The Economic Impact of the Kansas Renewable Portfolio Standard and Review of 'The Economic Benefits of Kansas Wind Energy'

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Good morning, I am Michael Head and I am a Research Economist at the Beacon Hill Institute at Suffolk University and a Senior Lecturer of Statistics at Suffolk University. I would like to thank the Committee for the opportunity to comment on this bill. I have had a chance to review House Bill No. 2241, although not as extensively as I have examined the RPS as it currently stands.

The changes to extend the time period under a ten percent mandate, and capping the increase at 15 percent, as opposed to the prior 20 percent, will reduce the economic costs of complying with the state RPS mandate when compared to the prior bill. That being said, RPS mandates, by their very nature create negative net economic effects, and the House Bill being discussed does not change that point. Governments enact RPS policies because most sources of renewable electricity cannot face the market test. Without specific policy support, demand is almost non-existent. That is because renewable energy generation is less efficient and thus more costly than conventional sources of generation. Most consumers would not choose to pay a higher price given the alternatives of conventional energy. Thus, in order to prop up these new industries (which have not gained market share without taxpayer subsidies) governments enact renewable energy mandates to force utilities to buy electricity from renewable sources, thus guaranteeing a market for the renewable sources. But energy prices eventually

manifest themselves. These higher costs are passed to electricity consumers, including residential, commercial and industrial customers.

The costs and capacity factor estimates available for the different electricity generation technologies greatly diverge. To account for this variance, we provide three estimates of the effects of Kansas's RPS mandate using low, medium and high cost estimates of both renewable and conventional generation technologies. Each estimate represents the change that will take place in the indicated variable against the counterfactual assumption, or baseline, that the RPS mandate would not be implemented. The table below displays the cost estimates and economic impact of the current RPS mandate in 2020, compared to a baseline of no RPS policy.[1]

The Cost of the RPS Mandate on Kansas (2012 $)

Costs Estimates	**Low**	**Medium**	**High**
Total Net Cost in 2020 ($ m)	192	644	1,042
Total Net Cost 2012-2020 ($ m)	739	2,436	3,932
Electricity Price Increase in 2020 (cents per kWh)	1.51	5.07	8.20
Percentage Increase (%)	13	45	72
Economic Indicators			
Total Employment (jobs)	(3,615)	(12,110)	(19,609)
Investment ($ m)	(57)	(191)	(310)
Real Disposable Income ($ m)	(443)	(1,483)	(2,402)

The current RPS will impose costs of $644 million in 2020, within a range of $192 million and $1.04 billion. As a result, the RPS mandate would increase electricity prices by 5.07 cents per kilowatt hour (kWh) or by 45 percent, within a range of 1.51 cents per kWh, or by 13 percent, and 8.20 cents per kWh, or by 72 percent.

The State Tax Analysis Modeling Program (STAMP®) simulation indicates that, upon full implementation, the electricity price increases due to the RPS law will negatively affect the Kansas economy. The state's ratepayers will face higher electricity prices that will increase their costs, which will in turn put downward pressure on household and business income. By 2020, the Kansas economy will shed 12,110 jobs, within a range of 3,615 and 19,609 jobs.

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 items, such as home goods and services. In 2020, real disposable income will fall by an expected amount of $1.48 billion, between $443 million and $2.4 billion under the low and high

[1] For a more detailed methodical description please see *The Economic Impact of the Kansas Renewable Portfolio Standard*. http://www.kansaspolicy.org/researchcenters/budgetandspending/budgetandspendingstudies/d95311.aspx?type=view.

cost scenarios respectively. Furthermore, net investment will fall by $191 million, within a range of $57 million and $310 million.

It is important to stress that the results above are the effects of the RPS policy on the state of Kansas in the year 2020, compared to a baseline of no policy. Specifically, our estimate of a 45 percent increase in our medium case means that prices in 2020 will be 45 percent higher than if the RPS policy was not in effect from now until 2020. These results are not directly comparable to current annual estimates of the price of the RPS. Estimates of between 1 percent and 1.7 percent have been stated for the 2011 annual rate increase.[2] This rate increase only looks at the one year effect of moving to a 10 percent RPS, the easiest goal of the RPS mandate. As utilities have to progress beyond 10 percent, the 'low hanging fruit' will no longer exist. The most favorable (i.e. most consistent wind, at the lowest property value) wind farm locations will be taken, leading to the cost of each addition MWh of renewable energy being more costly then the last.

Moreover, as wind power begins to saturate the Kansas market, the marginal gains will decrease. That is, as wind power penetration in Kansas surpasses five percent of the load, the actual net MWhs per installed MW of capacity contributed will decrease. Since there is a correlation between wind speeds across the state, the requirement for backup power sources, available to come online at a moment's notice, increases as the share of capacity increases. That is, conventional energy sources will need to be available at a moment's notice to replace the full amount of electricity from wind power, preventing brownouts. Since power plants cannot come online that quickly, they need to be kept as 'spinning reserves,' that is idling, causing the cost per additional MWh of wind power to increase as its market share increases. Given these facts a "practical upper limit for wind penetration is 10%," according to sources.[3]

For these reasons, in addition to the more detailed analysis in our paper, we believe that our medium estimate of a 45 percent increase for rate payers in Kansas, within a range of 13 to 72 percent, is accurate.

Kansas has enacted a series of laws implementing RPS mandates based on the idea that state government can get into the game of energy production by promoting green energy policies. In reality, these mandates are mere handouts to favored wind energy producers. Equally problematic is the lack of transparency between cost and benefit. The RPS hides its costs in the higher prices to be paid in the future by ratepayers where higher taxes or a direct budget appropriation would be more transparent.

The paradigm driving renewable energy found in most RPS mandates is flawed. The policies promote only certain forms of renewable energy. While Kansas does hold a

[2] Testimony of Bob Glass, Chief of Economics and Rates Kansas, Corporation Commission, March 12, 2011.
http://www.kslegislature.org/li/b2011_12/committees/misc/ctte_h_engy_utls_1_20120312_03_other.pdf.

[3] William Korchinski, *The Limits of Wind Power*. http://reason.org/files/thelimitsofwindpower.pdf.

comparative advantage in wind power, due to its geography, there is still a very high cost associated with it relative to conventional energy, thereby raising electricity prices for future consumers and businesses in Kansas. The cost difference between electricity generated from wind and natural gas is likely to widen further due to the recent decrease in natural gas prices.

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

Other studies have gone as far as to claim that RPS mandates could create economic benefits.[4] We categorically reject the notion that net benefits will come from the state RPS, as these studies often rely on multiplier models, which ignore the opportunity costs of projects, or on misleading methodology. For example, the report issued by Polsinelli Shughart entitled 'The Economic Benefits of Kansas Wind Energy' employs an apt title.[5] By reviewing only the benefits of projects, wind power is bound to look more favorable than an examination of net benefits, that is, benefits minus costs. I will briefly review the five 'Key Findings' from the report to determine its robustness, as well as focusing on its relation to the Kansas Renewable Portfolio Standard.

Key Finding #1: "New Kansas wind generation is cost-effective when compared to other sources of new intermittent or peaking electricity generation."

The first observation to make from this key finding is that if it were true the state RPS policy is not necessary. If wind power is truly cost-effective compared to other sources of energy, state mandates that wind power be used should be repealed, allowing wind power to compete with other technologies to provide low cost electricity in Kansas.

Two important caveats should be noted in this key finding. First, while looking the total cost per Megawatt Hour (MWh), no consideration is made to the actual cost of the power. While both natural gas and wind power receive generous federal subsidies, the wind power production tax credit is the largest. For each MWh of wind power generated, taxpayers pay an additional $22, or 63 percent of the cost per MWh reported for the Power Purchase Agreement. Including these costs would be a more complete picture of the cost of a new electricity source.

The second caveat pertains to the implied capacity factors utilized in Table 5: Actual Costs of New Non-Baseload Generation in Kansas. For the Natural Gas Emporia Energy Center (EEC) the capacity factor is 7.5 percent, for the Utility-Owned Flat Ridge (FR) it is

[4] Biobased Energy Analysis Group. *Projected Impacts of Proposed Federal Renewable Portfolio Standards on the Kansas Economy*, http://bipartisanpolicy.org/sites/default/files/Kansas%20Study%20Document%20October.pdf .

[5] *The Economic Benefits of Kansas Wind Energy.* Polsinelli Shughart. November 19, 2012. http://goo.gl/LR4xJ.

33.8 percent and for the Power Purchase Agreement of Ironwood and Post Rock (IPR) it is 40.0 percent.

The first important point to consider is that this takes a relatively low capacity factor for the EEC plant during its early years and extends that factor though the life of the project. This rate is particularly low when compared to an estimated 30 percent for a combustion natural gas turbine according to the U.S Energy Information Administration (EIA), or an 87 percent capacity factor if the plant is converted to a combined cycle natural gas plant. To then compare this to the IPR with an assumed 40 percent capacity, the high end of possible projections, is a major assumption which is heavily biased towards wind power.[6]

The second observation pertains to the assumed 40 percent capacity for the IPR. The EIA provides actual net generation for the two plants referenced in the IPR example.[7] This real-life data suggests a capacity factor of 28.3 percent, which, following the report's methodology would result in a cost per MWh of $49.43, the highest of the three examined projects.[8]

As we have shown, weak assumptions determined the results of the conclusion in this key finding. A more thorough review or including sensitivity analysis could correct for this issue. If wind power was truly cost-effective when compared to other sources of generation, then the subsidies and policies mandating its purchase would not be necessary.

Key Finding #2: "Wind generation is an important part of a well-designed electricity generation portfolio, and provides a hedge against future cost volatility of fossil fuels."

Hedging has been, and will continue to be, a useful tool for utilities, and benefits the consumer. But the Kansas state government should not engage in this level of industrial policy by regulating just how much utilities can hedge, all for the sake of requiring wind power production. This is not a benefit in itself. Utilities will attempt to maximize profits by consistently analyzing the energy market and making the best decisions, often through long term purchasing agreements.

Claiming that long term purchases of wind power are a benefit purely because it prevents utilities from having to face a volatile market is an untenable position. Volatile

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[6] Table 1: Estimated Levelized cost of New Generation Resources, 2017. EIA. http://www.eia.gov/forecasts/aeo/electricity_generation.cfm#2.

[7] EIA Application Programming Interface. Ironwood Wind. http://www.eia.gov/beta/api/qb.cfm?category=40165&sdid=ELEC.PLANT.GEN.57639-WND-WT.M Post Rock Wind http://www.eia.gov/beta/api/qb.cfm?category=40166&sdid=ELEC.PLANT.GEN.57678-WND-WT.M.

[8] (30,542*12) + (45,757*12) = 915,588: the annualized net MWhs generated. $905,083,200/(915,588*20) = 49.43 $/MWh.

markets work both ways, by locking in a price now producers are just as likely to miss out on savings if prices fall.

For example, natural gas electric power prices were lowest in April 2012, according to historical data the EIA began collecting in 2002.[9] Additionally, 2012 recorded the lowest average yearly price (through October 2012, the most recent data available). By forcing utilities to hedge, when they may not have otherwise done so, could have forced utilities to miss out on the ability to maximize the benefit of these lower gas prices, which would have been passed along to consumers.

In short, hedging is a valuable tool when left to the discretion of the utility, but by utilizing a heavy-handed mandate, state lawmakers are actually constraining the ability of the utilities to make sound business decisions.

Key Finding #3: "Wind generation has created a substantial number of jobs for Kansas citizens."

This key finding fails to take into consideration opportunity costs, a concept that Bastiat explained in his 1850 essay, and is a prime example of the reviewed paper only considering benefits.[10] If a shopkeeper has a window broken, this creates work for a glazer to replace the window. However, this classic "broken window" fallacy mistakes breaking windows as job creation policy. At this point 'The Economic Benefits of Kansas Wind Energy' is correct, wind generation does create jobs, just as a broken window creates jobs. But the report stops at this point and fails to provide a complete analysis of the effect of wind generation on total employment in Kansas.

As Bastiat showed, a consideration must be made to the opportunity cost. How would the shopkeeper have spent his money if he did not need to replace his window? He could use the money on capital investment, further growing his business, hire another worker or make various other purchases. Regardless of what it was, they would have all brought him more benefit, than replacing his window. If not, he would have broken the window himself.

The Kansas RPS mandates the use of renewable energy, mostly fulfilled by wind power, because without the mandate there would be less renewable energy in the state. If wind power was competitive in the market, government sticks and carrots would not be required. For this reason, the RPS leads to net lower employment in the state.

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[9] Natural gas electric power price (dollars per thousand cubic feet) is 'the price of gas used by electricity generators (regulated utilities and non-regulated power produces) whose line of business is the generation of power.' Per Definitions, Sources & Notes. EIA http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm.

[10] *That Which Is Seen and That Which Is Unseen*. Frederic Bastiat, 1850.

As I mentioned, in the case of the current Kansas RPS approximately 12,000 less jobs would exist in the state in 2020, compared to a baseline case of no RPS policy. These losses can be grouped into three general categories:

-When a company that would have operated under the baseline scenario closes due to higher utility costs,
-When a company which would have opened in Kansas chooses to do business in an another state that has lower energy costs, and
-When a company faces slower growth, thereby hiring fewer employees, due to higher electricity costs.

Key Finding #4: "Wind generation has created significant positive impact for Kansas landowners and local economics."

This key finding makes a common mistake by assuming transfer payments are a benefit, a fallacy. The transfers of money via lease payments or property tax payments are not benefits. This transfer of money is a cost to one party and a benefit on the other, and can be illustrated easily.

What if Kansas wind farms vastly overpaid for their land and lease payments were valued at $1 billion a year. This report would place the benefit of wind power leasing this land at $1.25 billion a year. But the project has not changed, where did these new benefits come from?

In fact, there would not be any change to the net benefit of the project. Landowners would amass benefits equal to $1 billion minus the land value and utilities would amass costs equal to $1 billion minus the land value. These costs would in turn be passed along to rate payers in the form of higher utility costs. This illustrates the point that this policy is industrial policy. By dispersing the costs of a project to all citizens in the state, small, but powerful, groups with strong lobbying efforts are able to gather the rewards.

Key Finding #5: "The Kansas Renewable Portfolio Standard is an important economic development tool for attracting new business to the state."

This key finding is related closely with the analysis of the job benefits that wind power purportedly conveys. Of course, legally requiring that utilities use specific sources of electricity will attract new business in that sector to the state. But we need to see the whole picture. This policy has costs, which will be borne by state residents and businesses via higher utility prices. We estimate that in 2020 this industrial policy will be seen though utility prices that are 5.07 cents per kWh above a baseline scenario of no RPS policy.

To put this rate in perspective, that would be $660 more a year for an average residential ratepayer, $3,915 per commercial ratepayer and $25,516 per industrial ratepayer. These are significant costs for businesses considering relocation to Kansas, showing the duality of industrial policy. It takes from all ratepayers in the state, and gives to selected industries that politicians deem worthy.

The main question to ask after reading all of the benefits proposed by Polsinelli Shughart is: "With all of these supposed benefits of wind power, why does it require a government mandate and taxpayer funding'?" Wind power has existed in Kansas since 1999, and has continued to grow as it became economically more and more viable. But government intervention has forced this industry to grow faster than its economics support, costing state money through higher electricity prices.

While wind power does bring many benefits to the state, proponents of policies mandating its use should be more honest in discussing the costs as well as the benefits. Thank you for allowing me to talk with you today about HB 2241, and the Kansas RPS in general. While I do not currently have details about how HB 2241 will affect the outcomes of our study, it will reduce the costs I have referenced. Going from 15 percent to 20 percent will be more costly for state residents then moving from 10 percent to 15 percent. But, even with these improvements, the policy is one that increases the cost of electricity for everyone.