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Short Circuited

Assessing the Ontario Progressive Conservative Party's Energy Policy

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Short Circuited

Assessing the Ontario Progressive Conservative Party's Energy Policy

PART OF THE Ontario Conservative Party's "one million jobs" promise is based on cancelling renewable energy policies. In this brief review, we highlight the flawed and unrealistic assumptions behind this element of the election platform. The econometric model and database used to project GDP and employment effects from eliminating renewable energy programs have major errors, which make the results meaningless. Also, the projections do not pass the test of policy realism. The party platform suggests electricity rates can be reduced to the national average without presenting any evidence of how this can actually occur given Ontario's energy context. Far from creating jobs, scrapping renewable energy projects is more likely to kill jobs in relatively labour intensive green energy industries.

In a recent interview (Reevely 2014) Ontario Conservative leader, Tim Hudak, explained that the assumptions for his plan were based on the analysis of Benjamin Zycher (2014). As Hudak explained, "Zycher's model assumes Ontario's energy costs will decline to the national average from a level that in Zycher's analysis is about 20 per cent higher. That average is based on the national mix of power sources, which includes hydroelectricity, nuclear power, gas-fired generating stations, solar and wind farms and coal plants." Zycher performed an econometric regression that links GDP growth to a series of variables, including energy prices for commercial and indus-

trial customers. He then assumes that these electricity prices could be reduced to what he understands to be the national average, in order to estimate jobs and GDP impacts of lower electric prices.

The Data and Methodology of Zycher's Analysis

A careful review of the Zycher paper, on which the Conservative job claims are based, highlights several statistical and methodological problems. The first involves his source of data on electricity prices. The electricity price data used in the Zycher regression is *not* an interprovincial comparison of electricity price levels. Rather, it is an *index* (set to 100 in an arbitrary base year, 2009) of industrial electricity prices in Canada and the provinces, published by Statistics Canada (CANSIM Table 329-0073). It measures the cumulative *change* in electricity prices since 2009 in each province. For Ontario, Zycher uses a simple unweighted average of prices paid by industrial users with under 5000 kW of installed load capacity and those with over 5000 kW; for Canada, he uses a blended "national total" series constructed by Statistics Canada. Yes, Ontario's prices have risen more than the national average since 2009. But that doesn't tell us whether, or by how much, actual electricity price levels are higher in Ontario. That depends on where electricity prices were in the first place.

Zycher (and the Ontario PCs) have thus misinterpreted an index of price inflation as a comparison of absolute price levels. Zycher's job estimates are then benchmarked to the December 2013 values for those Statistics Canada indices (which equaled 132.7 for Canada, and 160.9 for Ontario averaged across the two sizes of industrial users). That does not mean that Ontario electricity prices are higher than the Canadian average; it means that prices in Ontario have grown faster since 2009 than the Canadian average. Given the nature of industrial electricity pricing, those monthly indices fluctuate rapidly. In November 2013 (just one month earlier) the gap between Ontario and Canada was less than half as big (127.2 for Canada and 140.3 for Ontario). Indeed, as recently as August 2012, Ontario's price index was *lower* than the rest of Canada. The relative scores of Ontario versus other provinces can also be reversed by the arbitrary choice of base year for the index; for example, choosing 2002 instead of 2009 for the base year causes Ontario to seem to have lower electricity prices, but only because the price increases experienced in Ontario came later than those imposed in other provinces. For all these reasons, it is inappropriate to base a long-run job

prediction on just one month's measure (December 2013) of an inflation index that fluctuates dramatically from one month to another.

It is true that electricity prices are higher in Ontario than several other provinces (for many reasons, including a lack of cheap hydro-power and the heavy costs incurred for transmission & distribution investments, not just because of renewable energy procurement policies). But the 2009=100 index is not an appropriate or meaningful way to measure that difference — and any econometric coefficients based on that index cannot be interpreted as evidence of the impact of higher electricity prices on GDP.

Zycher's misunderstanding of the Statistics Canada data is further evidenced by his claim (in footnote 52 of his paper) that the Statistics Canada report erred in reporting the categories of electricity users in kW (kilowatts). Zycher suggested the categories should be based on kWh (kilowatt hours, a measure of total consumption), not kW (which measures installed load capacity). In fact it is Zycher, not Statistics Canada, who erred: industrial electricity rate classes are indeed established with regard to how much non-interruptible capacity a purchaser has access to.

In addition to these data concerns, further questions can be asked about the econometric methodology used by Zycher. His regression singles out the industrial electricity price, among all other input costs incurred by business, as a potential determinant of GDP. Why should the electricity price alone have such importance in determining the whole course of economic growth? To be sure, it is one relevant cost factor affecting investment and pricing decisions. But there are many other input cost factors that could influence investment and growth, too: such as other forms of energy, transport costs, raw materials, and the cost of labour. Zycher has singled out one cost element from the whole bundle of input costs because of his policy mission (namely, to show that lower prices for that particular input will affect overall economic growth). But the argument is not convincing, without at least considering (in a more complete model) the comparable effect of other input costs. For most businesses, electricity prices are a small component of total costs. The fact that his regression finds a significant correlation between electricity prices and total GDP may reflect covariation between electricity prices and other cost factors which affect business decisions (such as other forms of energy and other commodity inputs) but which are excluded from his model. Zycher does not allow for any negative effect on GDP and employment from cancelling renewable energy programs, and this casts further doubt on his assumption that lower electricity prices are unambiguously positive for the economy (more on this below).

One final methodological question involves the time frame of the analysis. Zycher's regression is based on the annual level of GDP and employment. He multiplies his attained coefficient (-$0.71 billion GDP for each point the Ontario price inflation index is higher than the national) by the absolute size of the gap between the two indices in December 2013 (28.2 points), to attain the estimated gain in Ontario GDP ($20 billion) from lowering Ontario's price inflation index to meet the national average.[1] This gain in GDP in turn is held to create 5048 jobs (the precise link between GDP and jobs is not clear in Zycher's report). The $20 billion GDP increment (equivalent to a boost in total provincial output of 3 percent) is attained once. This should correspond to a one-time gain in employment (perhaps experienced over several years, depending on how long it took for electricity prices to be cut and businesses to expand their output). The Ontario PC technical backgrounder, however, claims that 5048 new jobs will be created *every year* (to eventually total 40,384) from the *one-time* reduction in electricity prices.[2] This does not seem to be consistent with the methodology used in Zycher's own paper.

Policy Realism: Factors Determining Electricity Prices

Zycher's econometric model estimates job creation based on an assumption of Ontario electricity prices dropping towards the "national average". As stated above, Zycher's model is not actually comparing electricity prices across provinces, but the cumulative change in electricity prices between an arbitrary base year and a particular month. However, even if the explanatory variable in his model captured actual inter-provincial electricity price differences, there is nothing to suggest that a price reduction could be achieved with a wave of the policy wand, given the actual context of Ontario's electricity system vis-à-vis the rest of Canada.

Zycher's qualitative discussion of electricity systems actually suggests wind energy is a pretty good deal. He quotes U.S. Energy Information Agency (2013) estimates of average levelized generation costs which state that onshore wind ($86.6/MWh) is cheaper than both advanced nuclear ($108.4/MWh) and conventional coal ($100.1/MWh). He then unconvincingly tries to discredit the lower wind energy cost (at one point he blames the Obama Administration for political interference). He notes the "unconcentrated energy content of wind flows". He seems to be referring to the lower wind energy capacity factor (MWh produced as a percentage of potential maximum output given the installed MW capacity). Wind has a lower capacity factor

when compared to technologies such as coal or nuclear because the wind is not always blowing at the same speed. However the lower capacity factor is embedded in the levelized costs he quotes since the costs are spread over actual energy production (MWh) rather than the installed capacity (MW).[3]

At one point Zycher unfortunately mixes up the price increases projected for the entire system with the increases due to renewable energy. He writes that the Ministry of Energy states that the "renewables program would increase residential power bills by 7.9 percent annually for five years", whereas Ontario's 2010 Long-Term Energy Plan actually stated that renewables would account for 56% of the increase (while 44% of the increase would be due to nuclear and gas capacity, as well as transmission and distribution costs). His list of divergent projections of future electric price increases only emphasizes the unfeasibility of projecting rate decreases or moving towards a national average in the near future.

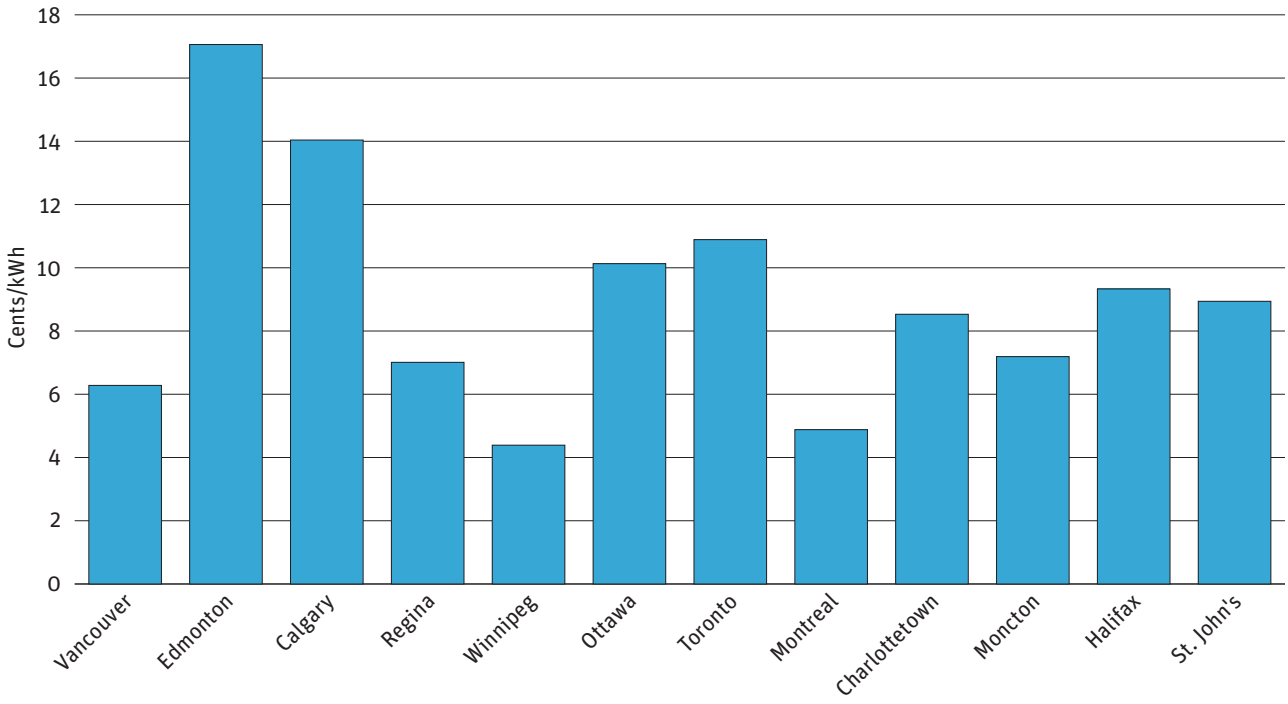
Nowhere in this discussion does Zycher defend the feasibility of actually reducing electric rates to an undefined national average. The average electric rate in Canada is heavily influenced by the presence of low-cost hydroelectricity, built decades earlier, in Québec, British Columbia, and Manitoba. Ontario does not have access to the same cheap hydro resources. This is a result of geography, not policy.

The electricity generation and conservation (see Ontario Ministry of Energy 2013; Molina 2014) resources available and their fixed and variable costs determine the electricity prices ultimately paid by electricity consumers. The electricity rate is also influenced by the allocation of overall system costs across different consumer groups (e.g. typically industrial rates are lower than residential).

Electric costs are not solely driven by energy generation. Another major cost driver in Ontario is investments in transmission and distribution infrastructure. Ontario's electric grid is ageing and it requires significant investment to maintain its present levels of reliability (see Ontario Energy Board 2010). The Conference Board of Canada (Baker et al. 2011) estimates that the Canadian electricity sector needs to invest $293.8 billion from 2010–30. These investments will be needed whether Ontario develops renewable energy or not, although a sustainable energy future could change the design and operation of future electric grids.

A regression exercise outside of any geographic context or consideration of electric system structures cannot be used to estimate future electric rates. A defensible analysis would have to consider the real constraints on

FIGURE 1 Average Prices For Large-Power Customers, 2013



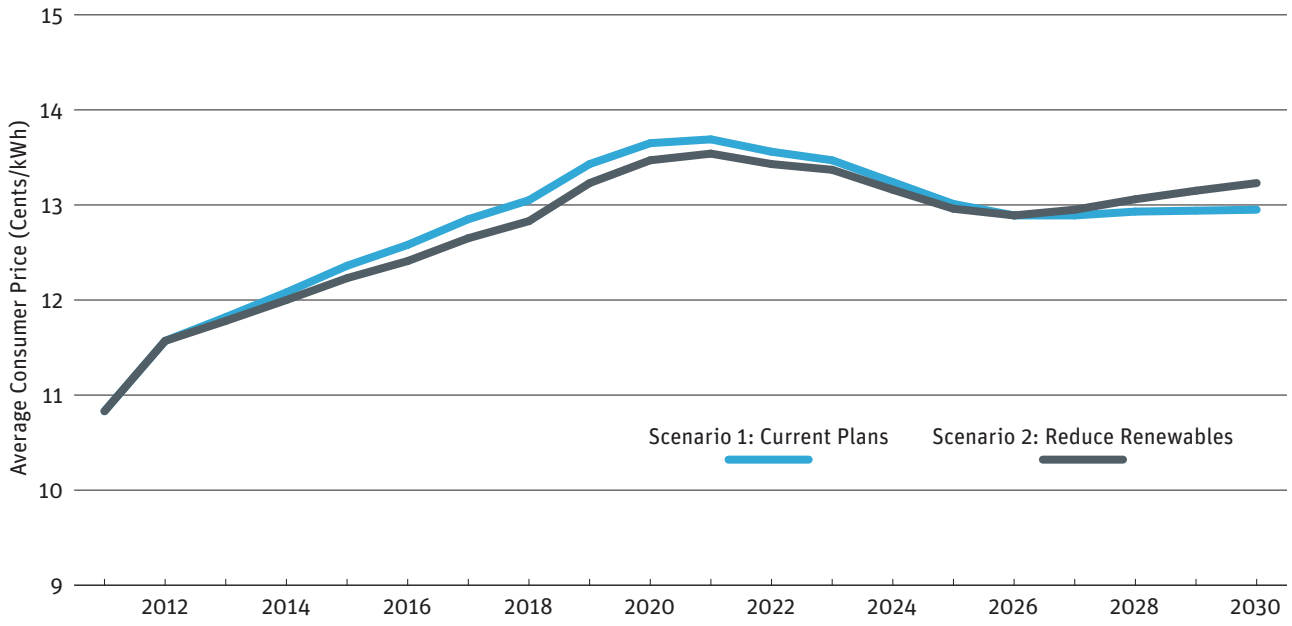
Source Source Hydro-Québec (2013), p. 5. For a monthly consumption of 3,060,000 kWh and a power demand of 5,000 kW; rates in effect April 1, 2013.

the electricity system and the real decisions that have to be made between different energy options to keep the lights on.

The Pembina Institute (Weis and Partington 2011) undertook a detailed modeling of Ontario's electricity system to determine the cost of different electricity options. They found that scrapping renewable energy programs would require the use of more natural gas. While the use of natural gas instead of renewables would deliver slightly lower electric prices in the medium-term (less than a 2% difference), renewable energy would eventually contribute to lower prices as natural gas fuel costs increase and the price of renewable energy continues to decrease.

It should be stressed that both scenarios illustrated in the figure involve increases in the absolute price. We are not aware of anyone actually projecting near-term price decreases,[4] which suggest the assumptions in the Ontario PC plan are very unrealistic.

FIGURE 2 Projected Electricity Price Impact of Current Plans and Reduced Renewables Scenarios



Source Weis and Partington (2011), Figure 16. 2010 constant dollars.

Industrial Electric Rates

Zycher's regression exercise is not looking at overall electricity prices, but prices in the non-residential sector. Thus the Ontario PCs might not be promising residential price reductions, but reductions for the commercial and industrial sectors.

To limit consideration of rate impacts to certain sectors we should consider the electric rate design and cost allocation policies in Ontario. To understand who pays which costs, we must understand that the Ontario electricity rate is based on two components. The first is the electric price in the wholesale market. The second is the "Global Adjustment", which adjusts for the difference between the wholesale market price and prices that are determined by regulatory contracts. This includes prices paid to nuclear, hydro, natural gas, and coal, well as renewable generators. It is worth noting that the overwhelming bulk of the global adjustment costs are still due to nuclear and natural gas.[5] Ontario has introduced new mechanisms that effectively allow industrial consumers to pay an electricity rate based less on the global adjustment and more on the lower prices in the wholesale market (see Ontario Ministry of Finance 2014). The *Industrial Conservation In-*

itiative allows large and medium-sized electricity consumers (with monthly peak demand greater than 5 MW, with a proposal to reduce eligibility to 3 MW) to reduce their contribution to the global adjustment if they help reduce costs on the electricity system by shifting their consumption to low-demand, off-peak hours. The government states this could reduce industrial bills by 15–20%, coming close to achieving the reduction simply assumed by the PCs. The *Industrial Electricity Incentive* lets energy-intensive sectors avoid the global adjustment and make use of low-price surplus electric generation if they undertake capital investments.

Both of these policies already exist to lower electric rates for businesses,[6] but only if they make a positive contribution to the management of the electricity system and undertake new investments that can create jobs. These *strings attached* mechanisms contrast to the Ontario PC platform's call for a blanket reduction in electric rates for industrial and commercial sectors.

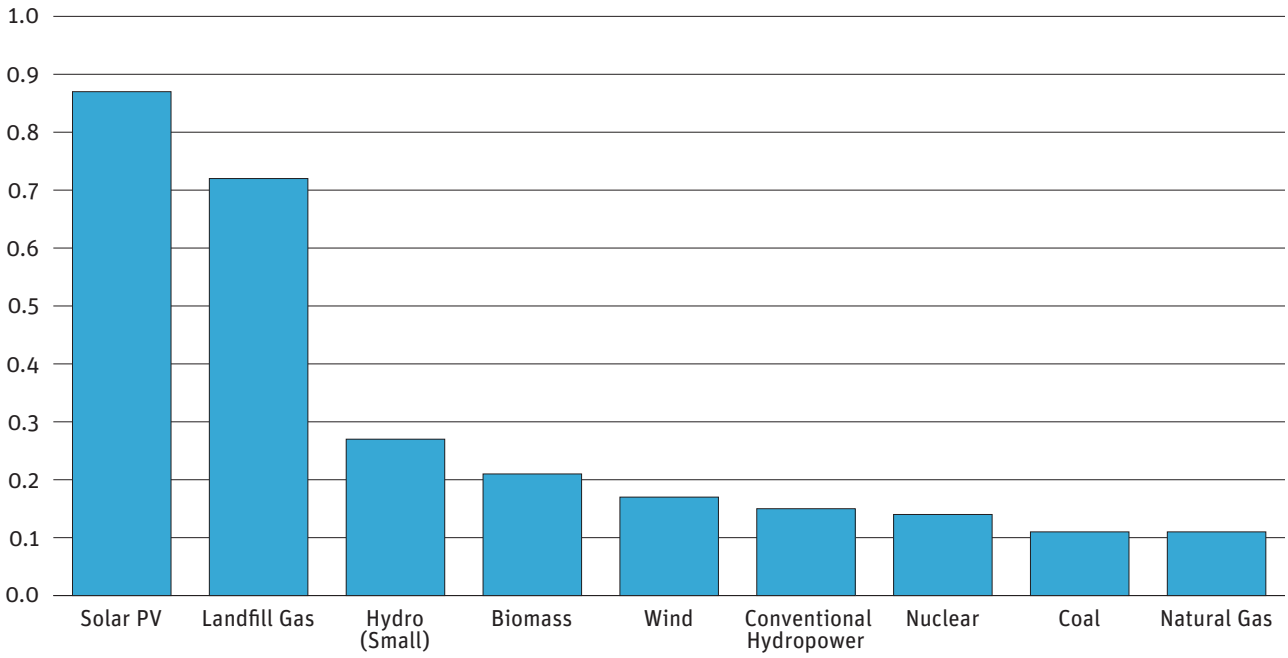
One way for a future PC government to achieve lower industrial and commercial electric rate levels could be to essentially push more costs onto residential ratepayers and off of business. This would not decrease overall electric prices, but only change the distribution between electricity consumer groups.

However, the irony is that if more mechanisms were developed to let non-residential ratepayers see more of their bill made up of wholesale prices as they avoid the global adjustment costs (where renewable energy costs are embedded) *more renewable energy would deliver the lower industrial prices sought in the PC platform*. This is because more renewable energy would effectively reduce the demand in the wholesale market and therefore reduce the price. In Germany, trade-exposed industries (and some non trade-exposed ones) are exempted from the cost of the renewable feed-in tariffs and they pay the price on the wholesale electricity market. Via the "merit order effect" (see Pöyry 2010) German industries are paying less, the more that renewable energy reduces demand in the wholesale market.

Will it Create Jobs?

Even if a future PC government could decrease industrial and commercial electric rates, their policies would destroy jobs in the green energy sector. While natural gas and other non-renewable options will need to be imported from other jurisdictions, renewable energy provides manufacturing as well as installation jobs in Ontario (Smith and Neumann 2014). Renewable energy technologies tend to have a higher labour intensity than fossil energy tech-

FIGURE 3 Comparison of Job-Years Across Technologies (Direct Job-Years/GWh)



Source Wei et al. 2010 and "Green Jobs Calculator" available at http://rael.berkeley.edu/node/20.

nologies per GWh produced (see *Figure 3*). This suggests that there would be net job losses from scrapping renewable energy projects and replacing them with less labour intensive forms of electricity production. This effect is simply excluded by assumption from the Zycher analysis (and hence from the PC jobs estimates), but a complete analysis must consider all the employment effects resulting from such a dramatic policy change.

Conclusion

A review of the Zycher paper that the Ontario Conservative Party uses to justify its election platform highlights several statistical and methodological problems, and policy assumptions that do not correspond with the reality of Ontario's electricity system. The econometric model is not comparing inter-provincial price levels, which makes the model results meaningless in terms of the actual impact of electric prices on jobs. Furthermore, the Ontario Conservative Party seems to have over-inflated (by a factor of 8) the job creation

estimates from this flawed analysis by taking a one-time employment gain, but counting it several times over in consecutive years.

A basic analysis of the context of the Ontario electricity system suggests that it is highly unlikely and infeasible that a policy change could reduce overall electric rates to the "national average". Other alternatives would only create a marginal change in electricity system costs, and are likely to result in higher longer-term costs and greater exposure to fuel price volatility.

One way the PCs could meet their promise to reduce commercial and industrial rates is to shift costs onto residential consumers. This would have nothing to do with renewable energy, except that renewables could ironically help reduce the electricity prices industries pay. Rather than delivering blanket price reductions in the hope that they result in more economic activity, it would make more sense to develop electric rate incentives with "strings attached". Ontario is already providing incentives to industries that require them to actually invest in job-creating activities and to help reduce costs on the overall electricity system.

Finally, scrapping renewable energy projects would kill jobs in green energy industries that are more labour intensive than fossil fuel sectors. This would stall the further development of a clean technology industry in the province.

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Notes

1 As noted above, this result changes dramatically if we use price index data from another month — even just one month earlier.

2 Many economists have noted this problem of multiple-counting within the PC jobs estimates, which arises from a confusion on the party's part between "jobs" and "person years" of employment. See, for example, Adrian Morrow, "Economists poke holes in Hudak's job-creation plan," *Globe and Mail*, May 28, 2014, http://www.theglobeandmail.com/news/politics/economists-poke-holes-in-hudaks-job-creation-plan/article18881984/.

3 Zycher also discusses the inability to "dispatch" wind and solar electricity plants in the same manner as other power plants. Wind and solar are variable resources since their output largely depends on the availability of wind and solar flows. It is possible that some "systems costs" will be incurred for other resources to help balance wind/solar variability. Based on the level of renewable energy generation planned for Ontario these costs can be expected to be between $1–7/MWh, which does not significantly influence the competitiveness of wind compared to other resource options, see International Energy Agency (2011), Chapter 10 and figure 34.

4 Or perhaps rapid increases in other provinces to bring Ontario down to the national average.

5 An analysis by Navigant Consulting calculated the share of the global adjustment costs between Oct 2011 to Sept 2012 by technology as follows: 42% nuclear, 26% natural gas, 17% renewable, and 15% coal. See Spears (2013).

6 Furthermore, it is not clear, based on Statistics Canada's sampling methodology, whether the impact of these measures is included in the price inflation indices used in Zycher's regression, and hence it is possible that those indices overstate the true cost of electricity for industrial users in Ontario.

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