



Ohio Renewable Portfolio Standard

A Market Mechanism for Stable
Renewables
Development in Ohio

Carbon Solutions Group Opponent Testimony
October 18th, 2017



Carbon Solutions Group

- Founded in Chicago, IL in 2006
- Utility Customers include Illinois Power Agency, ComEd, Ameren, MidAmerican, AEP, First Energy, Dayton Power & Light, Dynegy, & Constellation.
- Largest Solar Aggregator in Illinois Market
- Solar Project Developer in IL, MI and OH
- > 100 Fortune 500 Clients
- Productive Stakeholder in Illinois RPS Fix (Grand Bargain) in 2016-2017



Major Themes

A Renewable Portfolio Standard (RPS) is not a mandate but instead a 21st century market mechanism to ensure that the benefits of new types of energy (renewable, distributed, zero-cost fuel) can be properly valued in a dynamic regulatory environment over time.

- Federal tax credits for renewables are sunseting and will end in 2020 (wind) and 2022 (solar) respectively.
- Federal tax reform reduces the economic value of accelerated depreciation afforded to renewables.
- Federal tax reform reduces the demand for sunseting tax incentives.
- High wind resource areas historically have needed Production Tax Credits to trump often negative power prices.
- Fuel Secure Baseload capacity incentives are likely to come from the Federal (or State) governments. Nuclear and coal generation still have a place and if they are subsidized then renewables must have a mechanism to react and find their place in the power stack.
- The cost of maintaining this market mechanism will be less than \$.05/MWh or \$0.12 per customer per month in 2017. Source: DOE EIA Form 861 and current market prices



In Economic Terms

CSG makes an economic argument for each component of the RPS' value to Ohioans that can be boiled down to tangible financial impacts in \$/MWh and \$/Customer/Month.

- Federal production tax credits sunseting reduces the profitability of wind by \$13.80/MWh between 2016 and 2019.
- Federal tax reform resulting in a reduction of corporate taxes from 40% to 20% would reduce the profitability of wind by \$8.00/MWh by reducing the positive impact of accelerated depreciation.
- High wind resources (and resulting congestion) areas can result in negative electricity prices as low as -\$20/MWh. Production is currently not curtailed only due to tax incentives in these cases.
- Fuel Secure Baseload incentives could result in additional marginal disadvantage for renewables of up to \$16/MWh (the subsidy allotted to nuclear power in Illinois' Zero Emission Credit market).
- For reference, we can consider natural gas which is a clean baseload source of power and costs about \$22/MWh in fuel costs. If natural gas were to increase to \$6.00/MMBtu this would mean an increase of the cost of fuel to \$43/MWh at a typical plant (\$21/MWh increase in costs)



Impact of Tax Credit Sunsetting

A Renewable Portfolio Standard (RPS) in Ohio provides a market-based mechanism to ensure continued development even as renewables tax incentives sunset.

- Below is a table that shows the value of the tax credit as it sunsets (\$/MWh) and the overall value of a new project that begins construction in that calendar year. The current tax code enables a wind facility to generate the \$/MWh tax credit amount for 10-years; subject to the year in which the facility begins construction. For example, a wind project that begins construction in 2018 and begins flowing electricity in 2019 will receive \$13.80/MWh in tax credits from 2019 through 2028. **A wind project that begins construction in 2019 and begins flowing electricity in 2020 would receive just \$9.20/MWh and a project starting construction in 2020 would receive no tax credits - a 60% (\$650M) reduction from 2016 levels.**

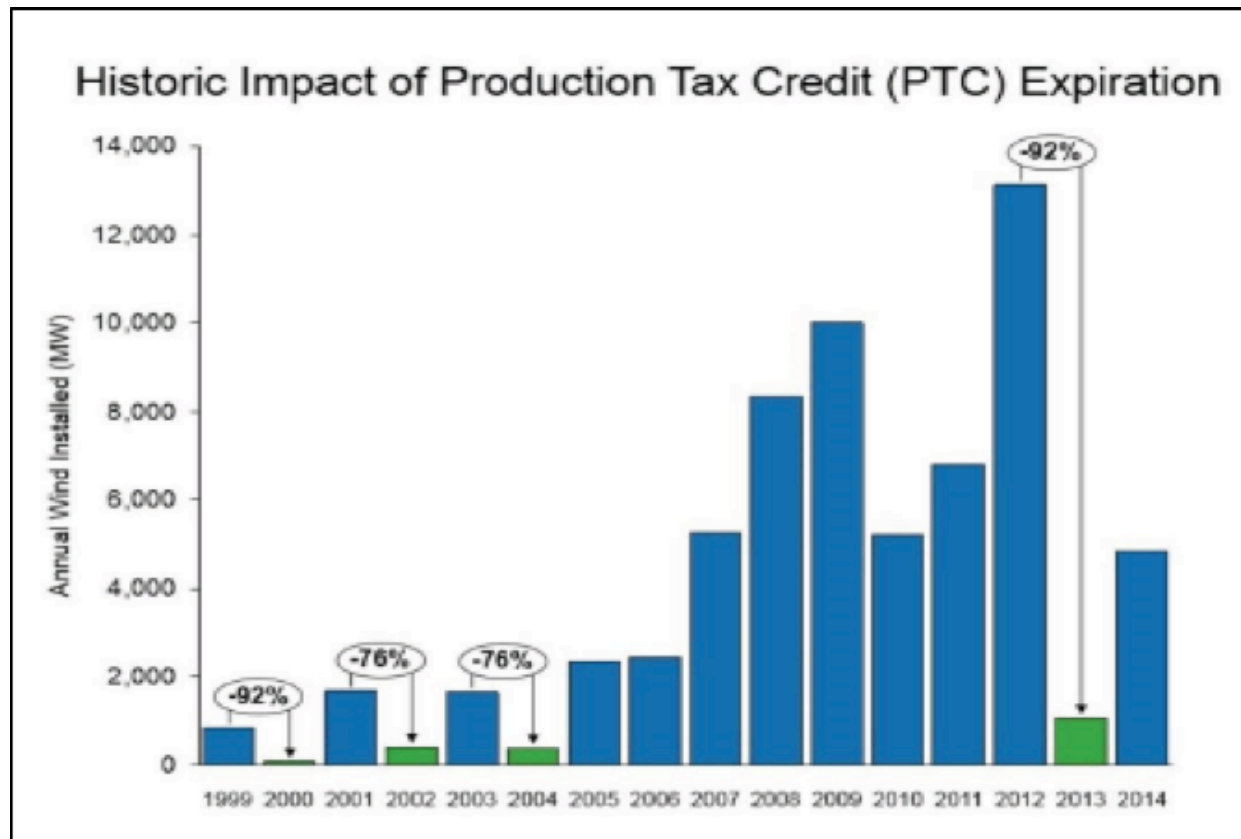
Economic Value of Wind PTC for 500MW Facility		
	\$/MWh	10 Year Value
2016	\$ 23.00	\$ 767,050,000
2017	\$ 18.40	\$ 490,912,000
2018	\$ 13.80	\$ 276,138,000
2019	\$ 9.20	\$ 122,728,000
2020	\$ -	\$ -

Source: AWEA (<https://www.awea.org/production-tax-credit>)



Historic Impact of Tax Reform

Lapse of the Production Tax Credit has been severely detrimental to the development of wind in the past. Without a robust RPS as a counterbalance Ohio's wind resources will go to waste and its ability to compete for corporate renewable buyers will be challenged by surrounding states in the region.

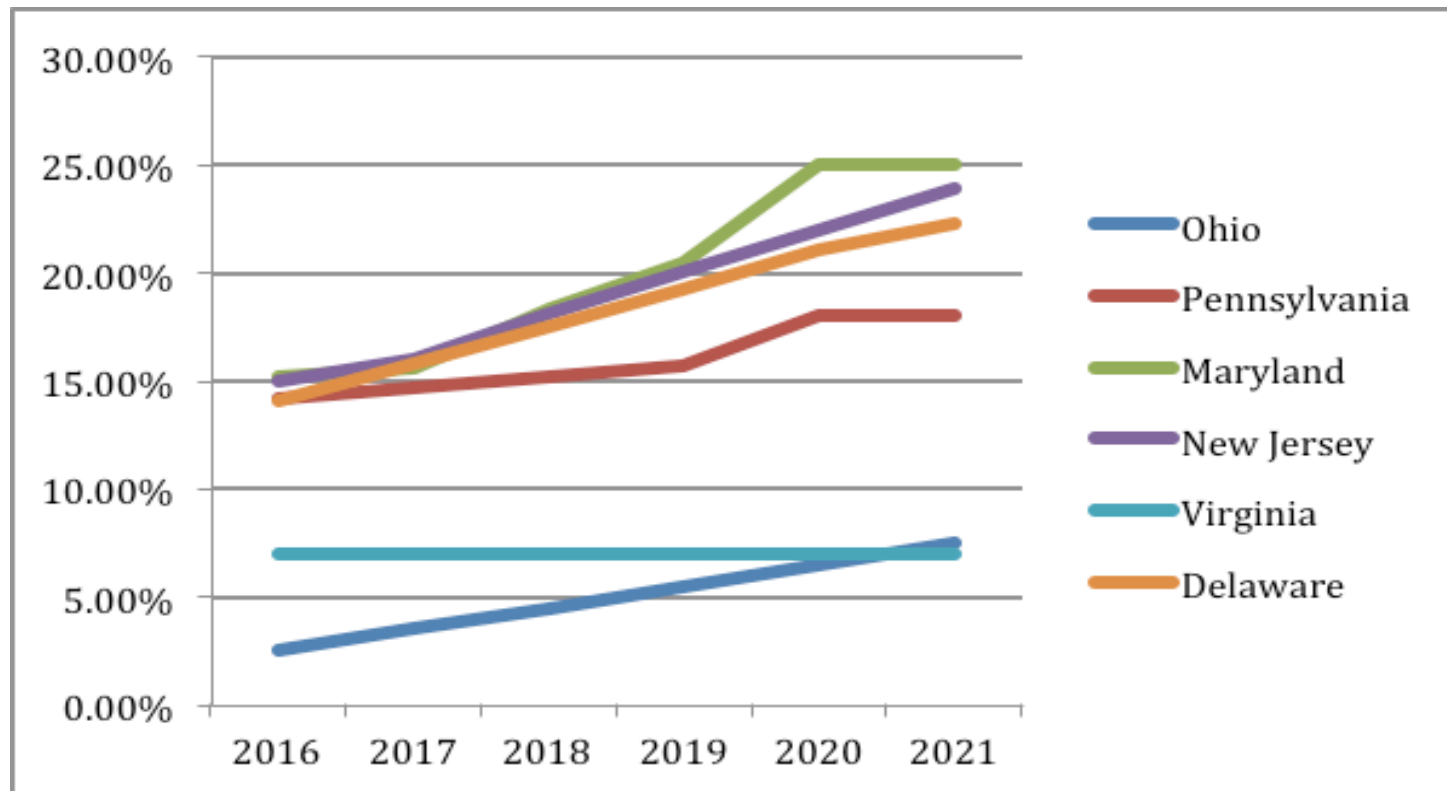


Source: <https://www.forbes.com/sites/jamesconca/2017/09/26/how-long-will-renewable-tax-credits-be-around/#495c5ba24ccd>



Regional Export for Ohio RECs

Other states in the region have much more aggressive renewables specifications and Ohio would be well positioned to be a net exporter in a cooperative regional market. Maintaining the RPS ensure long term opportunity to monetize the value of wind, solar and hydro resources in Ohio. (Renewable Portfolio Standard % Levels over time of States in the Region)

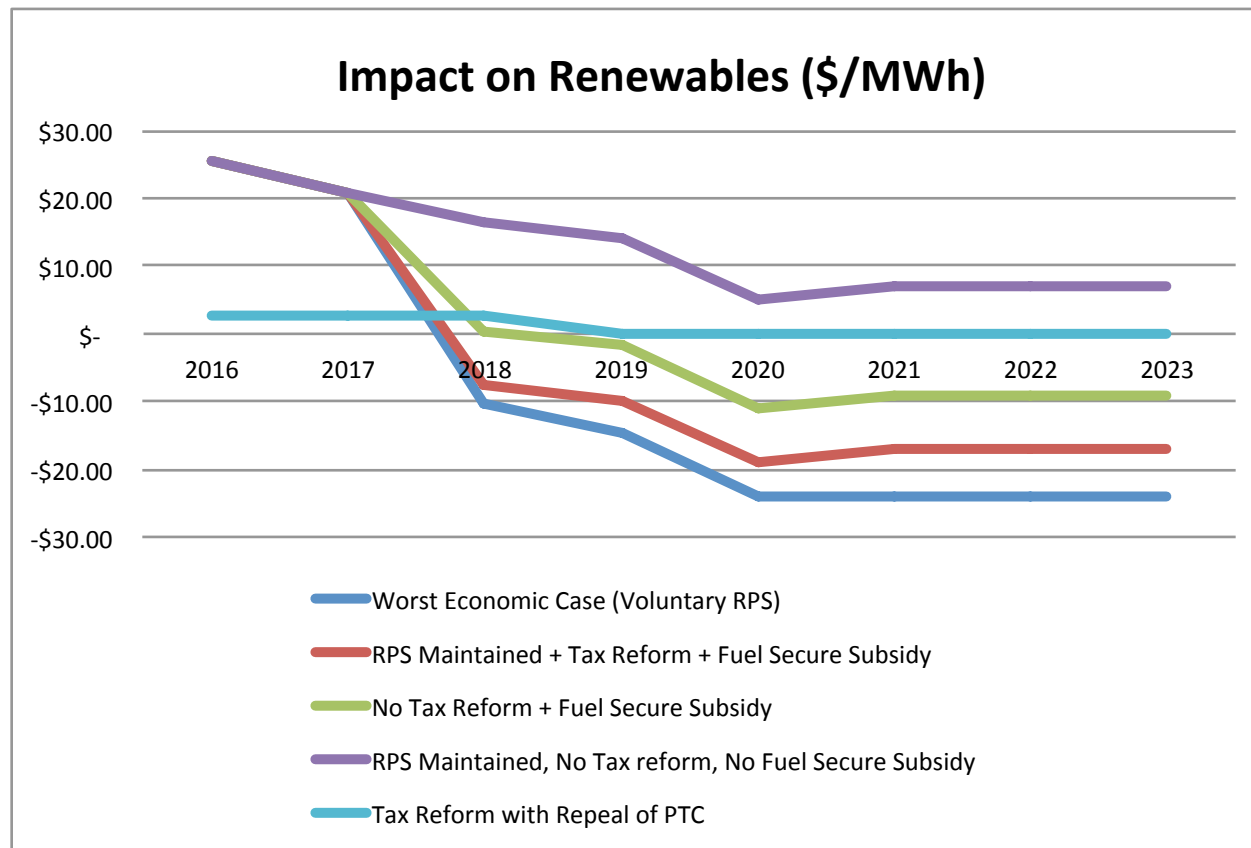


Source: Database for State Incentives for Renewables & Efficiency (<http://www.dsireusa.org>)



Regulatory Scenarios

The only economic scenario where wind has a positive economic scenario is if the RPS is maintained, there is no Federal tax reform and no fuel secure subsidy. Even in this best case scenario (for renewables) the economics are materially degraded. The maintenance of the RPS is Ohio's only shot at preserving the long term viability of renewables.





Comprehensive Solution

- **CSG is in favor of Fuel Secure Baseload Generation as it has significant value to Ohioans as part of an all of the above strategy**
- **CSG supports the maintenance of the Renewable Portfolio Standard as a market mechanism that must be preserved to ensure long term competitive edge in Ohio.**
- **Wind setbacks are necessary, but cannot do the job alone.**
- **A “Grand Bargain” could build viable long term strategy that ensures a place for Fuel Secure Baseload Generation, natural gas and renewables in Ohio.**

“Keep the RPS – Keep Ohio Competitive”

An Economic Argument to Ensure Robust Renewables Development in Ohio Under Future Federal Energy & Tax Regimes

Introduction

A Renewable Portfolio Standard (RPS) is not a mandate but instead a 21st century market mechanism to ensure that the benefits of new types of energy (renewable, distributed, zero-cost fuel) can be properly valued in a dynamic market over time.

The individual attributes of any commodity now have their own markets. Corn is no longer just corn, but distillers grains, ethanol, corn oil, feed and food. The regulatory definitions provided for octane put a price on the value of ethanol and USDA feed specifications put a value on animal feed. These are not mandates, they are finer specifications which outline what is necessary to ensure the health and wellness of citizens.

These finer specifications help consumers make better decisions because all of the value can be taken into consideration. RPS is not a mandate, it is a product specification and the value of the specification is determined by a market mechanism because it is so new as to be abstract.

Mandates on renewables can also be thought as creating a market mechanism for creating price points for the economic value of renewables. There are a few key areas where renewables are distinctly different from an economic standpoint and which deliver new value for Ohioans that traditional energy cannot.

Areas Where Renewables Offer New Value and Economic Advantages

Energy Security – FirstEnergy has rightfully argued that coal/nuclear are more energy secure than natural gas because of the lack of redundancy in the delivery of natural gas. However, wind and solar are even more secure in that regard.

Distributed generation – Reduces cost of building new infrastructure. FirstEnergy is building X billion which customers will pay X for. A solar power owner will save X on transmission and distribution costs. Over all the MWh – would we rather incent renewables or build more lines?

The RPS is a market for NOT BUILDING NEW LINES. FirstEnergy aims at boosting its service reliability, which is expected to help in customer retention. Under the company’s “Energizing the Future” initiative, it has made an ambitious plan of investing nearly \$1 billion in 2017 and \$3.2–\$4.8 billion over the 2017–2021 period. An RPS incentivizes distributed generation which can help reduce the need to build transmission and distribution infrastructure.

This is important in the context of the customer’s power bill. If $\$2.50/\text{REC} \times 3.5\% = 7\text{M}$ dollars how much is renewables saving in building transmission lines. Distributed generation saves customers money.

Reduced Long Term Price Risk -Building wind and solar insulates customers from fossil price risk. Europe and Japan are beginning to receive our natural gas exports and the global demand for gas will ideally increase prices to the benefit of our important and innovative domestic gas producers.

Market-Based Incentive to Ensure Fair Competition in a Regulatory Environment in Flux

Wind setback reform as proposed in SB 188 only solves the immediate problem for the development of renewables in Ohio. It is not designed to address the bigger picture. The scheduled sunset of Federal tax (production and investment) incentives & proposed tax reform are looming and will spell disaster for the utilization of wind resources in Ohio without effective market mechanisms in place to self-correct.

The Renewable Portfolio Standard is the flexible market-based mechanism that can ensure that as the market for renewables becomes more challenging (Federal tax incentives sunset completely in 2020 for wind and 2022 for solar) that Ohio will be a significant host of ***and*** net exporter of renewables.

Economic Facts

The following are the core economic tenets that support the maintenance of a robust RPS in Ohio:

- Federal tax credits for renewables are sunsetting and will end in 2020 (wind) and 2022 (solar) respectively.
- Federal tax reform reduces the economic value of accelerated depreciation afforded to renewables.
- Federal tax reform reduces the demand for sunsetting tax incentives.
- High wind resource areas historically have needed Production Tax Credits to trump often negative power prices.
- Fuel Secure Baseload capacity incentives are likely to come from the Federal (or State) governments. Nuclear and coal generation still have a place and if they are subsidized then renewables must have a mechanism to react and find their place in the power stack.
- The cost of maintaining this market mechanism will be less than \$.05/MWh or \$0.12 per customer per month in 2017.

CSG makes an economic argument for each component of the RPS' value to Ohioans that can be boiled down to tangible financial impacts in \$/MWh and \$/Customer/Month.

- Federal production tax credits sunsetting reduces the profitability of wind by \$13.80/MWh between 2016 and 2019.
- Federal tax reform resulting in a reduction of corporate taxes from 40% to 20% would reduce the profitability of wind by \$8.00/MWh by reducing the positive impact of accelerated depreciation.

- High wind resources (and resulting congestion) areas can result in negative electricity prices as low as -\$20/MWh. Production is currently not curtailed only due to tax incentives in these cases.
- Fuel Secure Baseload incentives could result in additional marginal disadvantage for renewables of up to \$16/MWh (the subsidy allotted to nuclear power in Illinois' Zero Emission Credit market).
- For reference, we can consider natural gas which is a clean baseload source of power and costs about \$21/MWh in fuel costs. If natural gas were to increase to \$6.00/MMBtu this would mean an increase of the cost of fuel to \$42/MWh at a typical plant.

As we can see, the combination of production tax credit sunseting (\$13.80/MWh), reduction in corporate income taxes (\$8.00/MWh), and Fuel Secure Baseload incentives (\$16/MWh) could total \$37.80/MWh in reduced competitiveness for wind. This loss of competitiveness would be the same as if natural gas prices increased from \$5.45/MMBtu to \$9.00/MMBtu.

Just as \$9.00/MMBtu prices would materially impact natural gas project development; the impending risks to wind could be as deleterious.

A Renewable Portfolio Standard (RPS) in Ohio provides a market-based mechanism to ensure continued development even as renewables tax incentives sunset.

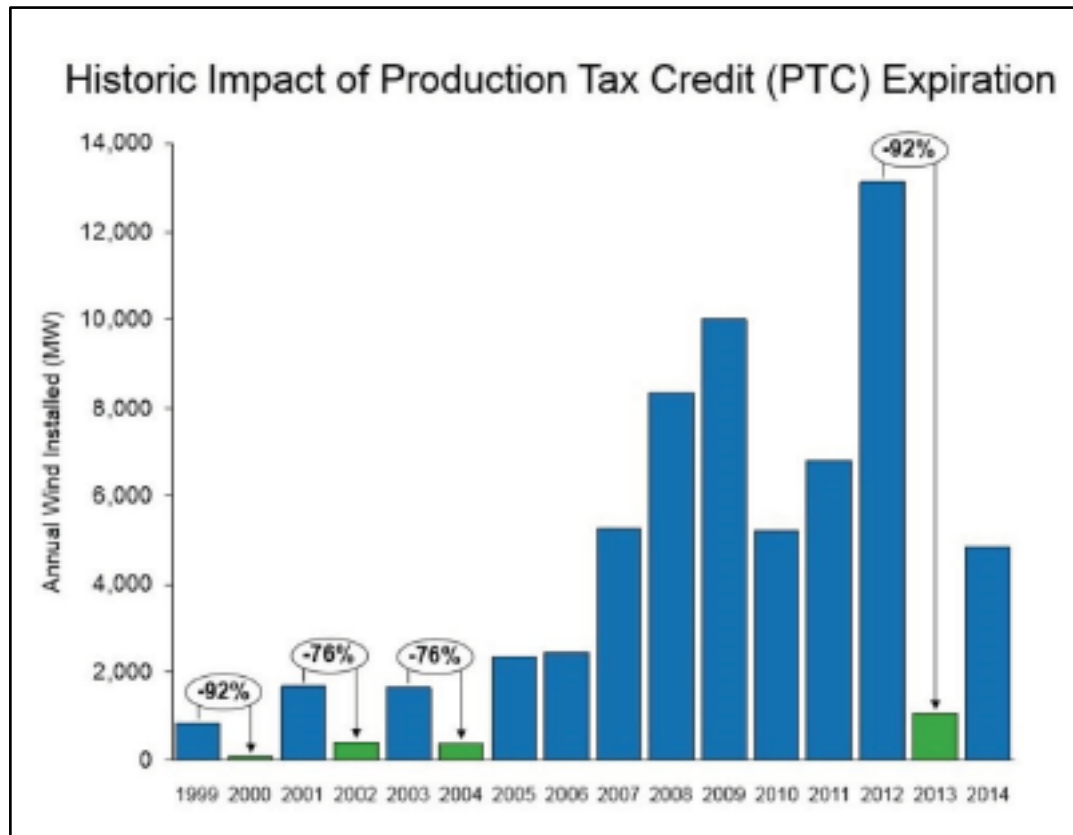
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It is important to realize that reforming setbacks only gets projects in Ohio moving towards construction but the amount of tax credits received by new projects is reducing every year. The chart below illustrates the substantial negative impact that timing has on a 500MW wind facility.

If the facility had begun construction in 2016 it would receive \$767M over the life of the project. Projects which begin construction next year will receive nearly \$500M less over their life.

Economic Value of Wind PTC for 500MW Facility		
	\$/MWh	10 Year Value
2016	\$ 23.00	\$ 767,050,000
2017	\$ 18.40	\$ 490,912,000
2018	\$ 13.80	\$ 276,138,000
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Source: AWEA (<https://www.awea.org/production-tax-credit>)



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A Renewable Portfolio Standard in Ohio provides a market-based mechanism to prevent wind curtailment after tax incentives sunset

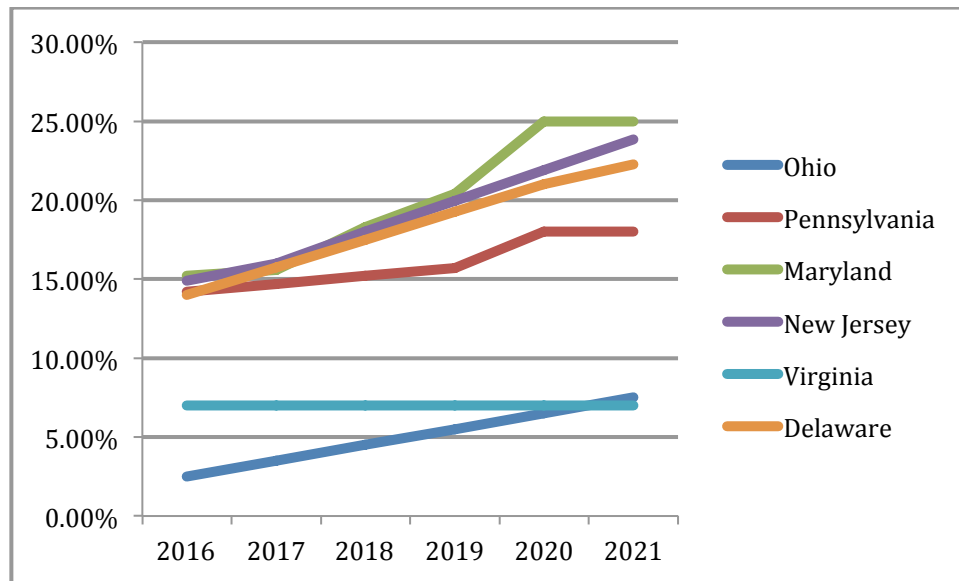
Overbuilding renewables in a single productive wind region will impact the long-term viability of the projects if they have no additional mechanisms for incentive besides tax incentives. Texas, Iowa and even as nearby as Benton County, IN are examples of productive regions that have suffered massive production curtailments because the price of power at times during the year can be so negative (\$25-\$30/MWh) that even \$23/MWh in tax credits can't justify production of power. Again, in lieu of tax incentives in the future Ohio could end up with billions of dollars of wind projects that are curtailed.

A Renewable Portfolio Standard in Ohio ensures a regional export market for Renewable Energy Credits (RECs)

A robust export market for RECs is integral to the long term viability of wind in Ohio. Assuming that 1-2GW of wind could be built in Ohio before the current PTC (production tax credit) cycle sunsets this would mean that ~5,000,000 RECs per year could be exported at values that have historically traded as high as \$25/REC. This ~

\$125,000,000 / year economic value would accrue to the project developers, utilities (ratepayers) and tech company C&I consumers (Commercial & Industrial).

If Ohio repeals the RPS it will likely lead to other states focusing on in-state REC markets which would cause the value of renewables in Ohio to plummet to nearly worthless. Over the 10-12 year wind agreements which are typically being sought by tech companies in Ohio this could represent more than \$1.25 Billion in lost economic value.



Source: Database for State Incentives for Renewables & Efficiency (<http://www.dsireusa.org/>)

It makes sense for Ohio to be a leader in production of wind power, but that demands that a viable export market for renewables exists. Yes, the power can be consumed in-state, but the \$1.25 Billion potential value of the renewable energy credits requires an intelligent, market-based mechanism to be in place in the region.

A Renewable Portfolio Standard in Ohio provides a market-based mechanism to enable renewables and Fuel Secure Baseload (FSB) generation to co-exist

In the event that Fuel Secure Baseload (FSB) generation receives a new state or federal subsidy there will need to be a market based mechanism to prevent curtailment of wind. Wind/solar are intermittent and can currently only survive with tax incentives; new incentives for fuel secure baseload generation coupled with sunseting of tax credits (and potentially more aggressive tax reform) is a recipe for disaster for wind. Ohio could lose a massive amount of the \$4.2 billion in economic value if the assets built underperform due to curtailments or competition with subsidized Fuel Secure Baseload generation.



A Renewable Portfolio Standard in Ohio provides a market-based mechanism to ensure that corporate tax reform does not kill development of renewables in Ohio

Reduction of corporate tax rate also makes the overall demand for tax credits lower. So, the supply of renewable projects has less leverage to negotiate with the tax equity investor. This increases the cost of the tax equity partners' involvement and increases the cost of developing.

The chart below shows the difference in the economic value of accelerated depreciation if the corporate tax rate is reduced from 40% to 20% for a 500MW wind project. The differential in taxes avoided in the first year is \$72M and \$19M in year two and so on.

Tax reform would significantly reduce the economic value of accelerated depreciation afforded to renewables. A 500MW wind project would lose \$119 million over a 10 year contract. Put another way this would result in an \$8/MWh difference in the cost of power to a corporate buyer.

States with RPS programs will have a lever to counteract this degradation of project economics as the increased effective cost of producing renewable energy would be offset by a REC that could be sold by the corporate buyer.

500MW Wind Farm Capital Cost		\$ 600,000,000				
Tax Reform Impact on Economic Value of Modified Accelerated Depreciation						
		40% Tax Rate				
	Depreciation	Depreciation	Taxes Avoided	MWh	\$/MWh	
Year 1	60%	\$ 360,000,000	\$ 144,000,000	1,500,000	\$ 96.00	
Year 2	16%	\$ 96,000,000	\$ 38,400,000	1,500,000	\$ 25.60	
Year 3	9.60%	\$ 57,600,000	\$ 23,040,000	1,500,000	\$ 15.36	
Year 4	5.75%	\$ 34,500,000	\$ 13,800,000	1,500,000	\$ 9.20	
Year 5	5.70%	\$ 34,200,000	\$ 13,680,000	1,500,000	\$ 9.12	
Year 6	2.90%	\$ 17,400,000	\$ 6,960,000	1,500,000	\$ 4.64	
Tax Reform Impact on Economic Value of Modified Accelerated Depreciation						
		20% Tax Rate				
	Depreciation	Depreciation	Taxes Avoided	MWh	\$/MWh	
Year 1	60%	\$ 360,000,000	\$ 72,000,000	1,500,000	\$ 48.00	
Year 2	16%	\$ 96,000,000	\$ 19,200,000	1,500,000	\$ 12.80	
Year 3	9.60%	\$ 57,600,000	\$ 11,520,000	1,500,000	\$ 7.68	
Year 4	5.75%	\$ 34,500,000	\$ 6,900,000	1,500,000	\$ 4.60	
Year 5	5.70%	\$ 34,200,000	\$ 6,840,000	1,500,000	\$ 4.56	
Year 6	2.90%	\$ 17,400,000	\$ 3,480,000	1,500,000	\$ 2.32	
Differential						
		Taxes Avoided	MWh			
Year 1		\$ 72,000,000	1,500,000	\$ 48.00		
Year 2		\$ 19,200,000	1,500,000	\$ 12.80		
Year 3		\$ 11,520,000	1,500,000	\$ 7.68		
Year 4		\$ 6,900,000	1,500,000	\$ 4.60		
Year 5		\$ 6,840,000	1,500,000	\$ 4.56		
Year 6		\$ 3,480,000	1,500,000	\$ 2.32		

Conclusion

In conclusion, we agree that there is value in fuel secure generation and that wind setbacks are necessary, but these only address pieces of the problem. The RPS must be preserved. Finally, this fight has to end. Businesses like CSG are watching Ohio and longing for the opportunity to enter the market and invest in this State. But they will not do it with this constant uncertainty hanging over the energy industry. Ohio cannot expect outside companies to invest in the State when it constantly changes the rules. We support the development of a comprehensive solution and an end to this continual fight.