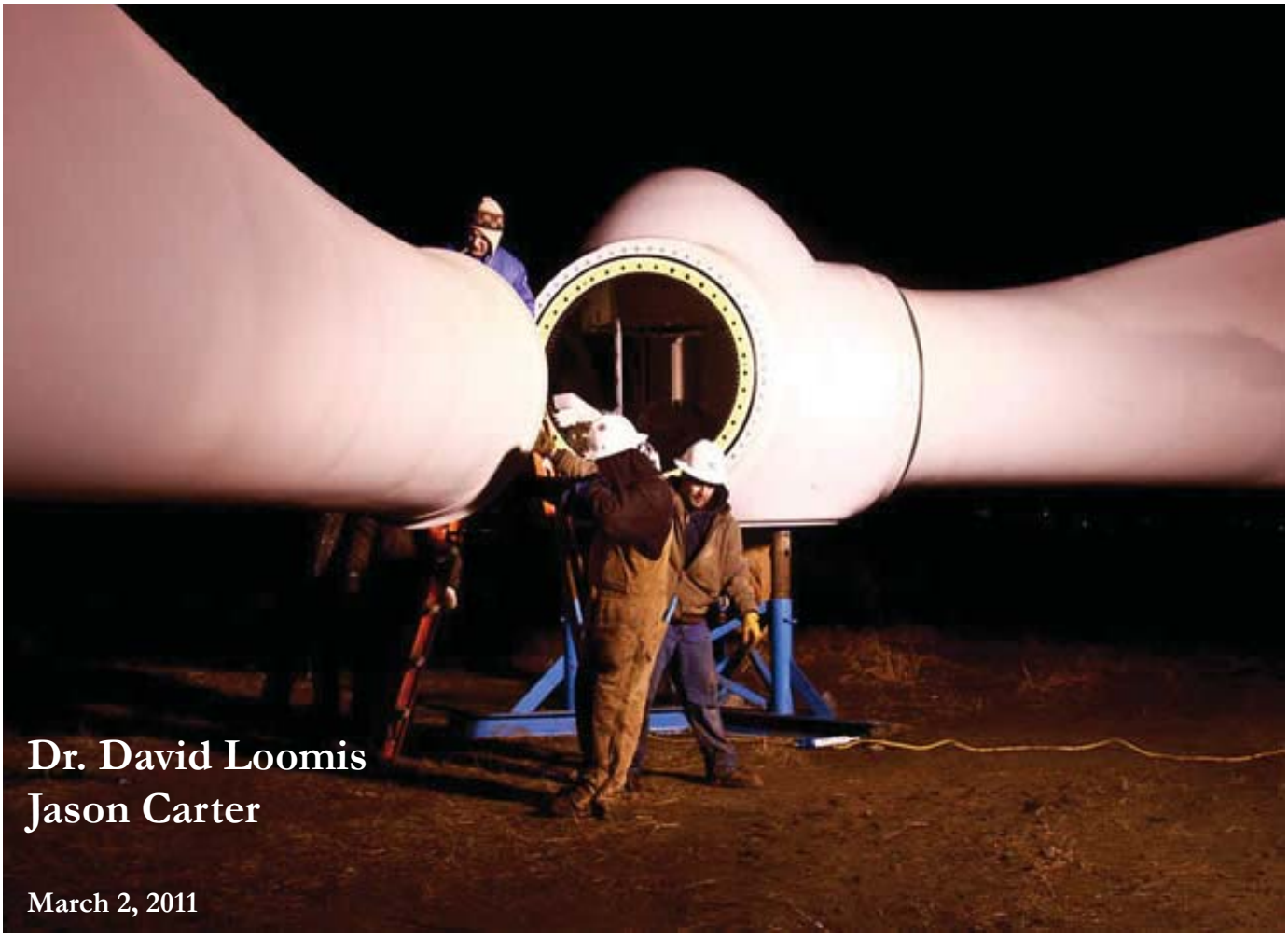
Wind Development Provides the Most Jobs of the Various Generation Sources in Illinois



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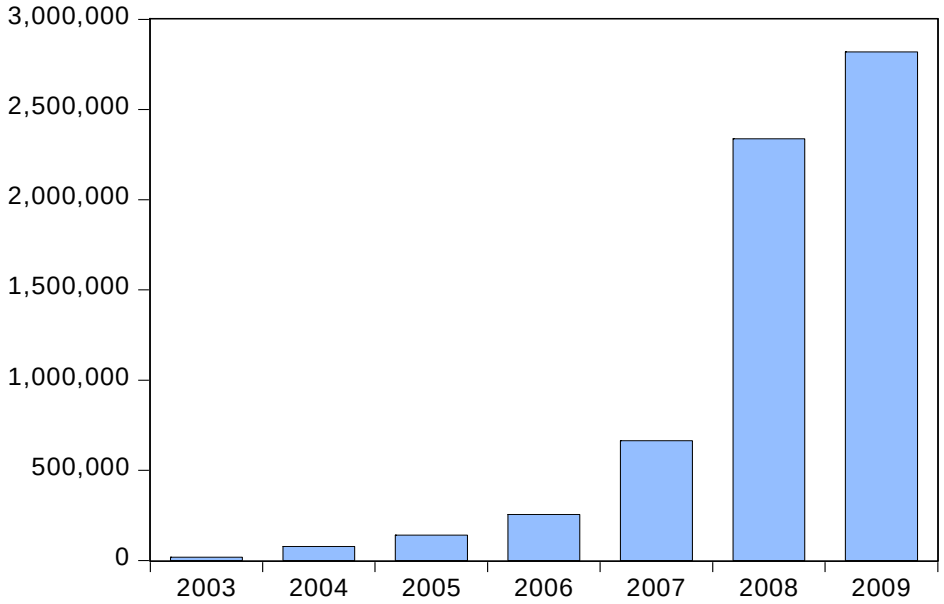
Executive Summary

This paper analyzes the probable employment impacts on other electricity generation sources as a result of increasing wind generation in Illinois. Key findings include:

- Over the last decade generation from wind, coal, and nuclear sources has increased in Illinois, indicating that employment in each of these areas has likely increased as well.
- Illinois is a net exporter of electricity and additional generation in the state does not necessarily cannibalize generation from other sources.
- New generation for wind creates the most jobs followed by coal and natural gas generation, respectively.

Figure 1 – Illinois Wind Generation (in MWh)



Source: EIA, Electric Power Annual 2009 – State Data Tables

Introduction

Wind energy development is said to bring many benefits. One of the more notable benefits is job creation. Most studies of wind farm development on the state level note the employment that accompanies it (see for example Loomis and Hinman, 2010). Some have expressed concern that development is not actually creating jobs, however, but simply displacing ones associated with other forms of electricity generation. Given the public policies and tax treatment the wind industry has received, skeptics are justified in expressing their doubt and a closer look at wind energy job creation in the larger context of employment for all forms of electric generation is in order.

This paper will analyze the growth in electric generation from wind in Illinois (see Figure 1) and its probable net employment impact for all forms of generation in the state. Ideally,

statistics would be kept regarding employment numbers for differing forms of generation, but no such records are maintained, at least for the state of Illinois. Fortunately, there are other ways of exploring the issue and those methods will be utilized here.

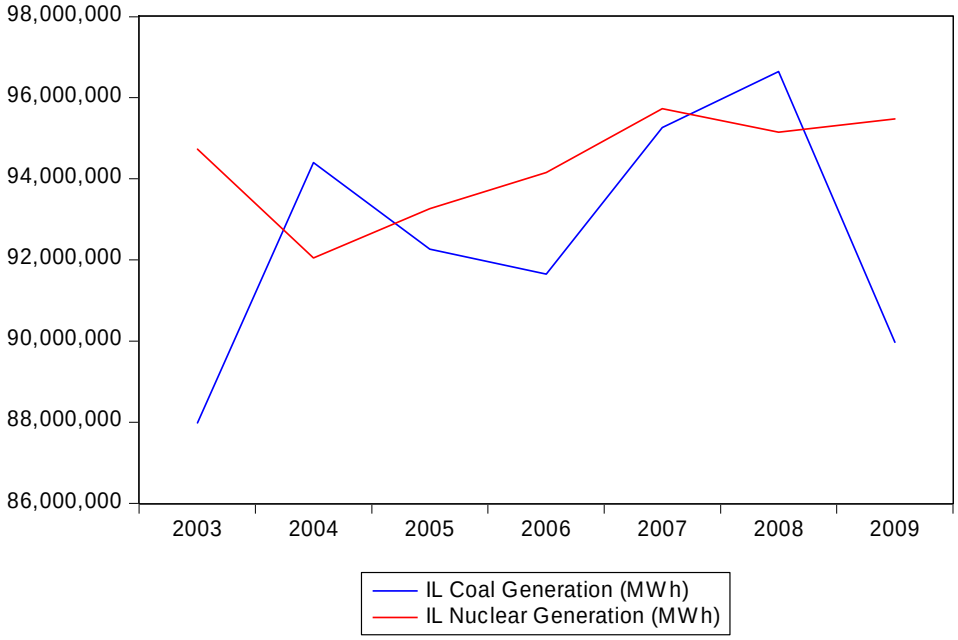
First, the paper will examine if Illinois has witnessed displacement of generation sources in favor of wind generation, which would imply job displacement also. Then we will turn our attention to whether additional generation is needed in the state. The final section will utilize models of economic development to examine what form of generation creates the most jobs.

Jobs & Generation Displacement

The supposition that jobs on wind farms are displacing jobs at other generation plants implies that electricity generated from wind is replacing electricity from other sources. If this were true, generation from other sources would be decreasing. This is not the case in Illinois.

Illinois receives most of its electricity from nuclear and coal plants. While wind installation was dramatically increasing over the last decade, generation from these sources trended upward also. Figure 2 shows total generation in megawatt-hours for nuclear and coal plants in Illinois over the last decade. Two conclusions can be reached from the graph. The first is that employment more than likely increased or stayed the same at coal and nuclear generation sites over this period, as the overall trend in generation from these sources is upward. If in fact this is not the case and employment decreased, the second conclusion is that it was not because of wind displacement, but was due to another factor such as technological change or increasing productivity.

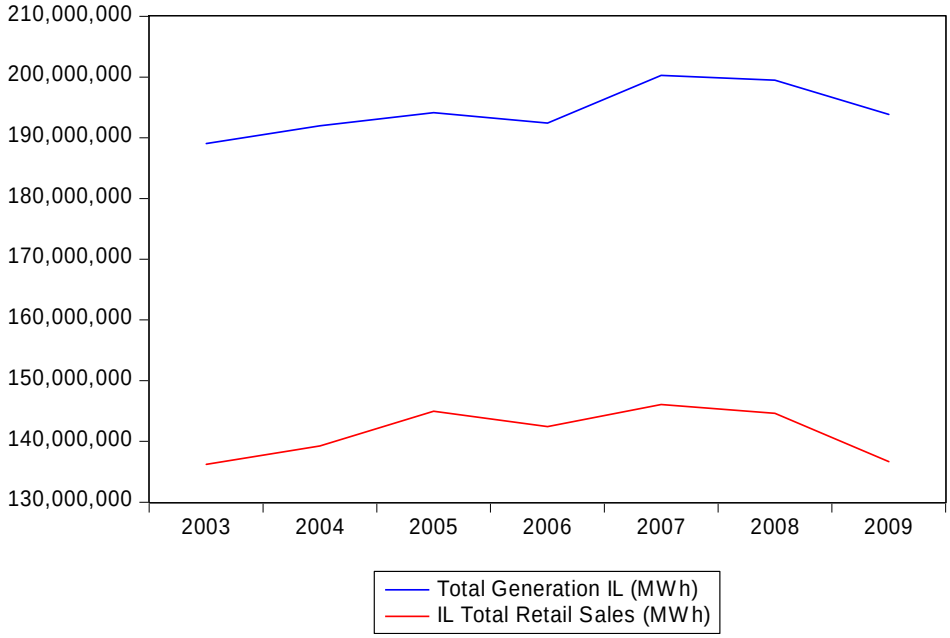
Figure 2 – Coal and Nuclear Electricity Generation in Illinois



Source: EIA, Electric Power Annual 2009 – State Data Tables

If wind is not displacing other generation sources (and hence jobs), what is the overall demand picture for electricity? Does Illinois even need more generation? Figure 3 shows the total amount of generation and the total amount of electric sales to end users for the state over the 2000-2009 time period. Its implications will be discussed in the next section.

Figure 3 – Electricity Generation and Retail Sales for Illinois



Source: EIA, Electric Power Annual 2009 – State Data Tables

Demand for Electricity Generated in Illinois

Both electricity sales and generation have trended slightly upward over the last decade, but generation has been significantly larger than intra-state sales over this period. This would seem to indicate that additional generation is not necessary. This is a faulty conclusion, however, for three reasons.

First, Illinois is an exporter of electricity to other states, which largely accounts for the difference between generation and intra-state sales in Figure 3. Second, the average coal plant in Illinois' fleet is substantially past its typically accepted useful life, and there is uncertainty surrounding some of the fleet's ability to continue to operate economically. Finally, most of the electricity currently generated in Illinois comes from coal and nuclear plants. Additional generation sources are needed to diversify our state's generation portfolio.

Looking at retail sales solely for Illinois to assess the demand for electricity generated in the state is unnecessarily narrow. Generators in Illinois are members of transmission networks and sell their power in wholesale markets, which allows it to go to other states. This, along with increasing demand for electricity in Illinois, explains how generation from coal, wind, and nuclear sources has trended upward over the last decade.

Additionally, more generation is needed because of the age of many coal plants that Illinois relies on. The average age of an Illinois coal plant is 42 years old (see Graph 1 in the appendix for the distribution of age for the coal fleet). The estimated useful life of a coal plant is approximately 30 years. As long as these plants are able to continue operating safely, this is not much of an issue. What is problematic, though, are that older plants tend to pollute more. Arguments about the merits of reducing pollution aside, most of these plants continue to be economical to operate solely because they were grandfathered in and are not responsible to meet many environmental standards (see discussion in Environmental Law & Policy Center, 2001). With ever increasing environmental standards from the EPA and the possibility of a cap and trade legislation on carbon dioxide being passed, many of these plants are one piece of legislation away from being shut down.

It should come as no surprise, then, that Illinois would be wise to diversify its generation portfolio (Hickey, Carlson, and Loomis, 2010). Our state currently relies on two sources, coal and nuclear power, to meet the great majority of its energy needs. Illinois ratepayers are unduly exposed to cost increases due to legislation or an unforeseen event raising the cost of business for these generation types.

Job Creation by Generation Source

Since additional generation in Illinois is beneficial, what type of generation results in the most jobs being created? For help answering this question we have turned to the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) models for natural gas and coal generation, in addition to a report assessing job creation from wind development in Illinois (Loomis and Hinman, 2010).[1]

The JEDI models are input/output models tailored to be state specific and are derived from industry norms. After entering the specifics of new generation construction, the models return estimates of direct and indirect job creation, tax revenue changes, property value and other impacts. Even though the models estimate induced job impacts, this paper only considers direct employment effects.[2]

Table 1 shows the results from the JEDI models and the Loomis and Hinman report (2010) for the effective capacity of 100 MW wind, coal, and natural gas installations, respectively. Wind creates the most direct jobs in both construction and operation phases in total and per MW of generation. So, if Illinois wants to add 100 MW of effective capacity, wind would be the clear choice from a job creation perspective.

[1] Nuclear generation is not considered because the NREL does not make a JEDI model for this type of generation.
[2] Induced job impacts are employment effects from additional money in the local economy and increased employment down the supply chain. Direct employment effects are jobs created in constructing and operating the generation resource.

Table 1 – Jobs Created per 100 MW of Effective Capacity[3]

	Effective Capacity	Total Jobs Construction Phase	Total Jobs Operation Phase	Construction Jobs per MW	Operational Jobs per MW
Wind*	100 MW	1473	110	4.91	.37
Coal[+]	100 MW	447	12	3.78	.10
Natural Gas[+]	100 MW	177	8	1.14	.05

**Source: Loomis and Hinman (2010)*

[+]Source: NREL's Coal and Natural Gas JEDI Models

Conclusion

In consideration of these facts, it is certain that the development of wind resources in Illinois has created jobs in the state. The major sources of generation have continued to expand capacity as installation of wind resources has increased. As coal plants age and electric demand increases, more generation will be necessary. Wind development provides the most jobs of the various generation sources and helps to diversify Illinois' generation portfolio.

[3] Effective capacity is the nameplate capacity times the capacity factor. Nameplate capacity considered here for wind, coal, and natural gas generation is 300 MW, 118 MW, and 154 MW, respectively. The capacity factor for wind, coal, and natural gas generation is 33%, 85%, and 65%, respectively. Capacity factor assumptions for coal and natural gas generation are the default values for the NREL's JEDI Models. The capacity factor for wind generation comes from Loomis and Hinman (2010).

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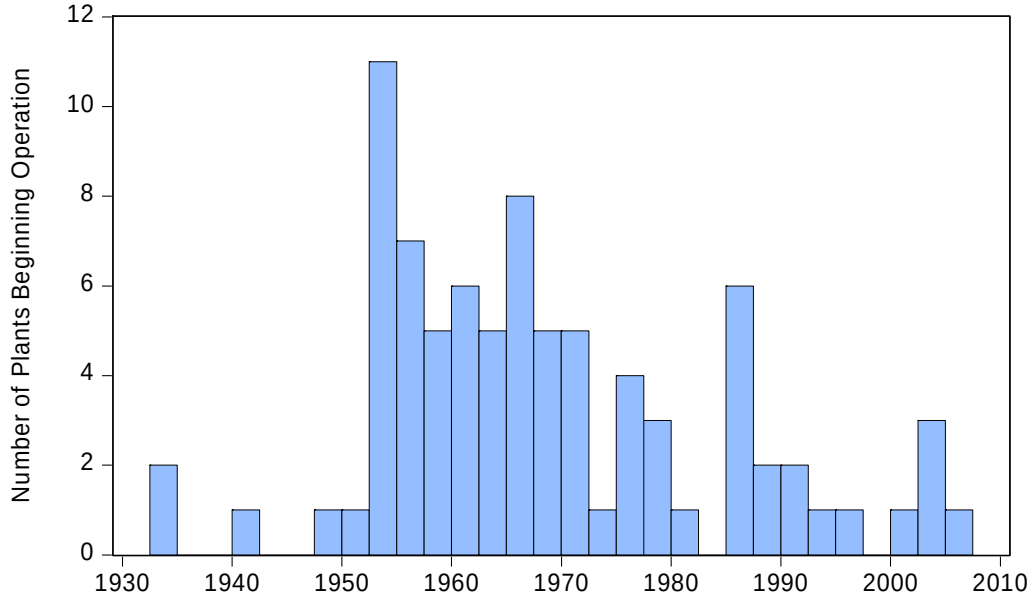
Appendix

Graph 1 – Coal Plants Operating in Illinois (Distributed by Initial Year of Operation)



Source: EIA, Electric Power Annual 2009 – State Data Tables