By 2025, the Oregon economy would shed 17,530 jobs, within a range of 10,025 and 24,630 jobs.

The decrease in labor demand, as seen in the job losses, will cause gross wages to fall. In 2025, the 25 percent mandate will reduce annual wages by $275 per worker, with the low-cost case producing a $157 wage drop and the high-cost case reducing wages by $385 per worker.

The job losses and price increases would reduce real incomes as firms, households and governments spend more of their budgets on electricity and less on other items, such as home goods and services. In 2025, annual real disposable income would fall by $145 million, and by $83 million and $204 million under the low- and high-cost case mandates, respectively.

Furthermore, annual net investment would fall by $170 million, within a range of $101 million and $230 million. The investment losses are tempered by the investments required in building renewable power plants, transmission lines and reconfigurations to the national electricity grid.

CONCLUSION

SB 838 was signed into law in 2007 to provide "a comprehensive renewable energy policy for Oregon, enabling industry, government and all Oregonians to accelerate the transition to a more reliable and more affordable energy system."[12] However, many current forms of renewable energy, solar and wind in particular, are more costly and less reliable than conventional sources and other sources not deemed renewable.

The renewable portfolio standard will raise electricity prices for consumers and businesses in Oregon. Meanwhile, the Oregon business community will see a reduction in its competitive advantage over the 19 states that have not adopted similar legislation.[13] The result is that Oregon will face slower growth in disposable income, employment and wages over the next fifteen years.

APPENDIX

CALCULATION OF THE NET COST OF NEW RENEWABLE ELECTRICITY

To calculate the cost of renewable energy under the RPS, BHI used data from the Energy Information Agency (EIA), a division of the U.S. Department of Energy. We collected data on the expected annual electricity sales for Oregon from the EIA Annual Energy Outlook Report for 2010-2035.[14] To these totals, we apply the percentage of renewable sales prescribed by the Oregon RPS. By 2025, renewable energy sources must account for 25% of total electricity sales in Oregon.

Next, we projected the growth in renewable sources that would have taken place absent the RPS. We used the EIA's projection of renewable energy sources by fuel for the Northwest Power Pool Area through 2025 as a proxy to grow renewable sources for Oregon through 2025.[15]

We subtracted our projection of renewable sales from the RPS mandated quantity of sales for each year from 2011 to 2025 to obtain our estimate of the annual increase in renewable sales under the RPS in megawatt hours (MWhs). The RPS mandate only exceeds our projected renewable sales beginning in 2015. This figure also represents the maximum number of MWhs of electricity from conventional sources that are avoided, or not generated, through the RPS mandate. We will revisit this shortly. Table 3 contains the results.

TABLE 3

PROJECTED ELECTRICITY SALES, ELIGIBLE RENEWABLES AND REQUIRED UNDER RPS

YEAR	PROJECTED ELECTRICITY SALES	ELIGIBLE RENEWABLE	RPS REQUIREMENT	DIFFERENCE
	MWhs (000s)	MWhs (000s)	MWhs (000s)	MWhs (000s)
2015	50,995	4,880	7,649	2,769
2016	51,584	4,880	7,738	2,857
2017	52,186	4,880	7,828	2,947
2018	52,887	4,880	7,933	3,053
2019	53,632	4,880	8,045	3,164
2020	54,239	4,933	10,848	5,915
2021	54,724	4,933	10,945	6,012
2022	55,214	4,933	11,043	6,110
2023	55,813	4,933	11,163	6,229
2024	56,546	4,933	11,309	6,376
2025	57,216	5,593	14,304	8,711
TOTAL	595,036	54,661	108,804	54,143

To estimate the cost of producing the additional extra renewable energy under an RPS against the baseline, we used estimates of the Levelized Energy Cost (LEC), or financial breakeven cost per MWh to produce the electricity.[16] The EIA produces estimates of LEC and capacity factor for conventional and renewable electricity technologies (coal, nuclear geothermal, landfill gas, solar photovoltaic, wind and biomass) assuming the new sources enter service on 2016.

The EIA also provides LEC estimates for conventional coal, combined cycle gas, advanced nuclear and onshore wind, assuming the sources enter service in 2020. The EIA does not provide LEC estimates for combustion turbine, solar, geothermal, biomass or hydroelectric. However, the EIA does produce estimates of the overnight capital costs for all ten technologies (conventional and renewable) for the years 2015, 2025, 2030 and 2035.

However, as outlined in the "electricity cost" section above, the EIA numbers provide a rather optimistic picture of the cost and generating capacity of renewable electricity, particularly for wind power. A literature search provided alternative LEC estimates that were generally higher and capacity factors that were lower for renewable generation technologies than the EIA estimates.[17] We used these alternative figures to calculate our "high" LEC estimates and the EIA figures to calculate our "low" cost estimates and the average of the two to calculate our "average" cost estimates. Table 4 displays the LEC and capacity factors for each generation technology.

We used the 2016 LEC for the years 2015 through 2017 to calculate the cost of the new renewable electricity and avoided conventional electricity, assuming that for 2015, the 2016 LEC slightly underestimates the actual costs for those years and for 2017, the 2016 LEC slightly overestimates the actual costs. We assumed that the differences will, on balance, offset each other. The assumption is that LEC will decline over time due to technological improvements over time.

We use the EIA's reference case scenario for all technologies. Since capital costs represent the large component of the cost structure for most technologies, we used the percentage change in the capital costs from 2015 to 2025, 2030 and 2035 to adjust the 2016 LECs to 2025, 2030, and 2035. For the technologies that the EIA does not forecast LECs in 2020, we used the average of the 2016 and 2025 LEC calculations, assuming a linear change over the period.

Once we computed new LECs for the years 2020 and 2025, we applied these figures to the renewable energy estimates for the remainder of the period. For the years 2018 through 2022, we use the 2020 LEC, and for the years 2023 through 2025, we use our 2025 LEC estimates.

TABLE 4

LEC AND CAPACITY FACTORS OF ELECTRICITY GENERATION TECHNOLOGIES

	CAPACITY FACTOR	TOTAL PRODUCTION COST (cents / MWh)				
	(%)	2010	2020	2025	2030	2035
COAL						
LOW	74.0	67.41	64.82	63.53	62.23	60.96
AVERAGE	79.5	83.96	85.21	79.39	76.15	72.93
HIGH	85.0	100.50	105.60	95.25	90.08	84.90
GAS						
LOW	85.0	75.86	73.25	73.25	73.25	73.25
AVERAGE	86.0	79.48	76.77	75.42	74.75	74.07
HIGH	87.0	83.10	80.30	77.60	76.25	74.90
NUCLEAR						
LOW	90.0	76.94	59.20	49.33	39.46	68.07
AVERAGE	90.0	97.97	85.35	74.34	66.37	77.63
HIGH	90.0	119.00	111.50	99.35	93.28	87.20
BIOMASS						
LOW	83.0	111.10	86.99	62.88	55.18	47.48
AVERAGE	75.5	112.50	95.27	80.62	74.18	83.43
HIGH	68.0	113.90	103.54	98.36	93.19	88.01
WIND						
LOW	34.4	148.78	96.10	87.50	83.20	78.90
AVERAGE	26.9	201.22	188.54	175.85	127.38	148.90
HIGH	15.5	287.67	269.54	251.40	232.14	212.87

For conventional electricity, we assumed that the technologies are avoided based on their costs, with the highest cost combustion turbine avoided first. For coal and gas, we assumed they are avoided based on their estimated proportion of total electric sales for each year. Although hydroelectric and nuclear are not the cheapest technology, we assume no hydroelectric or nuclear sources are displaced since most were built decades ago and offer relatively cheap and clean electricity today.

We also adjusted the avoided cost of conventional energy to account for the lower capacity factor of wind relative to conventional energy sources. We multiplied the cost of each conventional energy source by the difference between its capacity factor and the capacity factor for the renewable source, and then by the ratio of the new generation of the renewable source to the total new generation of renewable under the RPS. For example, for coal under the 25% RPS "average" case, we multiplied the avoided amount generation of electricity from coal (3.27 million MWhs) by the LEC of coal ($85 per MWh), and then by the difference between the capacity factor of coal and the weighted average (using MWs as weights) capacity factor wind (33). This process is repeated for each conventional electricity resource.

These LECs are applied to the amount of electricity supplied from renewable sources under the RPS, because this figure represents the amount of conventional electricity generation capacity that presumably will not be needed under the RPS. The difference between the cost of the new renewable sources and the costs of the conventional electricity generation foregone represents the net cost of the RPS. Tables 5, 6 and 7 display the results of our Average, Low and High Cost calculations respectively.

TABLE 5

AVERAGE COST CASE OF RPS MANDATE FROM 2015 TO 2025

YEAR	GROSS COST	LESS CONVENTIONAL	TOTAL
	(2010 $000s)	(2010 $000s)	(2010 $000s)
2015	441,451	42,810	398,641
2016	455,545	44,177	411,368
2017	469,942	45,573	424,369
2018	440,712	46,440	394,272
2019	456,850	48,140	408,710
2020	855,435	90,381	765,054
2021	869,475	91,864	777,611
2022	883,635	93,360	790,274
2023	807,398	91,477	715,921
2024	826,388	93,629	732,759
2025	1,116,763	125,220	991,544
TOTAL	7,623, 594	813,071	6,810,524

TABLE 6

LOW COST CASE OF RPS MANDATE FROM 2015 TO 2025

YEAR	GROSS COST	LESS CONVENTIONAL	TOTAL
	(2010 $000s)	(2010 $000s)	(2010 $000s)
2015	75,623	304,858	380,481
2016	78,038	314,591	392,629
2017	80,504	324,533	405,037
2018	83,373	222,404	305,777
2019	86,426	221,278	307,703
2020	162,907	412,172	575,079
2021	165,581	418,937	584,518
2022	168,278	425,759	594,037
2023	171,580	396,070	567,650
2024	175,616	405,386	581,002
2025	219,644	562,477	782,121
TOTAL	1,467,569	4,008,464	5,476,033

TABLE 7

HIGH COST CASE OF RPS MANDATE FROM 2015 TO 2025

YEAR	GROSS COST	LESS CONVENTIONAL	TOTAL
	(2010 $000s)	(2010 $000s)	(2010 $000s)
2015	25,618	517,828	543,446
2016	26,436	534,361	560,797
2017	27,271	551,249	578,521
2018	28,243	539,388	567,631
2019	29,278	549,776	579,054
2020	53,007	1,031,492	1,084,499
2021	53,877	1,048,422	1,102,299
2022	54,754	1,065,496	1,120,250
2023	55,829	1,021,827	1,077,656
2024	57,142	1,045,860	1,103,002
2025	75,882	1,404,417	1,480,300
TOTAL	487,337	9,310,116	9,797,453

RATEPAYER EFFECTS

To calculate the effect of the RPS on electricity ratepayers, we used EIA data on the average monthly electricity consumption by type of customer: residential, commercial and industrial.[18] The monthly figures were multiplied by 12 to compute an annual figure. We inflated the 2008 figures for each year using the average annual increase in electricity sales over the entire period.[19]

We calculated an annual per kWh increase in electricity cost by dividing the total cost increase, calculated in the section above, by the total electricity sales for each year. We multiplied the per kWh increase in electricity costs by the annual kWh consumption for each type of ratepayer for each year. For example, we expect the average residential ratepayer to consume 14,239 kWhs of electricity in 2025, and we expect the 25 percent RPS to raise electricity costs by 1.733 cents per kWh in the same year. Therefore, we expect residential ratepayers to pay an additional $246.75 in 2025.

MODELING THE RPS USING STAMP

Now that we have the net cost of the RPS, we can model their impact on the Oregon economy using STAMP. We simulate the costs and benefits of SB 838 as changes in tax policy. We place increases in state fees on the utility sector in the STAMP model by the net costs of the RPS we calculated above.

In order to estimate the impact of the Oregon RPS, we estimated the size of the utility sector within the STAMP model through 2025. We calculated the percentage increase represented by the net costs of the RPS for the year that the RPS increases to its maximum of 25% in 2025. We input these percentages into the STAMP model as an increase in state fees applied to the utility sector. The additional fee revenue stream was allocated back to the utility sector. The result is that utility customers pay a higher price for utility services that would be refunded back to the industry.

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The Beacon Hill Institute at Suffolk University in Boston focuses on federal, state and local economic policies as they affect citizens and businesses. The institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

ENDNOTES

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