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Not-so-smart ALEC: Inside the attacks on renewable energy

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Renewable energy is clean, sustainable, non-polluting, reduces our dependence on fossil fuels, improves the health of communities surrounding power plants, and protects the natural environment. Who could be against it?

Answer: The American Legislative Exchange Council (ALEC), a lobbying group that is active in drafting and advocating controversial state legislation on many issues.[1] When it comes to energy, ALEC wants to speed up the permitting process for mines, oil and gas wells, and power plants – and to eliminate all state requirements for the use of renewable energy. The latter goal is packaged as the "Electricity Freedom Act." ALEC uses studies by the Beacon Hill Institute (BHI) at Suffolk University in Boston to claim that the "Electricity Freedom Act" will free ratepayers from the allegedly immense costs and job losses said to come from renewable energy standards.

A look inside the ALEC energy reports[2] reveals numerous flaws, both in energy calculations and in economic analysis. This memo summarizes what's wrong on both counts, and concludes with talking points for responses to the ALEC anti-renewable energy studies.

What ALEC "knows" about energy

Issued with great fanfare by an unmistakably partisan group, the ALEC studies have not been reviewed by independent researchers. Close your eyes and imagine every accusation that opponents of renewable energy might make, if no one were checking their facts. Now open your eyes and look at one of the ALEC state renewable energy studies. Did you imagine all of the following?

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[1] American Legislative Exchange Council, http://www.alec.org.

[2] The Beacon Hill Institute, frequently with an in-state co-sponsor, has published studies regarding the economic impact of renewable portfolio standards in a number of states, including Colorado, Delaware, Kansas, Maine, Michigan, Minnesota, Missouri, Montana, New Mexico, North Carolina, Ohio, and Oregon, as well as study on the United States economy. The studies are listed in the appendix, and are referenced with their state abbreviation, e.g. ALEC-KS. This report is based on a detailed review of ALEC-CO, ALEC-MI, and ALEC-KS, as well as a brief examination of the other studies listed in the appendix.

ALEC's Claim:

The costs of renewable energy are huge and rising. To estimate a range of renewable energy costs, ALEC takes the carefully developed, conservative estimates of wind and solar power costs from the Energy Information Agency (EIA) as the low end of the scale. Arbitrary, unsupported numbers far above the EIA level are used as the high end, so their "mid case," between the two extremes, is well above real costs. Moreover, ALEC assumes that wind turbine construction costs will rise over time as demand increases, because turbine parts will become more expensive.

The Facts:

Wind power is a bargain. Many credible sources project that wind power costs will be as low as, or even lower than, the EIA estimates, including the engineering firm Black & Veatch,[3] financial advisors Lazard Ltd.,[4] the California Energy Commission,[5] and Lawrence Berkeley National Laboratories (LBNL).[6] A study from LBNL tracks the prices of actual wind power contracts over time, as shown in Figure 1 (next page); in that figure, the size of each circle indicates the size of the contract. We have extended the graph upward to include the ALEC estimates for 2010 on the same scale.[7]

As Figure 1 demonstrates, actual prices have averaged less than $60/MWh for many years. Prices are often lower than the national average in the windiest states, while higher in other states, especially California. ALEC's low estimate, however, is above actual contract prices, even in California. ALEC's low, mid, and high estimates for wind power costs in 2010 are roughly 2, 3, and 4.5 times higher than the national average for wind power contracts in that year.

Despite ALEC's imagined rising price of renewable energy, the actual trend is clearly downward, in both wind and solar photovoltaic costs.[8]

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[3] Ryan Pletka, *Black & Veatch's (RETI's) Cost of Generation Calculator*, Black & Veatch (2011), http://www.energy.ca.gov/2011_energypolicy/documents/2011-05-16_workshop/presentations/Ryan_Pletka_B&V.pdf.

[4] Lazard Ltd., *Levelized Cost of Energy Analysis, Version 5.0*, (2011).

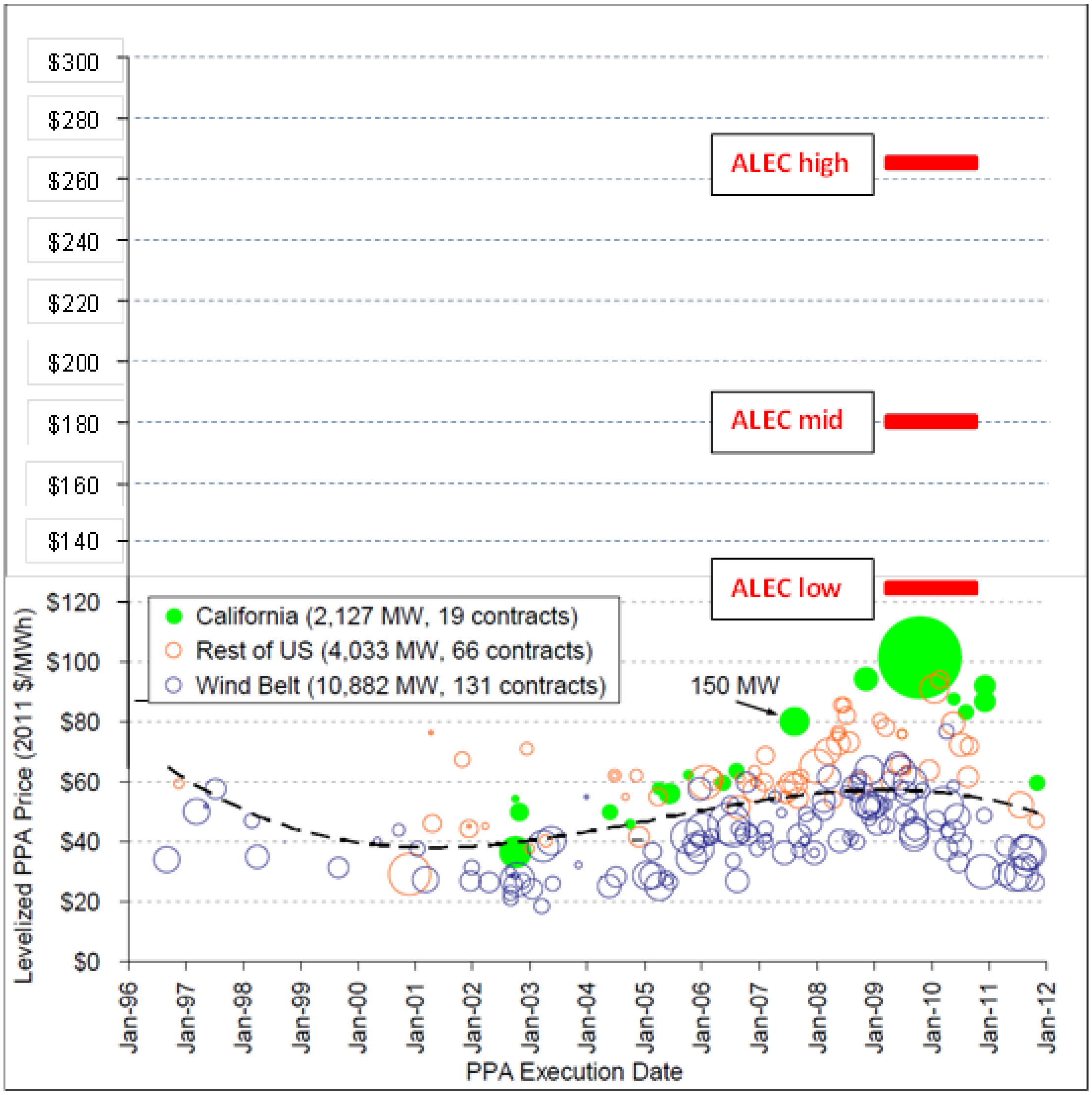
[5] California Energy Commission, *Comparative Costs of California Central Station Electricity Generation: Final Staff Report*, (2010), CEC-200-2009-07SF.

[6] Wiser, et al., *2011 Wind Energy Technologies Report*, prepared for the US Department of Energy, (2012), http://www1.eere.energy.gov/wind/pdfs/2011_wind_technologies_market_report.pdf.

[7] Since the other estimates in Figure 1 include a $22/MWh Production Tax Credit, we have decreased ALEC's $201/MWh mid-range estimate to $179/MWh, and similarly for the high and low estimates, for comparability.

[8] On trends in wind power costs, see the US Department of Energy's *2011 Wind Technologies Market Report*, cited above (note 6); on trends in photovoltaic installed costs, see the Solar Energy Industries Association's *Solar Energy Facts: Q3 2012*, (2012), http://www.seia.org/sites/default/files/2012%20SMI%20Q3%20Factsheet_Final5.pdf.

Figure 1. Wind Contract Price Analysis



(Data for actual contracts by Lawrence Berkeley National Laboratory; ALEC estimates added by Synapse)

ALEC's Claim:

Renewable energy is so unpredictable that it can't be relied on; conventional backup generation capacity is always required. In the words of ALEC's Kansas study, "Wind is not only intermittent but its variation is unpredictable, making it impossible to dispatch to the grid with any certainty. This unique aspect of wind power argues for a capacity factor rating of close to zero."[9] The ALEC studies assume that

[9] ALEC-KS, page 6.

new, conventional capacity must be built and run whenever wind power is used, adding to the estimated expense of renewable energy.

The Facts:

Wind generation is highly predictable, and is relied on by electric utilities. System operators rely on highly accurate near-term weather forecasts. They track local weather patterns closely as they move across the country, and this makes wind generation in a given area quite predictable over a several-hour time frame. Furthermore, as more wind farms are built in a region, their collective generation behaves in an even more predictable manner.[10]

There is a broad consensus across utilities and system planners that wind can be relied on for significant load-carrying capacity throughout the country, without causing extraordinary expenses. There are 11 states in which 7% or more of electricity generation is already from wind; every one of these states has electric rates below the national average.[11]

It is not necessary to build new conventional capacity to back up every renewable energy resource. Many parts of the country have surplus capacity at present, and will not need to build new plants for years to come.[12]

ALEC's Claim:

Enormous new transmission costs are required for renewable energy. ALEC estimates huge costs for transmitting electricity from new renewables to customers. The average cost used in their studies, about $60/MWh, makes new transmission about as expensive as power generation itself, while their high-end transmission cost is twice the cost of generation![13]

The Facts:

New transmission accounts for just a small fraction of the cost of renewable energy. Once again, the ALEC numbers are nowhere near what other researchers find. In fact, one study cited by ALEC states that transmission costs have "a median of $15/MWh." Nonetheless, the ALEC studies use a mid-case estimate four times that expensive.

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[10] K. Orwig et al., *Economic Evaluation of Short-Term Wind Power Forecasts in ERCOT: Preliminary Results*, Conference Paper NREL/CP-5500-56257, (2012), http://www.nrel.gov/docs/fy12osti/56257.pdf.

[11] The states are Colorado, Idaho, Iowa, Kansas, Minnesota, North Dakota, Oklahoma, Oregon, South Dakota, Texas, and Wyoming. Wind generation and total generation data for first 10 months of 2012, and average retail electric rates for all sectors for 2011, from EIA, *Electric Power Monthly*, downloaded January 2, 2013.

[12] Of the 17 NERC assessment areas in the contiguous United States, 12 have surplus capacity beyond 2021, and another 2 do not need any capacity additions to come online until 2021. NERC, *2011 Long-Term Reliability Assessment*, (2011), p. 5. http://www.nerc.com/files/2011LTRA_Final.pdf.

[13] The study, Andrew Mills et al., *The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies*, (2009), http://eetd.lbl.gov/ea/emp/reports/lbnl-1471e.pdf states that "In terms of cost per megawatt-hour of wind power generation, the aggregate range of transmission costs is from $0/MWh to $79/MWh, with a median of $15/MWh and most studies falling below $25/MWh". (p xi).

ALEC's Claim:

Renewable energy leads to rapidly rising electricity costs per customer. Projected impacts per customer are exaggerated by ALEC's unusual approach to forecasting the likely future demand for electricity. In their Colorado study, for example, they forecast that electricity demand will grow 3.6% each year, while the number of customers stays the same.[14] In essence, they assume that each family's and each business' demand for electricity – and the impacts of rising electricity prices – will grow by 3.6% each year.[15]

The Facts:

Costs per customer will rise more slowly, if at all. ALEC not only exaggerates costs per kWh of renewable electricity; they exaggerate the growth in electricity use. Figure 2 (next page) compares nine ALEC forecasts[16] of electricity demand growth through 2025 with comparable forecasts from the EIA's *Annual Energy Outlook* (AEO) – the federal government report that is widely taken as a standard source of near-term energy projections. AEO offers electricity use projections for nine regions of the contiguous United States. The lowest, median, and highest of these regional projections are shown by the blue lines on the graph. We looked at nine ALEC state studies, and included the highest, median, and lowest of their forecasts, shown in the red lines on the graph. (In fact, four of the nine, including the Colorado study, forecast identical rates of growth, shown by the "ALEC max" line on the graph.) The lowest of the ALEC studies roughly matches the AEO median forecast. The median, let alone maximum, ALEC forecasts are far above the AEO range.

Other forecasts are typically well below the ALEC levels. In Colorado, for example, the largest utility in the state and the Department of Energy forecast 1% annual growth in electricity demand, similar to the AEO median forecast.[17]

Having inflated the costs per MWh of renewable energy, in other words, ALEC compounds this error by also inflating the quantity of electricity that will be required in the near future. Moreover, the inflated demand estimates make it appear unrealistically difficult to reduce dependence on coal and other non-renewable energy sources.

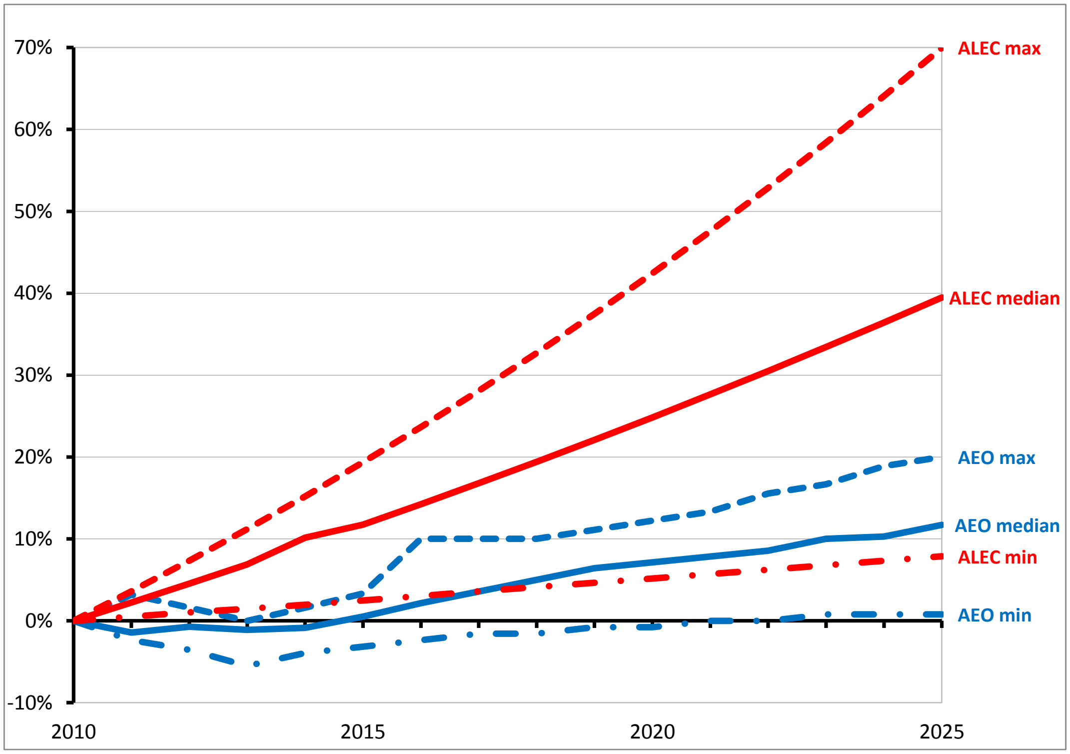
[14] ALEC-CO, p. 15.

[15] A different approach shows up in the ALEC study for Michigan. That state has an explicit cap on cost increases resulting from its renewables standard, but the ALEC study admits that it ignores that cap in order to model the "full impact" of the standard. Thus they are modeling a different, more expensive standard than the one Michigan actually adopted. ALEC-MI, p. 3.

[16] From the ALEC renewable energy studies of Delaware, Maine, Michigan, Minnesota, Missouri, Montana, New Mexico, Ohio, and Oregon.

[17] Public Service Company of Colorado, *2011 Electric Resource Plan, Volume I* (2011); EIA, *Annual Energy Outlook 2013 Early Release*, (2012) Table 2: Energy Consumption by Sector and Source, Electric Power Sector, Mountain Region, Delivered Electricity for All Regions.

Figure 2. Forecasts of Electricity Demand Growth



ALEC's Claim:

Traditional, non-renewable energy is incredibly cheap. A scattering of other questionable assumptions have the effect of biasing results in favor of non-renewable energy. Some (not all) of the ALEC studies estimate the cost of electricity natural gas-fired power plants at mere pennies per MWh.[18] In other cases, land requirements for wind power are said to be enormous, while a nuclear power plant is absurdly said to fit on less than an eighth of an acre of land.[19]

The Facts:

ALEC studies appear to make simple errors on these points. Their ultra-low gas-fired power costs may result from mistaking dollars for cents in standard data sources.[20] Their land requirements for wind power versus nuclear power represent a misreading of a study that reported wind power needs less than 500 times as much land per MW as nuclear power; BHI erroneously cites this study as finding that wind power needs 1,000,000 times as much land.[21]

[18] ALEC-OR Table 4; ALEC-NM, ALEC-MN, ALEC-KS Table 5; ALEC-MT Table 6; ALEC-ME Table 7; ALEC-US Table 8. The title of each of these Tables is "LEC and Capacity Factors for Electricity Generation Technologies."

[19] ALEC-CO, p. 14: "a wind power plant would need a land mass of 20 by 25 kilometers to produce the same energy as a nuclear power plant that can be situated on 500 square meters."

[20] This is our inference, based on the fact that some of their studies report gas power costs two orders of magnitude lower than others.

[21] See ALEC-CO, p.14. Even the underlying study, correctly cited, may overstate land requirements for wind power.

What ALEC "knows" about economics

ALEC estimates the economic impacts of renewable energy standards (and many other policies) using the STAMP model. The STAMP model is not well-known; based on web searches, it does not appear to have been used or described in any academic publications, and does not appear to have been used by anyone outside of BHI, the institute where it was developed. In some case, STAMP estimates job losses when other better-known models project job gains. For example, when STAMP was used to examine the job impacts of a combined $1 billion tax increase and $1 billion government spending increase in Arizona, it estimated a net loss of about 9,000 jobs, while models using standard economic methods projected a net gain of about 8,000 jobs.[22]

Why does the STAMP model so often find that new policies will cause job losses? There are at least three ways in which it goes wrong:

If everyone's employed, there are no jobs to be gained. STAMP is a "computable general equilibrium" (CGE) model, a type of economic model that is often used to examine impacts of policy changes. Like many, though not all, CGE models, STAMP assumes that everyone who wants a job has one (economists call this "full employment"). This strange assumption greatly simplifies the model's calculations, and it may not be too far from the truth at times of very high employment, such as the late 1990s. Under today's economic conditions, however, the full employment assumption misses reality by a mile. In the world according to STAMP, the auto industry bailout of 2009 – or any other stimulus measure – couldn't possibly save any jobs, because no one who wants a job is ever out of work. So why not save taxpayers' money by letting the auto companies fend for themselves?

Viewing public policy from this perspective, STAMP compares every proposed policy to an imaginary world of full employment. If you think you're starting from the top of the mountain, there's nowhere to go but down. In general, any model that assumes automatic full employment is irrelevant to real-world concerns about job creation at a time when unemployment is a pressing problem.

Some people just won't work if they have to pay taxes. Since full employment is allegedly automatic, how can STAMP estimate any job losses? For an answer, look closely at the definition of full employment above: full employment means that *everyone who wants a job* has a job. STAMP assumes that people make their decisions about whether or not to work based on after-tax wage rates: the higher the after-tax wage, the more people want to work. Higher taxes reduce after-tax wages, so fewer people choose to work; that is the primary mechanism driving STAMP's job losses. Note that this simplistic story ignores the new public sector jobs created when the government spends the increased tax revenues; STAMP assumes very little government job creation in general, as discussed below.

In STAMP, higher income taxes lead directly to lower after-tax wages and fewer people choosing to work, causing a "job loss." The same result occurs more circuitously for other taxes and policies. In the

[22] Alberta Charney, "Comparison of UA [University of Arizona], REMI, and STAMP Simulations of Tax/Spending Increases," (2010), http://ebr.eller.arizona.edu/research/articles/2010/compare_ua_remi_stamp_simulations.asp.

ALEC studies, higher electricity rates are modeled as if they were a sales tax: since every business uses electricity, any increase in rates will be passed on to consumers, raising prices throughout the economy – much like a sales tax.[23] That is, higher electricity rates, like a sales tax, will raise the prices of goods, reducing the demand for goods and therefore reducing the demand for labor. With lower demand for labor, wages fall, leading fewer people to choose to work. (Again, this ignores the new jobs funded by the increase in taxes or electricity rates.) Despite this job loss, there is still "full employment" of those who choose to continue working at the lower wage level, but it is a smaller number of workers.

After-tax wage rates also affect the number of people who live in the study area. If taxes (or electric rates) are low and employment is high, more people will choose to migrate into the area – and will immediately get jobs in the automatic-full-employment world of STAMP. Conversely, if taxes (or electric rates) are high, and employment is lower, and migration into the area will slow or even reverse, reducing population growth and hence decreasing the number of people with jobs. This makes the job loss picture even worse.

In short, STAMP assumes that full employment always reigns and no new workers can be hired – except by cutting taxes or electric rates. Finicky workers need low taxes and low electric rates to persuade them to step forward and accept those automatically available jobs; they tend to quit whenever their take-home pay drops. The only job losses in STAMP-world occur when burdensome taxes or electric rates make some workers choose to stay home – or migrate elsewhere.

Arbitrary judgments are used where data are not available, boosting estimates of job losses. CGE models in general, and STAMP in particular, require numerous estimates of the responses of different sectors of the economy to changes in prices and taxes. Data on such responses are spotty in some areas and non-existent in others. Inevitably, a model of this type ends up relying on the modelers' judgments to fill in the holes in the data.

The evaluation of STAMP results for Arizona, cited above, found that STAMP makes numerous undocumented or partially documented judgments that boost its estimates of job losses.[24] The model assumes that more government funding has only limited effect on public sector employment, estimating unrealistically few government jobs per million dollars of government spending. It also assumes extreme responses of state economies to local price changes or sales tax (or electric rate) increases. In STAMP-world, a state that dares to raise taxes (or electric rates) loses jobs to other states much more rapidly than in other models.

[23] See, e.g., the ALEC-CO study, p. 21.
[24] Charney, op. cit. (note 22).

The bottom line

In energy, ALEC offers a densely woven fabric of factual errors, concealing the true costs of renewable energy beyond recognition. They imagine implausibly high-priced renewables and rapidly rising demand, making it a foregone conclusion that renewable energy standards look hopelessly expensive. In the real world, renewables are much cheaper than ALEC suggests, and their costs are falling steadily, while demand is growing quite slowly.

In economics, ALEC relies on a fable about how markets might function: workers can always find jobs, but sometimes decline them if taxes or electric rates are too high. They ignore the real-world processes of job gains and losses, while assuming hypersensitivity to taxes and electric rates. By a process of arbitrary assumption, ALEC has created a model in which tax cuts are always the right policy option, while involuntary unemployment is impossible by definition. They are as far from reality in economics as in energy.

ALEC vs. renewable energy: Talking points

These points are a summary of the analysis in the preceding pages; see that analysis for support and documentation.

ALEC claims the costs of renewable energy are huge and rising; the facts are that wind power is a bargain.

ALEC's estimates of wind power costs are 2-4 times higher than actual wind power contract prices. Renewable energy costs are heading down, not up, over time.

ALEC claims renewable energy is so unpredictable that it can't be relied on; the facts are that wind generation is highly predictable, affordable, and relied on by utilities in many states.

Weather forecasts allow utilities to make accurate near-term predictions of wind generation. The spread of wind power makes its collective behavior even more predictable. The states with the highest levels of wind generation today all have electric rates below the national average.

ALEC claims enormous new transmission costs are required for renewable energy; the facts are that costs are far lower.

One national survey of the evidence found median transmission costs to be one-fourth of ALEC's estimates.

ALEC claims costs per customer are rising rapidly; the facts are that ALEC projects unusually fast growth of electricity demand.

National studies and utility estimates project much slower growth of electricity use than ALEC.

ALEC's economic model assumes that everyone who wants to work can find a job.

This makes for a nice abstract model, but bears little resemblance to the real world with millions of people unable to find work.

ALEC assumes that people stop wanting to work whenever taxes – or electric rates – go up.

Fewer people supposedly choose to work – and some even leave the area – whenever taxes or the cost of living increases; this strange assumption is the main cause of "job loss" in their economic model.

ALEC's economic model predicts job losses when standard economic models predict gains.

A study in Arizona found that ALEC's model underestimated jobs created by government spending, and therefore predicted net job losses from a job-creating stimulus program.

Appendix: The ALEC Energy Studies

ALEC-CO: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of Colorado's Renewable Portfolio Standard*, Beacon Hill Institute and American Tradition Institute (2011).

ALEC-DE: David G. Tuerck, Paul Bachman, Michael Head, *The Cost and Economic Impact of Delaware's Renewable Portfolio Standard*, Caesar Rodney Institute and American Tradition Institute (2011).

ALEC-KS: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of the Kansas Renewable Portfolio Standard*, Beacon Hill Institute and Kansas Policy Institute (2012).

ALEC-ME: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of Maine's Renewable Portfolio Standard*, Beacon Hill Institute and Maine Heritage Policy Center (2012).

ALEC-MI: David G. Tuerck, Paul Bachman, Michael Head, *The Projected Economic Impact of Proposal 3 and Michigan's Renewable Energy Standard*, Beacon Hill Institute and Mackinac Center for Public Policy (2012).

ALEC-MN: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of Minnesota's Renewable Portfolio Standard*, Beacon Hill Institute and Minnesota Free Market Institute (2011).

ALEC-MO: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of Missouri's Renewable Energy Standard*, Beacon Hill Institute (2012).

ALEC-MT: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of Montana's Renewable Portfolio Standard*, Montana Policy Institute and American Tradition Institute (2011).

ALEC-NM: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of New Mexico's Renewable Portfolio Standard*, Rio Grande Foundation and American Tradition Institute (2011).

ALEC-NC: David G. Tuerck, Paul Bachman, Michael Head, *The Economic Impact of North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard*, Beacon Hill Institute (2011).

ALEC-OH: David G. Tuerck, Paul Bachman, Michael Head, *The Cost and Economic Impact of Ohio's Alternative Energy Portfolio Standard*, Beacon Hill Institute and American Tradition Institute (2011).

ALEC-OR: David G. Tuerck, Paul Bachman, Michael Head, *Economic Impact of Oregon's Renewable Portfolio Standard*, Beacon Hill Institute and Cascade Policy Institute (2011).

ALEC-US: David G. Tuerck, Paul Bachman, Michael Head, *The Effects of Federal Renewable Portfolio Standard Legislation on the U.S. Economy*, Beacon Hill Institute and American Tradition Institute (2011).