

## **Why Senate Bill 310 Must Be Repealed:**

**September 9, 2015**

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My name is Ned Ford. I have been promoting cost-effective utility efficiency programs in Ohio since 1984. I have collected data from Ohio utility reports regarding these standards because the PUCO has not, for the last six years.

What I do is not a substitute for the PUCO work, but it is the only way anyone can understand how important the efficiency and renewables standards are, or how badly the passage of SB 310 hurt these benefits in the absence of the PUCO's reports. I have also narrowed down uncertainty about the costs of the renewables standards to about \$250 million over six years, although the PUCO is much more secretive about renewables costs than about efficiency costs.

I am keenly aware of the problems created by such a long document at this time. Nonetheless, the subject material which ought to have been addressed by the Energy Mandates Study Committee (EMSC) is large, and this paper just provides a good basic overview:

- **Costs and benefits of efficiency are identified starting on Page 5**
- **The Absurd Consequences of the PUCO's consideration only of a 100% natural gas response to the U.S. EPA Clean Power Plan is compared to two alternative scenarios starting on Page 9**
- **The Cost of the Renewables Standard in Ohio is on Page 13**

**These three sections were originally prepared as separate handouts and are incorporated here without change.**

Passage of Senate Bill 310 in 2014 has reduced economic benefits to all Ohioans by allowing utilities to reduce and delay efficiency and renewable energy programs which are demonstrated to save Ohioans substantial amounts of money. Only FirstEnergy has actually reduced their programs at this time, but all four electric distribution utilities have reduced their planning for future program expansion as provided for by the standards before SB 310. The renewables standard would have increased from 2.5% in 2014 to 3.5% in 2015 if SB 310 had not prevented that expansion.

**Allowing the “freeze” to expire does not eliminate the harm.** The primary economic harm in SB 310 is the second “opt out” provision added to the original opt-out in SB 221, passed in 2008. The second greatest economic harm is debatable, but it may be the elimination of recovery of renewables expenditures. SB 310 eliminates recovery for any project not under contract prior to April 1, 2014 (4927.641(A) and (B)). It does describe a continued renewables standard, but does not clearly identify a cost recovery path which would overcome the prohibition in section (B) of this provision.

There are dozens of other harmful provisions in this 57 page law which professes to address problems which have not been demonstrated to exist. The EMSC has not spent its time on the problems created by SB 310. Therefore these summary comments are probably not the place to discuss the dysfunctional details of SB 310.

What the EMSC has spent its time on would have been appropriate, except that the PUCO refused to provide answers to the most basic questions about costs and benefits from the standards, and has misled the EMSC on the importance of efficiency and renewables in meeting the U.S. EPA’s Clean Power Plan.

There are three straightforward reasons for my interest in this matter;

- 1) The efficiency programs are enormously cost-effective, and have already produced several billion dollars in real savings to all customers by eliminating the need for additional new generating capacity, contrary to testimony by industrial proponents of SB 310. Ohio deserves more of this, and there is a large potential to increase the benefits;
- 2) Renewables have become cheaper every year for over twenty years. Ohio wind is under contract at a price that a new natural gas combined cycle plant cannot compete with, but it has crossed this economic marker during the last two years when the Kasich change to wind siting regulations trumped any possible market response.

Ohio lawmakers expected to see this declining price trend lead to an important resource for Ohio in 2008 when they passed SB 221 and included three pages of language creating the standards which SB 310 takes 58 pages to weaken. The rest of the 120 page SB 221 was

deregulation, which the proponents of SB 310 originally supported, and are now trying to escape.

Solar photovoltaics are not as cheap as wind, but the Ohio standard limits solar to five percent of the standard in order to give Ohio utilities, citizens and businesses experience for what is clearly a coming wave of massive proportions. Solar power in Ohio is already cheaper than fossil fuel generation when measured by its value during peak hours of the air conditioning season. Since most states including Ohio do not measure generation this way, solar is not properly compensated.

Although the PUCO has refused to make straightforward reports on the cost of the renewables standards, there is enough information that can be extracted from PUCO reports, and enough public information to fill in the gaps. Some details are on page 13 below. Ohio's renewables standards have cost no more than \$250 million over six years, and the 2015 cost of the 2.5% standard is likely to be half of the 2011 cost of 1%;

- 3) Efficiency and renewables are the most cost-effective response to the Clean Power Plan, and may overcomply with the 2030 goal for carbon reduction if SB 310 is repealed. Ohio needs more overcompliance than the existing efficiency and renewables standards can produce for a variety of reasons. But the most important one is that SB 221's standards represent the most affordable way to meet Ohio's future electricity needs even if environmental impacts were irrelevant.

SB 310 is a convoluted attack on Ohio's 2008 efficiency and renewables standards. But SB 310 is only a symptom of the problem. The real attack is the refusal of the PUCO to provide the Legislature and the public with a lucid and accurate account of the costs and benefits of the standards. The PUCO also refuses to make public information about subsidies to large industrial customers. These are mandates. If these subsidies were clearly identified this entire matter would be settled and the alleged reasons for SB 310 would be openly identified as false.

It is not particularly useful to address all the problems with SB 310 given the lack of attention to the actual functions of the law during the EMSC deliberations. It may help to clarify if we identify the primary advocates of this deeply flawed legislation:

- A) The lead proponents in the House, Senate and EMSC hearings were five industrial companies who benefit from over \$200 million per year in direct subsidies from other customers. A research paper on these subsidies is available on request. These proponents want to retain the benefit of most of the efficiency savings, while escaping their fair share of the costs. \$200 million is more than the efficiency and renewables standards cost statewide in most years, and far more than the rate impact of efficiency and renewables for the FirstEnergy and AEP companies, where most of these industrial mandates impact rates.
  
- B) FirstEnergy is the only Ohio distribution utility which used SB 310 to reduce its efficiency programs. It is truly sad that the response of the other three utilities is not better recognized. All three have maintained their programs, and two of the three have recently reported substantial improvements in cost-effectiveness in 2015 compared to 2014.
  
- C) The Kasich administration is clearly attempting to undermine efficiency and renewables in order to make natural gas more successful in Ohio. To date, fracking is still only producing a fraction of Ohio's natural gas consumption, and the value of that production is substantially less than the value produced by efficiency and renewables jobs and savings and avoided alternative generating equipment. Every Administrative agency which has any role at all in energy has lent its effort to undermining the factual evidence in support of efficiency and renewables in Ohio.

Ohio deserves the original intent of SB 221, which was to establish a baseline, and allow the market to exceed those baselines if possible, while providing protections against failures. No failures have occurred, in spite of innuendo and allegations.

Ohio also deserves a chance to discuss these issues in a rational format, free from the hyperbole and misrepresentations that surrounded the formation of SB 310. It deserves a regulatory agency which complies with the law in terms of reporting and provision of data. PUCO is a well-qualified agency, and has done an excellent job of administering the efficiency and renewables standards. This makes the contrast of their failure to provide cost and benefit reports much more starkly suspicious than if they were not able to deal with the complexity of the standards and the larger energy market.

## Costs and Benefits of Ohio Electric Utility Efficiency Programs

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The Ohio utilities affected by the 2008 Efficiency standard are required to report to the PUCO on May 15<sup>th</sup> of each year. The PUCO has failed to require uniform reporting, and has failed or refused to provide a public account of the summary information necessary to understand how important these programs are to Ohio's economy. Therefore we make this report available in lieu of a legally mandated report that the PUCO is required to provide to the Ohio General Assembly, but does not.

### 2014 Regulated Electric Distribution Utility

**Efficiency Program Costs and Savings:** Values in **bold** are reported by the utilities to the PUCO. Other values are calculated from the reported values, as explained:

	2014 Program Spending	2009 – 2014 Cumulative Spending	2014 First Year Energy Savings (GWh's)
AEP	<b>\$72,942,700</b>	<b>\$325,682,700</b>	<b>631</b>
DP&L	<b>\$18,173,233</b>	<b>\$81,263,763</b>	<b>177</b>
Duke	<b>\$30,314,945</b>	<b>\$167,036,494</b>	<b>152</b>
FirstEnergy	<b>\$64,136,387</b>	<b>\$278,221,920</b>	<b>774</b>
Totals	<b>\$185,567,265</b>	<b>\$852,204,877</b>	<b>1735</b>
	2009 – 2014 Cumulative First-Year Savings (GWh's)	Lifetime Retail Rate Savings at 9.16¢ per KWh (\$ Million)	Retail Rate Savings Realized by Year-End 2014 (\$ Million)
AEP	2952	\$1,620	\$711
DP&L	1042	\$573	\$252
Duke	1201	\$661	\$291
FirstEnergy	3159	\$1,736	\$762
<b>Totals</b>	<b>8353</b>	<b>\$4,591</b>	<b>\$2,014</b>

PUCO rules require reporting of program costs and first year energy savings. In order to understand the value created by efficiency programs it is necessary to calculate the lifetime savings produced from installed measures. This calculation is done by the utilities, but only AEP includes the results in its filing. To be conservative, we assume an average measure life of 11 years. AEP's reported values are equal to a measure life slightly over 12 years, so our assumption probably understates the statewide achievement by about 8%. For consistency, we do not use the AEP values, but assume the same 11 year average measure life for that company.

AEP has reported a lifetime expected bill savings for these programs of \$1,736.6 million. (It is just coincidence that we reach the same value for FirstEnergy, since our value is an estimate). This analysis assumes the average of the four Ohio utilities is approximately 8% lower, although that appears to be conservative based on reported costs and first year savings.

The utility filings that are the source of the data used here are public record, but consist of hundreds of pages of program analysis, economic breakdown, and other information relevant to the proper recovery associated with these programs. Although we are highly critical of the PUCO for its failure to report costs and benefits for these programs in light of the attack on these standards and passage of SB 310, we find no significant flaws in the PUCO's overall management of efficiency (or renewables) under Ohio law. There are minor flaws, as is natural for a state in its seventh year of program activity, but the programs are extremely successful and they have been limited in scope through a profound misunderstanding which is perpetuated and aggravated by the PUCO's silence on costs and benefits.

12% of Ohio's electricity is sold to retail customers by public power entities. These public power customers (83 municipal electric companies in Ohio) have efficiency programs, but are not obligated to report in any public way. So it is impossible to provide comparable data. Ohio was ranked 18<sup>th</sup> in the nation for electric efficiency programs in 2013, but passage of SB 310 has caused us to drop backwards considerably. 2014 rankings are not available as of this writing.

This report addresses direct energy savings. The values indicated here are accurate, but we will also report soon on capacity benefits, described below. Ohio utilities also recover lost distribution revenues and incentives, which adds approximately \$400 million to the total program costs. We do not report this

because the PUCO has not made a clear and systematic report on these components possible. The benefits we report are substantially larger than those costs, and we will report them if we can identify them accurately.

Notes:

- 1) The \$4.6 billion and \$2.014 billion savings through the life of the installed measures and realized to date, respectively, are energy savings which are realized by the program participants. In the near future we will present and discuss the capacity savings created by this efficiency program activity. To the end of 2014 efficiency savings have reduced Ohio's need for generating capacity by well over 1500 MW's. A new combined cycle power plant capable of generating 1500 MW's would cost more than \$1.5 billion, and an additional \$1.5 billion worth of transmission and distribution equipment.

Capacity benefits flow to all customers. They explicitly overcompensate every single customer in Ohio for their share of program costs. The additional benefit realized by program participants is best viewed as a payment for providing a share of reduced capacity needs to the utility. Without a full understanding of these relative costs and benefits Ohio decisionmakers are going to respond to misleading statements by a handful of spokespersons for special interests. Our analysis is not the proper evidence of the true costs and benefits of efficiency. It is quite accurate, and is evidence of what the State of Ohio should be telling the public and decisionmakers who affect these programs and policies.

- 2) Duke has substantially overcomplied during early years. Since the eruption of controversy in the Ohio Legislature and the passage of SB 310 Duke has elected to diminish its bank of overcompliance rather than to sustain its prior level of program activity. This is of course regrettable, but is an understandable response to the chaotic environment created by Ohio's Republican lawmakers.
- 3) FirstEnergy is almost identical in size to AEP, but has created a large fraction of its cumulative savings through the self-administered project process allowed by the 2008 law. These are industrial projects which are extremely cost-effective, and for which FirstEnergy pays 75% as much as they would pay for the same projects done through their programs. This results in a significantly larger ratio of energy savings to dollars spent than the other utilities.
- 4) FirstEnergy is the only Ohio utility which does not have a shared savings incentive agreement with its customers. This is one likely motivation for that company's support of SB 310 and its announced reduction in 2015 program activity. The other three utilities intend to keep program activity flat from 2014 through 2016. The entire picture of shared savings includes lost distribution

revenues, which FirstEnergy has, and which AEP has foregone through negotiated settlement, and Duke and DP&L have, and incentives, which are based on net savings. These costs add approximately 45% to the program costs identified above. But the PUCO has not reported on them and the utility reports are extremely hard to interpret for a variety of legitimate reasons.

**References to 2014 filings:**

(Google “PUCO DIS”, enter case number below (must include dash)):

FirstEnergy 15-900 (Filed 5/15/2015)

<https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=15-0900-EL-EEC>

FirstEnergy Efficiency and PDR savings from page 4 of filing.

AEP - Ohio Power 15-919 (Filed 5/15/2015)

<https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=15-0919-EL-EEC>

AEP 2014 EE and PDR savings from Page 6 of filing (page 8 of the pdf file) and surrounding pages.

Program costs from Page 12.

Duke Ohio 15-454 (Filed 3/13/2015)

<https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=15-0454-EL-EEC>

Duke program costs are in the rider filing 15-534-EL-RDR.

DP&L 15-777 (Filed 5/15/2015)

<https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=15-0777-EL-POR>

DP&L 2014 EE and PDR savings from Page 2 of filing (page 10 of the pdf file).

Banked Savings from Page 3.

Cost from Page 5.

## **The absurd natural gas response to the Clean Power Plan in Ohio:**

***Natural gas emits 55% of the carbon that coal does per KWh. Therefore using natural gas to reduce CO2 requires elimination of more than twice as much coal as an energy efficiency and renewable energy strategy.***

*Such a strategy would eliminate most of Ohio's coal generation, quintuple the number of high efficiency natural gas plants, and increase Ohio's total consumption of natural gas by about 64%. It would cost nearly \$12 billion, and would increase Ohio electric rates by about 20%. This assumes that a 64% increase in natural gas use would not cause natural gas prices to rise.*

*This strategy would eliminate 96% of Ohio's coal, compared to simply repealing SB 310 and restoring Ohio's electric efficiency and renewables standards. **As absurd as this may seem, it is the only strategy which the Public Utilities Commission of Ohio and the Ohio EPA have considered in testimony to Ohio lawmakers, and in written comments on the U.S. EPA Clean Power Plan.***

***The most concise way to see the stark differences in these alternatives is to examine the three following scenarios:***

- Scenario A** CPP compliance with 100% EE and RE
- Scenario B** CPP compliance with 100% natural gas producing reductions from 2012 and 100% EE and RE meeting all new growth
- Scenario C** CPP compliance with 100% natural gas including all new growth

26,964,393 MWh's	<b>Scenario A:</b> MWh's of 2012 coal which must be eliminated to achieve CPP
31.50%	Percent of 2012 coal which must be eliminated to achieve CPP
- 0 -	Additional natural gas combined cycle MW's required
\$18 billion	Approximate <b>net savings</b> over 15 years
59,321,665 MWh's	<b>Scenario B:</b> MWh's of 2012 coal which must be eliminated to compensate for CO2 in natural gas if new growth is met with EE and RE
69.31%	Percent of 2012 coal which must be eliminated to achieve CPP
9,024 MW's	Additional natural gas combined cycle MW's required
\$9 billion	Approximate <b>capital cost</b> of required new generation (does not include fuel, interest charges or carrying costs)
46.61%	Percent increase in total Ohio natural gas consumption required by Scenario B
22,835,248 MWh's	<b>Scenario C:</b> additional MWH's of coal which must be eliminated to achieve CPP including offsetting CO2 from new natural gas
82,156,913 MWh's	Total MWh's of coal which must be eliminated to achieve CPP under Scenario C
95.99%	Percent of 2012 coal which must be eliminated to achieve CPP
12,498 MW's	Additional natural gas combined cycle MW's required by Scenario C
\$12.5 billion	Approximate <b>capital cost</b> of required new generation (does not include fuel, interest charges or carrying costs)
64.56%	Percent increase in total Ohio natural gas consumption required by Scenario C

***Restoring the 2008 efficiency and renewables standards, damaged by the passage of SB 310 in 2014, would reduce Ohio electric rates by \$18 billion (over the next fifteen years) and would require only a third of Ohio's coal generation be curtailed by 2030.***

If we are to take either Scenario B or C seriously, we need to consider additional factors. <sup>i</sup>

Ohio's goal under the U.S. EPA Clean Power Plan (CPP) is expressed as a rate or as tons of emissions. Because these two numbers are simply different ways of expressing the same goal, and because most people can think in terms of tons more clearly than rates, we have discussed tons here.

CPP affects the electricity sector carbon emissions. It does not address non electric carbon, and some very small private generators are probably not included in the regulation.

CPP establishes 2012 as the baseline year (although EPA materials can be confusing because of occasional discussions using 2005 as a baseline). In 2012 EPA uses 102,239,220 short tons of CO<sub>2</sub> as Ohio's baseline. EPA sets Ohio's 2030 goal as 73,769,806 short tons. This is a 27.85% reduction over 18 years, two and a half of which are now historical.

The average annual rate of reduction required is a fraction less than 1.6% per year. This paper shows the radical difference between any strategy for compliance based on natural gas, and one based on repeal of the 2014 SB 310 and restoration of the 2008 electric energy efficiency and renewable energy standards. The two year slowdown caused by SB 310 is not substantial in terms of meeting the CPP. But repealing the many weakening features in SB 310 is essential. The authors of the law clearly intended to convey the impression that the "freeze" could expire without harm. But the extensive modifications caused by the law are in fact a great deal more harmful than the "freeze".

There are infinite paths to compliance which blend the three strategies presented here, and many other approaches which include many other technologies and practices for minor roles in carbon reduction. The primary goal here is to establish that the Kasich Administration's PUCO and Ohio EPA have misled the legislature and provided similar testimony to the U.S. EPA on the cost and feasibility of these two strategies relative to each other. The State of Ohio is apparently leading a gaggle of states in litigation against the CPP. This is irresponsible. Ohio's best interest is squarely in the pursuit of economic benefits from efficiency and renewables, which can easily overcomply with the CPP, while creating a much more modern energy infrastructure, diversity, hundreds of thousands of jobs and tens of billions of dollars in economic expansion.

In order to actually achieve the carbon goal, reductions must not only eliminate about 1.6% of 2012 emissions per year. They must also eliminate or offset any increase in emissions due to population growth, increased economic activity and all the other things that cause electricity consumption to increase.

Average annual new growth is projected by the Federal Energy Information Administration to be 0.8% per year. Ohio has occasionally estimated its own projected growth, but has never been more accurate than EIA, so we will use that projection as an assumption.

### **Why Natural Gas is an Absurd Strategy:**

Efficiency eliminates the need for electricity, and that electricity can be the electricity generated by coal. Renewables produce electricity which can displace coal. Natural gas, however, emits carbon. In the most modern of natural gas plants – the combined cycle natural gas plant – the efficiency is good enough that the amount of CO<sub>2</sub> is about 55% of that which coal emits to produce a unit of electricity. Ohio has about 10,000 MW's of natural gas plants, none of which are that efficient. Only 30% of the existing plants come close.

### **Therefore to cut CO<sub>2</sub> using natural gas, more than twice as much coal must be displaced.**

By using efficiency and renewables to displace coal Ohio can achieve its CPP goals by cutting coal generation from 66% to 45.19% of generation. This does not accurately reflect the 2030 fraction, because it will also be necessary to either offset growth in consumption with efficiency, or to generate more electricity with renewables, in order to provide Ohio's electric needs. The original SB 221 efficiency and renewables standards will achieve both the reductions and the offset of new growth, and overcomply with the CPP, assuming the Davis Besse nuclear plant doesn't close, the price of natural gas doesn't rise, or other major unpredictable and unmanageable events don't happen.

In 2013 (the most recent year for which EIA has made detailed breakdowns available for) Ohio had 32,854 MW's of generating capability. In that year Ohio generated 137,284,189 MW's of electricity. This is nominally a 47% capacity factor, meaning that the existing plants were used 47% of the time. Ohio has been a net importer of electricity in all but one of the last twenty years, and in 2013 we imported a little over 10% of our total consumption. So clearly more information is needed if we want to understand Ohio's generating capability.

Each type of resource is able to produce at an industry standard capacity factor. Coal generally can function 75% of the time. Nuclear 90%. Wind 35%, although Ohio's wind farms are doing better than that. Natural gas is a little more complicated though.

Of the 32,854 MW's of power plants in 2013, 19,205 were coal. 9,465 were natural gas. One 525 MW combined cycle natural gas plant is listed as proposed to be in service in 2018 in the EIA data. The rest of Ohio's electric generators are nuclear and renewables, except for a fraction of oddball petrochemical generators. Here's where it gets tricky:

There are five different types of natural gas plants. Each has its own range of efficiency. Combined cycle is the most efficient, and the only type of gas plant which makes claims to be a baseload resource. The rest are increasingly expensive to operate because of their inefficiency. Inefficiency uses more fuel per KWh and the KWh's cost more as a result. The least efficient type of gas plant is a gas turbine. 58% of Ohio's natural gas plants are gas turbines, which are used for meeting daily peaks which last for a matter of minutes. The electricity they produce costs three to four times as much as the average price of generation in Ohio.

Ohio only had 2,012 MW's of combined cycle generators in 2013, plus another 1,485 MW's which were expected to come on line that year, but which are not reflected in EIA's data. (EIA often modifies data two or three years after the fact, due to the enormous volume and diverse sources they must collect from).

All 3,497 MW's of this fleet of combined cycle natural gas plants could have generated 22,990,376 MWh's in 2013. Actual generation from natural gas in Ohio was 21,694,211 that year. (Generation from natural gas dropped 4.5% from 2012 to 2013, reflecting an increase in gas prices, which were so low in 2012 that it permitted greater use of the less efficient generators.

The projections in this paper assume that combined cycle natural gas plants built from today forward are 55% efficient. That is a generous assumption. Most of the existing combined cycle plants in Ohio were built in 2002 and 2003 and are much less efficient, but are still the most economic natural gas plants in Ohio, assuming they can operate full time (~75% of the time).

This information makes several points. The most important is that any new natural gas generation intended to displace coal must be built. The existing plants are already fully in use. There is little or no room to increase natural gas generation from existing plants. 525 MW's is proposed, according to EIA, and another several thousand MW's are being advanced toward the state of formal proposals.

To underscore the absurdity of the strategy which Ohio's PUCO and Ohio EPA have presented to the Ohio Legislature via the Energy Mandates Study Committee, and which formed the basis of their comments to the U.S. EPA on the draft CPP, we examine briefly three scenarios here. Details of these scenarios are available in a spreadsheet (CPP Notebook 09 2015) provided on request by [Ned.Ford@fuse.net](mailto:Ned.Ford@fuse.net)

The Scenarios described in this paper are based on 2012 historical data. We have described some of these issues in terms of 2013. The difference between the two years is minor, and not pertinent to the general purpose of placing various CPP compliance paths in a reasonable context.

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<sup>i</sup> If we are to take either Scenario B or C seriously, we need to consider that Scenario B would require elimination of two thirds of the benefits of efficiency and renewables under a restored law. Scenario C would require elimination of all efficiency and renewables standards. Allowing the efficiency or renewables standards to proceed in concert with these strategies would result in an inability of the natural gas plants to sell power. Scenario B would produce economic benefits from efficiency. If the renewables standard were eliminated and the efficiency standard were reduced, the \$9 billion cost of new plants would be partially offset by \$6 billion in efficiency savings. This is an economically irrational strategy compared to Scenario A, but far preferable to Scenario C.

Scenario A will create hundreds of thousands of new Ohio jobs. Two different reports found 31,000 jobs created by the end of 2012, and 89,000 jobs created by the end of 2014, by the original efficiency and renewables standards established in law in 2008.

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## The Cost of the Renewables Standard in Ohio

July, 2015

This page summarizes a spreadsheet that reports complete data relevant to the PUCO reports and incomplete case filings on Ohio generator compliance with the SB 221 renewables standard. For a copy of this spreadsheet contact [Ned.Ford@fuse.net](mailto:Ned.Ford@fuse.net).

What we know:

The reporting generators comply almost precisely with the standard, unlike the efficiency standard where the distribution utilities have generally overcomplied.

The number of generators affected by the standard has risen substantially over the six years, although it seems fairly stable from 2012 to 2014 at about 60 entities.

The in-state requirement for renewables was impossible to meet until July of 2011 when the first Ohio commercial wind farm went online.

The PUCO has refused to provide comprehensive reporting on the actual cost of renewables, except for 2011 and 2012.

Year	Standard (% of generation)	Cost	Estimated Cost (Public REC prices)
2009	0.25		
2010	0.5		
2011	1	\$44.7 million	
2012	1.5	\$52.4 million	
2013	2		
2014	2.5		\$50 million
2015	2.5		\$25 million